# EPA FIBER PROJECT: SUBCHRONIC INHALATION EXPOSURE OF RATS TO AMPHIBOLE ASBESTOS

## (18 MONTHS POST-EXPOSURE)

THE HAMNER INSTITUTES FOR
HEALTH SCIENCES PROTOCOL NO. 10026

EPL PROJECT NO.: 304-466
EPL PATHDATA NO. 90188

FINAL PATHOLOGY REPORT

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August 30, 2013

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## BACKGROUND

The vermiculite mine near Libby, Montana was the world's leading source of vermiculite for 70 years until its closure in 1990. Vermiculite is used for insulation, as an absorbent material, and as a soil conditioner, and has applications in the construction, agricultural, horticultural and industrial markets. However, the Libby vermiculite ore coexists with a complex array of amphibole mineral types, primarily winchite, richterite, tremolite, and magnesioriebeckite with crystal forms (habits) ranging from asbestiform to acicular/prismatic.

Occupational exposure to Libby vermiculite has been (and continues to be) associated with significant increases in asbestosis, lung cancer, and pleural cancer compared to the rest of the U.S. population. For example, in addition to elevated rates of lung cancer and mesothelioma among Libby residents, 17.8% of 6,668 persons who lived or worked in the Libby area for at least 6 months before 1991 show (upon medical testing) pleural abnormalities (calcifications, thickenings, or plaques).

Furthermore, exposures to individuals outside of Libby have occurred, and are likely continuing; as asbestos-contaminated vermiculite ore from Libby was shipped to hundreds of locations around the nation for processing, and used as attic insulation in millions of homes throughout the United States. The health effects associated with former and current exposures from the asbestos contaminated vermiculite from the Libby mine continues to be a subject of intensive study and public health concern.

## OBJECTIVE

The overall goal of this research is to improve the scientific basis for the risk assessment of asbestos-contaminated communities by conducting toxicology studies to help define key determinants of internal dose and provide critical insight on additional key health or pathologic endpoints. These types of toxicology studies can only be done in animals and to date, rodent inhalation studies have not been conducted with the amphibole asbestos that contaminates vermiculite from Libby, Montana (Libby amphibole or LA).

The specific aims of the study are to determine the biological potency of inhaled Libby amphibole (LA) fibers over the near-life span of the rat compared to the potency of inhaled amosite, a known fibrogenic amphibole asbestos fiber, and to develop fiber burden data to use in a dosimetry model of amphibole fiber deposition, clearance, and retention in the respiratory tract (head, trachea, lung lobes), pleura and lymph nodes.

## INTRODUCTION

This Hamner Institutes for Health Sciences Study 10026 was conducted in male F344 rats. The in-life portion of this study consists of a 90-day inhalation exposure (65 exposures), 6 hours/day, 5 days per week, followed by necropsy time points at 1-Day, 1-Month, 3-Months and 18-Months after the last exposure day. The 1-Day, 1-Month, and 3-Months timepoints have already been reported (Willson and Wall, 2013).

Male F344 (CDF) rats were procured and housed a minimum of 10 days before commencing nose-only inhalation exposures. At the beginning of the inhalation exposures, the rats were about 10 weeks of age (about 200 grams). The rats were exposed in nose-only exposure tubes, to the LA2007 material, spanning a 10-fold concentration range, at low, medium, and high concentrations (1.0, 3.3, and 10.0 $mg/m^3$), or a UICC amosite sample as a positive control fiber at 3.3 $mg/m^3$, for 6 hr/day, 5 days/week, for 13 consecutive weeks (no exposure weekends). Rats exposed to filtered air served as the negative control.

Rats were necropsied at approximately 18 months after the end of the 13-week exposure (Table 1). Groups 1 – 5 were added by EPL for data collection purposes.

The critical endpoints examined in this study are outlined in Table 2. Rats reserved specifically for fiber burden analysis are shown in rows labeled "Fiber #". At each time point, 3 control rats and 6 amosite- or LA-exposed rats were necropsied and organs removed for the evaluation of clearance/biopersistence (via tissue fiber burden analysis). At the 1-day, 1-month, and 3-month time points, 8 other animals were necropsied, and bronchoalveolar lavage (BAL) fluid and blood were taken, and lungs, parietal pleura, and other organs were taken for histopathology. The BAL and lung histopathology were carried out in the same animal by tying off the left lung lobe and lavaging the right lung lobes, then removing the left lung lobe for histopathology. At the final (~18 month) necropsy, BAL was conducted on 8 of the surviving animals from the scheduled group of 50. The rest of the 50 rats assigned for final necropsy, including those with unscheduled early deaths, were reserved for histopathology only, and also for blood samples at final scheduled necropsy. To facilitate exposure and necropsy scheduling, animals were assigned to necropsy groups (Table 3). Table 4 details the animal numbers assigned to each dose group and exposure level for histopathology/BAL evaluations.

The study design is shown in Table 1 below:

**Table 1. Study Design**

| Group Nos. | Test Material | Concentration ($mg/m^3$) | 18-Months |
|---|---|---|---|
| 1 | Air Control | 0.0 | 53 |
| 2 | Amosite | 3.3 | 56 |
| 3 | LA | 1.0 | 56 |
| 4 | LA | 3.3 | 56 |
| 5 | LA | 10.0 | 56 |

**Table 2. Critical Endpoints**

| Group Numbers | Test Material | Exposure Level Conc. ($mg/m^3$) | End Point | No. of Rats |
|---|---|---|---|---|
| | | | | 18-Month |
| 1 | Air Control | 0 | Fiber #* | 3 |
| | | | BAL** | 8 |
| | | | Histopath | 50 |
| 2 | Amosite | 3.3 | Fiber #* | 6 |
| | | | BAL** | 8 |
| | | | Histopath | 50 |
| 3 | LA | 1.0 | Fiber #* | 6 |
| | | | BAL** | 8 |
| | | | Histopath | 50 |
| 4 | LA | 3.3 | Fiber #* | 6 |
| | | | BAL** | 8 |
| | | | Histopath | 50 |
| 5 | LA | 10.0 | Fiber #* | 6 |
| | | | BAL** | 8 |
| | | | Histopath | 50 |

*Only fiber analysis is conducted on animals listed in "Fiber #" rows.

**BAL (Bronchoalveolar Lavage) is conducted on same set of animals as histopath; but only on 8 from each group of 50 at the final necropsy.

**Table 3. Necropsy Group Assignment**

| Necropsy Group # | Description | Number of Animals |
|---|---|---|
| 10 | 18-Months Post-exposure Period, Histopath /BAL (10 animals per dose group) | 50 |
| 11 | 18-Months Post-exposure Period, Histopath /BAL (10 animals per dose group) | 50 |
| 12 | 18-Months Post-exposure Period, Histopath /BAL (10 animals per dose group) | 50 |
| 13 | 18-Months Post-exposure Period, Histopath /BAL (10 animals per dose group) | 50 |
| 14 | 18-Months Post-exposure Period, Histopath /BAL (10 animals per dose group) | 50 |
| 15 | 18-Months Post-exposure Period, Fiber Burden - Control, Amosite, and LA Low Dose Animals | 15 |
| 16 | 18-Months Post-exposure Period, Fiber Burden - LA Mid and LA High Dose Animals | 12 |

**Table 4. Dose Group, Exposure Level, End Point, Sentinel Animals and Animal Identification Number**

| Dose Group | Exposure Level Conc. ($mg/m^3$) | End Point | Animal ID Numbers* | Sentinel Animals |
|---|---|---|---|---|
| | | | 18-Month | |
| Air Control | 0 | Histopath / BAL | 137-186 | 1-4 |
| Amosite | 3.3 | Histopath / BAL | 249-298 | 5-8 |
| LA | 1.0 | Histopath / BAL | 307, 319, 321, 349-395**, 397 | 9-12 |
| LA | 3.3 | Histopath / BAL | 419, 420, 423, 449-494***, 496 | 13-16 |
| LA | 10.0 | Histopath / BAL | 520, 549-597 | 17-20 |

* Per study protocol amendment #5, early mortality or moribundity caused reassignment of animals (within the same exposure group) for the 18-month time point with emphasis placed on maintaining 6 animals per group for fiber burden analysis. Animals 396, 398, 495, 497, 498, and 598 were reassigned to the fiber burden groups due to early deaths/moribundity of animals 319, 321, 419, 420, 423, and 520, who were reassigned to the histopathology/BAL groups. Animal #304 was reassigned to the 1-month necropsy fiber burden group, and animal #307 was reassigned to the 18-month histopathology/BAL group due to early moribundity of animal #364.

**Animal #364 was euthanized moribund during the 13-week inhalation exposure regimen.

***Animal #478 was found dead; too cannibalized and tissues too autolyzed for histopathology.

**HISTOPATHOLOGY PROCEDURES**

Necropsies were performed at The Hamner Institutes. Animals to be euthanized were deeply anesthetized with sodium pentobarbital (intraperitoneal injection, approximately 50 mg/kg) followed by additional injections, if necessary, but not exceeding the euthanasia dose of 200 mg/kg and exsanguinated by transection of the abdominal aorta.

For those animals reaching terminal sacrifice, 8 animals from each dose group had the right lungs lavaged for BAL cells, the remaining, (up to 42 animals), had left and right lung lobes collected for histopathology. For animals assigned to histopathology and BAL evaluation, the left lung was ligated and the right lung lobes were lavaged with a total of 15 ml phosphate-buffered saline (PBS) five times with approximately 3 ml each time. BAL cells were isolated and the total number of cells enumerated.

Once the right lung lobes were collected the ligature on the left lung lobe was removed. The trachea and left lung lobe were fixed *in situ* with 10% neutral buffered formalin (NBF) at approximately 30 cm of NBF pressure. The tissues of animals that had left and right lung lobes collected were fixed in the same manner. The nasal cavities were flushed with NBF. The head was removed, skinned, trimmed of excess tissue, and stored in NBF for approximately 3 days. The heads were then rinsed in running tap water, decalcified, and re-rinsed in water.

Cross sectional blocks of the nasal cavity were prepared (6 levels) and embedded in paraffin wax. The left lung lobe, trachea, sternum (including pleura), and relevant gross organ/tissue lesions were fixed with NBF for 48 hours, rinsed, and stored in 70% ethanol, embedded in paraffin wax, sectioned (approximately 5 micrometers), deparaffinized, and stained with H&E. An additional set of slides from the lungs, trachea, and sternum were stained with a collagen specific stain (Masson-Goldner's trichrome stain). Testes and epididymis were collected at necropsy, stored in fixative, and one section from the left testis and left epididymis evaluated histologically. A histological section was prepared from all tissues for which there was a gross observation made. Preparation of histological slides and microscopic examinations was performed by Experimental Pathology Laboratories, Inc. (EPL®) Durham, NC.

Hematoxylin and eosin stained microscopic slides of left lung, trachea, sternum, testis and epididymis and any additional gross lesions were evaluated via light

microscopy by an EPL pathologist and selected findings from the left lung are presented in the Results section. Trichrome stained microscopic slides of the left lungs, trachea, and sternum were evaluated by light microscopy by an EPL pathologist and the results incorporated into the histological assessment of these tissues.

During the light microscopic examination histopathologic diagnoses were recorded. Microscopic findings were graded using a subjective grading scale (1=minimal, 2=slight/mild, 3=moderate, 4=moderately severe, 5=severe). Mean severity grades for a finding are calculated by summing the severity grades in a group and dividing by the total number examined in the group. Some findings not suitable for grading were recorded as present (P). Gross findings at necropsy were correlated with histological findings when possible.

All lesions are summarized by treatment group and are presented in the Summary Tables. A tabulation of gross lesions observed at the time of necropsy or during gross trimming, along with corresponding microscopic findings, if any, is provided in the Macro/Micro Correlation Table. Animals with no visible lesions at necropsy are not included in this table. The Table of Individual Microscopic Findings (Animal Organ Finding Table; AOFT) are presented in Appendix B, along with the Summary and Macro/Micro Correlation tables.

## RESULTS

Unless otherwise indicated, microscopic findings were diagnosed according to Pathology of the Fischer Rat (Boorman et al., 1990).

### Cause of Death

Cause of Death (Appendix A) and Summary of Cause of Death Table 5: there was an increased incidence of mononuclear cell leukemia (MCL) in the LA 10 group (n=7; 14%) as compared to the control group (n=3; 6%). MCL was the main cause of death in the early death animals in all groups other than the LA 3.3 group. However, the historical control data for the incidence of MCL is 36% for male Fischer rats (NTP, 2011). There were a number of animals with a squamous cell carcinoma of the oral cavity as the primary cause of death in all groups other than the LA 10 group. The incidence of oral squamous cell carcinoma in control animals (n=2; 4%) was higher than that found in the National Toxicology Program (NTP) historical controls (0.4%) for male Fischer rats.

The incidences of oral mucosa squamous cell carcinoma in the fiber exposure groups were n=3 (6%), n=4 (8%), n=1 (2%), and n=0 (0%) for the amosite 3.3, LA 1.0, LA 3.3, and LA 10 mg/m$^3$ groups, respectively. The other causes of death were responsible for only one or two animal deaths per exposure group (Table 5), an incidence of ≤ 4%. Except for MCL where the highest incidence in a fiber exposure group was below the historical control data, there did not appear to be a relationship between fiber exposure and cause of death.

**Table 5. Summary of Incidence of Cause of Death of Moribund Sacrifice or Early Death Animals (Group size n=50)**

| | Control | Amosite 3.3 mg/m$^3$ | Libby amphibole 1.0 mg/m$^3$ | Libby amphibole 3.3 mg/m$^3$ | Libby amphibole 10.0 mg/m$^3$ |
|---|---|---|---|---|---|
| # of Early Deaths | **10** | **10** | **19** | **9** | **12** |
| Mononuclear cell leukemia | 3 | 5 | 5 | 1 | 7 |
| Oral mucosa squamous cell carcinoma | 2 | 3 | 4 | 1 | 0 |
| Pituitary adenoma | 2 | 1 | 2 | 1 | 0 |
| Peritoneal Mesothelioma | 0 | 0 | 2 | 1 | 0 |
| Nephropathy | 0 | 0 | 1 | 0 | 2 |
| Undetermined | 0 | 1 | 1 | 1 | 0 |
| Preputial gland carcinoma | 0 | 0 | 0 | 2 | 0 |
| Osteosarcoma | 1 | 0 | 1 | 0 | 0 |
| Salivary gland carcinoma | 1 | 0 | 0 | 0 | 0 |
| Subcutis fibroma | 1 | 0 | 0 | 0 | 0 |
| Mesentery schwannoma | 0 | 0 | 1 | 0 | 0 |
| Thyroid follicular cell carcinoma | 0 | 0 | 1 | 1 | 0 |
| Lung alveolar bronchiolar carcinoma | 0 | 0 | 0 | 0 | 1 |
| Mammary fibroadenoma | 0 | 0 | 0 | 0 | 1 |
| Meningioma | 0 | 0 | 0 | 0 | 1 |
| Adrenal cortex carcinoma | 0 | 0 | 0 | 1 | 0 |
| Subcutis Sarcoma | 0 | 0 | 1 | 0 | 0 |

Gross and Microscopic correlations were performed and are detailed in the Correlation of Gross and Microscopic Findings Tables (Appendix B).

A variety of histopathologic changes was observed in both control and treated animals. Other than in the lung for the most part these changes were typical of the spontaneous type of microscopic pathology that may be observed for this age and strain of rat.

All eight animals diagnosed with mesothelioma had tumors in the epididymides and testes. In five animals it had spread to other organs in the abdomen [e.g. mesentery, body cavity, adipose tissue, spleen, lymph node and liver] (Table 6). Mesothelioma was not detected in the thoracic cavity of any rats. The distribution and morphology of mesotheliomas were characteristic of spontaneous neoplasms at these sites in the Fischer rat. These tumors are thought to originate in the tunica vaginalis.

**Table 6. Sites of Mesothelioma Occurrence in Animals Diagnosed with Peritoneal Mesotheliomas**

| Animal number | Testes | Epididymides | Mesentery | Spleen | Lymph node | Body cavity | Adipose tissue | Liver |
|---|---|---|---|---|---|---|---|---|
| 138 | P | P | - | - | - | - | - | - |
| 186 | P | P | - | - | - | - | - | - |
| 357 | P | P | - | - | - | - | - | - |
| 363 | P | P | P | - | P | P | - | - |
| 383 | P | P | - | P | - | P | - | - |
| 451 | P | P | P | - | - | P | P | - |
| 471 | P | P | - | -- | - | P | - | P |
| 554 | P | P | P | - | - | P | - | - |

P = Mesothelioma diagnosed in this tissue/site

A summary of selected histological findings in the left lungs at 18-Months post-exposure is given in Table 7. Tables 8, 9 and 10 illustrate the histological findings seen in the trachea, left epididymis and left testes. Other histological findings are in the Summary Tables, Tables of Individual Microscopic Findings, and Macro/Micro Correlation Tables in Appendix B.

**Table 7. 18 month Post-exposure Summary of Incidence and Severity [ ] of Selected Findings in the Left Lung**

| | Control | Amosite 3.3 mg/m$^3$ | Libby amphibole 1.0 mg/m$^3$ | Libby amphibole 3.3 mg/m$^3$ | Libby amphibole 10.0 mg/m$^3$ |
|---|---|---|---|---|---|
| Number of animals per group | 50 | 50 | 50 | 49 | 50 |
| Alveolus Inflammation | 0 | 45 [1.0] | 40 [0.9 ] | 47 [1.1] | 48 [1.1] |
| Interstitial Fibrosis | 0 | 42 [0.8] | 29 [0.6] | 43 [0.9] | 42 [0.9] |
| Pleural fibrosis | 0 | 25 [0.5] | 16 [0.3] | 19[0.4] | 22 [0.4] |
| Foreign Body* | 0 | 47 | 40 | 48 | 49 |
| Bronchiolization | 0 | 5 [0.1] | 5 [0.1] | 0 | 0 |
| Alveolar epithelium hyperplasia | 1 [0.04] | 9 [0.3] | 6 [0.2] | 6 [0.2] | 6 [0.3] |
| Alveolar bronchiolar adenoma* | 0 | 2 | 0 | 2 | 2 |
| Alveolar bronchiolar carcinoma* | 0 | 0 | 0 | 0 | 1 |
| Mononuclear cell leukemia* | 6 | 8 | 8 | 5 | 8 |

[ ] = Mean Severity Grade for the group is calculated by dividing the total of severity grades for a finding/lesion in a group by the number of that tissue examined in that group.
*Not graded

Lung

Air Control

The histopathological findings in the left lung of control rats were typical of the spontaneous type of microscopic pathology that may be observed for this age and strain of rat. Mononuclear cell leukemia (MCL) was evident in six animals. This was characterized by an infiltration of neoplastic mononuclear cells in the interstitium of the lung. One animal had mild alveolar epithelial hyperplasia. This finding is characterized by a proliferation of cuboidal type II alveolar cells without evidence of significant inflammation or macrophage infiltration as seen in more common spontaneous subpleural lesions.

Amosite 3.3 mg/$m^3$

Minimal to mild alveolus inflammation was evident in the left lung in most animals from this exposure group. Alveolus inflammation was characterized by an infiltration of macrophages, lymphocytes and occasional neutrophils in alveoli and alveolar ducts resulting in a concomitant increase in the thickness of the alveolar and alveolar duct walls. A constituent of this process was occasional granulomas which are aggregates of macrophages with rare giant cells. This inflammation was associated with the presence of amosite fibers in alveolar macrophages. Minimal interstitial fibrosis was evident in most animals from this exposure group. Interstitial fibrosis was characterized by fibroblasts and collagen deposition in alveolar walls and within granulomas. The diagnosis of fibrosis was reinforced by positive staining with Masson's trichrome. Fibrosis was evident along alveolar walls frequently increasingly evident at branchpoints into alveolar sacs. Foreign body was diagnosed when amosite fibers were evident in sections. Amosite fibers were evident in most animals in the left lung from this exposure group. These were mostly contained in macrophages, some of which were completely engulfed, while others were partially engulfed; syncytial giant cells were occasionally evident. Amosite fibers were seen within alveolar macrophages and also within cells in the interstitium. Fibers were frequently seen in a subpleural location. Twenty-five animals (50%) had focal pleural fibrosis which in all but one animal was minimal. Pleural fibrosis was characterized by fibroblasts and collagen deposition in the pleura resulting in a focal area of thickening. The diagnosis of fibrosis was reinforced by positive staining with Masson's trichrome. In a few animals (five) minimal bronchiolization was diagnosed. Bronchiolization was characterized by the appearance of cells that resemble bronchiolar epithelial cells at locations distal to the terminal bronchioles and thus occurring in alveolar ducts and adjacent alveoli. The presence of cilia was a helpful diagnostic criterion.

Nine animals had minimal to moderate alveolar epithelium hyperplasia (see Air Control for lesion descriptions) and there were two animals with a finding of alveolar bronchiolar adenoma. Alveolar bronchiolar adenoma was characterized by a distinct mass that may cause compression of adjacent lung parenchyma. There is a proliferation of simple cuboidal or columnar cells distorting the alveolar architecture. The epithelium of this benign neoplasm is uniform with little pleomorphism or atypia. Eight

animals had MCL characterized by an infiltration of neoplastic mononuclear cells in the interstitium of the lung.

Libby amphibole 1.0 mg/m$^3$

Minimal to mild alveolus inflammation, minimal interstitial fibrosis, and foreign body (Libby amphibole fiber) were evident in the left lung of most animals from this treatment group. In a few animals (five) minimal bronchiolization was diagnosed.

Six animals had alveolar epithelium hyperplasia (five minimal and one moderate), sixteen animals had minimal pleural fibrosis and there were no pulmonary neoplasms diagnosed. Eight animals had MCL. See Air Control and Amosite 3.3 mg/m$^3$ for lesion descriptions.

Libby amphibole 3.3 mg/m$^3$

Minimal to mild alveolus inflammation, minimal to mild interstitial fibrosis, and foreign body (Libby amphibole fiber) were evident in the left lung of most animals from this exposure group. Six animals had alveolar epithelium hyperplasia (three minimal, one mild, one moderate, and one moderately severe), nineteen animals had minimal pleural fibrosis and there were two alveolar bronchiolar adenomas present. Five animals had MCL. See Air Control and Amosite 3.3 mg/m$^3$ for lesion descriptions.

Libby amphibole 10.0 mg/m$^3$

Minimal to mild alveolus inflammation, minimal to mild interstitial fibrosis, and foreign body (Libby amphibole fiber) were evident in in the left lung of most animals from this treatment group. Six animals had alveolar epithelium hyperplasia (one minimal, one mild, three moderate, and one moderately severe), twenty two animals had minimal pleural fibrosis and there were two animals with a finding of alveolar bronchiolar adenoma and one animal with an alveolar bronchiolar carcinoma. Alveolar bronchiolar carcinoma frequently present as masses which are often not well circumscribed and the normal alveolar architecture is obliterated. The epithelium may be multilayered or growing in solid clusters. The cells frequently exhibit anaplasia. Eight animals had MCL.

See Air Control and Amosite 3.3 mg/m$^3$ for other lesion descriptions. The histological findings in the lung are slightly more severe in this exposure group compared to the amosite and the other LA exposure groups.

**Table 8. 18 month Post Exposure Summary of Incidence and Severity of Selected Findings in the Trachea**

| | Control | Amosite 3.3 mg/m$^3$ | Libby amphibole 1.0 mg/m$^3$ | Libby amphibole 3.3 mg/m$^3$ | Libby amphibole 10.0 mg/m$^3$ |
|---|---|---|---|---|---|
| No. Examined | 50 | 50 | 49 | 49 | 50 |
| NAD | 50 | 49 | 45 | 47 | 41 |
| **Squamous Metaplasia** | - | 1 | - | - | - |
| Grade 1 | - | 1 | - | - | - |
| **Chronic Inflammation** | - | - | 4 | 2 | 9 |
| Grade 1 | - | - | 3 | 1 | 9 |
| Grade 2 | - | - | 1 | 1 | - |

NAD = Nothing abnormal discovered

Trachea

There were a few observations of minimal to mild chronic inflammation in each of the groups exposed to LA which indicates an exposure related effect. This was characterized by an infiltration of mononuclear cells in the submucosa of the trachea. One amosite animal had a focus of squamous metaplasia of the tracheal epithelium which was characterized by replacement of the respiratory epithelium by squamous epithelial cells.

Sternum

There were only two observations made for sternum which were blood vessel arteritis in one animal (LA 10.0) and MCL in one animal (Amosite 3.3). These lesions were considered unrelated to exposure and were characterized by an aggregation of perivascular inflammatory cells.

Left Epididymis and Left Testis

The findings in the left epididymis (Table 8) and left testis (Table 9) were typical for this strain of rat. In general, the incidence and severity of these findings in the fiber-exposed groups was similar to the air control.

In the epididymis, a few mesotheliomas were evident on the serosa. Hypospermia was routinely diagnosed which is characterized by a reduction in sperm in the epididymal tubules.

In the testis, interstitial cell adenomas were commonly diagnosed. A few animals had interstitial cell hyperplasia. Atrophy of the seminiferous tubules and edema were also regularly diagnosed. A few mesotheliomas were evident on the serosal surface of the testis.

**Table 9. 18 month Post Exposure Summary of Incidence and Severity of Selected Findings in the Left Epididymis**

| | Control | Amosite 3.3 mg/m$^3$ | Libby amphibole 1.0 mg/m$^3$ | Libby amphibole 3.3 mg/m$^3$ | Libby amphibole 10.0 mg/m$^3$ |
|---|---|---|---|---|---|
| No. Examined | 49 | 50 | 50 | 49 | 50 |
| NAD | 18 | 14 | 21 | 22 | 24 |
| **Mesothelioma** | 2 | - | 2 | 2 | 1 |
| **Hypospermia** | 28 | 36 | 27 | 25 | 26 |
| Grade 1 | 1 | - | - | - | - |
| Grade 2 | 3 | - | 6 | 4 | - |
| Grade 3 | 8 | 14 | 10 | 11 | 8 |
| Grade 4 | 15 | 22 | 11 | 10 | 18 |
| Grade 5 | 1 | - | - | - | - |
| **Sperm Granuloma** | 1 | - | - | - | - |
| Grade 3 | 1 | - | - | - | - |
| **Blood Vessels Arteritis** | - | - | 1 | - | - |
| Grade 2 | - | - | 1 | - | - |

NAD = Nothing abnormal discovered

**Table 10. 18 month Post Exposure Summary of Incidence and Severity of Selected Findings in the Left Testis**

| | Control | Amosite 3.3 mg/m$^3$ | Libby amphibole 1.0 mg/m$^3$ | Libby amphibole 3.3 mg/m$^3$ | Libby amphibole 10.0 mg/m$^3$ |
|---|---|---|---|---|---|
| No. Examined | 49 | 50 | 49 | 49 | 50 |
| NAD | 2 | 1 | 3 | 1 | 1 |
| **Interstitial Cell Adenoma** | 31 | 38 | 34 | 33 | 37 |
| **Mesothelioma** | 2 | - | 3 | 2 | - |
| **Tubular Atrophy** | 25 | 16 | 15 | 12 | 14 |
| Grade 1 | 10 | 5 | 2 | 7 | 10 |
| Grade 2 | 9 | 4 | 11 | 4 | 2 |
| Grade 3 | 2 | 2 | 1 | - | - |
| Grade 4 | 3 | 5 | 1 | 1 | 1 |
| Grade 5 | 1 | - | - | - | 1 |
| **Edema** | 13 | 6 | 4 | 8 | 8 |
| Grade 1 | 2 | 4 | 1 | 4 | 5 |
| Grade 2 | 10 | 2 | 2 | 4 | 3 |
| Grade 3 | 1 | - | 1 | - | - |
| **Interstitial Cell Hyperplasia** | - | 5 | 1 | 1 | 1 |
| Grade 1 | - | 3 | - | 1 | - |
| Grade 2 | - | 2 | - | - | - |
| Grade 3 | - | - | 1 | - | 1 |

NAD = Nothing abnormal discovered

## CONCLUSIONS

Exposure of rats to amosite and various levels of LA for three months with an 18 month recovery period did not have an effect on survival of animals. After 18 months recovery period, post exposure histopathological changes persisted in the lungs of rats exposed to various exposure levels of LA and amosite. Fibers, though scant, could be identified in the majority of the animals from each exposure group. The foreign materials persisted and continued to be sequestered in macrophages and sometimes syncytial giant cells were evident. Pulmonary neoplasms, although only evident in treated groups, are within the current historical control incidence for male Fischer 344 rats which is 2.48% (range 0-8%) for alveolar bronchiolar adenomas or 1.2% (range 0-6%) for alveolar bronchiolar carcinomas (NTP, 2011). A few animals in each of the LA groups had minimal

to mild chronic inflammation in the trachea which may indicate a treatment associated effect.

As in the earlier time points previously reported, the most intense response was seen in the lungs of rats exposed to LA 10.0 mg/m$^3$. In this group, there was a marginally increased incidence and severity of alveolus inflammation and the presence of foreign body in comparison to the other exposure groups. The incidence and severity of alveolus inflammation and interstitial fibrosis, and foreign body presence was similar in the amosite 3.3 mg/m$^3$ group and the LA 3.3 mg/m$^3$ group; the LA 1.0 mg/m$^3$ group had a reduced incidence and severity of these histological findings.

The incidences of MCL were greater in the amosite, LA 1.0 and LA 10.0 groups than in the control group for animals in the moribund/early death category. The observed incidences of MCL were well within the historical control data range for this strain of rat. However, the incidences of squamous cell carcinomas in the air-control, amosite 3.3, and LA 1.0 mg/m$^3$ groups were increased compared to historical control incidence. The significance of this finding is unclear. No pleural mesotheliomas were observed in any treatment groups, including the positive control group (Amosite 3.3 mg/m$^3$). In animals dying before the end of the study, squamous cell carcinomas of the oral mucosa occurred at a higher incidence rate in the amosite and LA 1.0 groups than in the control group.

Post-Exposure Temporal Observations

Comparison of left lung histology to earlier time points in all groups:

The histological findings after 1 day and 3 months post-exposure were alveolus inflammation, interstitial fibrosis, the presence of foreign body, and bronchiolization and in the LA 10 mg/m$^3$ group only, bronchiole epithelial hyperplasia. After 1 month post-exposure, the same findings were evident in all exposure groups as after 1 day post-exposure. After 3 months post-exposure, the same findings were evident as at the earlier sacrifices, other than the absence of bronchiole epithelial hyperplasia. Additionally, two rats from the LA 10 mg/m$^3$ group had alveolar epithelial hyperplasia: one after one day post-exposure and one after three months post-exposure.

The histological findings in the moribund sacrifice and terminal sacrifice animals can be summarized as follows: Alveolus inflammation, interstitial fibrosis, foreign body, and pleural fibrosis were features of lungs from all exposure groups. Bronchiolization was only present in a few rats. Alveolar epithelial hyperplasia was diagnosed in all exposure groups (also in one control). There were also alveolar bronchiolar adenomas diagnosed in Amosite 3.3 mg/m$^3$, LA 3.3 mg/m$^3$ and LA 10.0 mg/m$^3$ groups and a single alveolar bronchiolar carcinoma diagnosed in the LA 10.0 mg/m$^3$ exposure group.

GABRIELLE A. WILLSON, BVMS, Dip RC Path,
FRC Path, MRCVS
Pathologist

30 August 2013
Date

GAW/dc

## REFERENCES

Boorman GA, Eustis SL, Elwell MR, Montgomery CA and MacKenzie WF, eds. 1990. Pathology of the Fischer Rat. 1st ed. San Diego, CA. Academic Press.

National Toxicology Program. May, 2011. NTP Historical Controls Report, All Routes and Vehicles, F344/N Rats. http://ntp.niehs.nih.gov/?objectid=92E705C7-F1F6-975E-72D23026B1645EB9

Willson G, Wall H. March 6, 2013. Amended Final Report: EPA Fiber Project: Subchronic Inhalation Exposure of Rats to Amphibole Asbestos (1-Day Post-Exposure, 1-Month Post-Exposure, and 3-Months Post-Exposure).

# QUALITY ASSURANCE FINAL CERTIFICATION

# QUALITY ASSURANCE FINAL CERTIFICATION

Study Title: EPA Fiber Project: Subchronic Inhalation Exposure of Rats to Amphibole Asbestos - 18 Month timepoint

Client Study: Protocol No. 10026

EPL Principal Investigator: Dr. Gabrielle Willson

EPL Project Number: 304-466

EPL Pathologist: Dr. Gabrielle Willson

The following aspects of this study were inspected by the Quality Assurance Unit of Experimental Pathology Laboratories, Inc. Dates inspections were performed and findings reported to the EPL Principal Investigator and Management are indicated below.

| Area Inspected | Dates: Inspection | Dates: Reporting |
|---|---|---|
| EPL Project Sheets | Jan. 19, 2011; Feb. 3, 2011; May 17, 2011; Aug. 5, 2011; Aug. 16, 2011; May 29, 2012; Oct. 11, 2012; Oct. 24, 2012; Nov. 2, 2012; Dec. 12, 2012; Jan. 30, 2013 | Jan. 19, 2011; Feb. 3, 2011; May 17, 2011; Aug. 5, 2011; Aug. 16, 2011; May 29, 2012; Oct. 11, 2012; Oct. 24, 2012; Nov. 2, 2012; Dec. 12, 2012; Jan. 30, 2013 |
| Necropsy Records Review | Oct. 10, 2012; Nov. 6-7, 2012; Nov. 8, 2012; Nov. 12, 2012 | Oct. 10, 2012; Nov. 7, 2012; Nov. 8, 2012; Nov. 12, 2012 |
| Project Setup | May 26, 2011; Aug. 7, 2012; Aug. 20, 2011; Oct. 18, 2011; Oct. 22, 2012; Nov. 19, 2012; Nov. 28, 2012; Dec. 14, 2012; Jan. 16, 2013 | May 26, 2011; Aug. 7, 2012; Aug. 20, 2011; Oct. 18, 2011; Oct. 22, 2012; Nov. 19, 2012; Nov. 28, 2012; Dec. 14, 2012; Jan. 16, 2013 |
| Data Review | Oct. 12, 2012; Nov. 2, 2012; Nov. 19, 2012; Dec. 11, 2012; Jan. 11 & 14, 2013; Jan. 21-23, 2013; Feb. 1, 2013; Feb. 6, 2013 | Oct. 12, 2012; Nov. 2, 2012; Nov. 19, 2012; Dec. 11, 2012; Jan. 14, 2013; Jan. 21-23, 2013; Feb. 1, 2013; Feb. 6, 2013 |
| Draft Pathology Report | July 2, 3, 5, 8 & 9, 2013; July 17, 2013; July 29 &30, 2013; Aug. 16. 2013 | July 9, 2013; July 17, 2013; July 30, 2013; Aug. 16. 2013 |
| Final Pathology Report | August 30, 2013 | August 30, 2013 |

Date of last quarterly facility inspection: July 2013

Jane T Hollingsworth — August 30, 2013

EPL Quality Assurance Unit — Date

Jane T. Hollingsworth, AB, RQAP-GLP

# APPENDIX A – CAUSE OF DEATH/MORIBUND SACRIFICE OR FOUND DEAD

| Animal Number | Cause of Death/Moribund Sacrifice or Found Dead |
|---|---|
| **Group 1 (Air Control)** | |
| 145 | Mononuclear Cell Leukemia |
| 152 | Oral Mucosa Squamous Cell Carcinoma |
| 154 | Pituitary Gland, Pars Distalis Adenoma |
| 157 | Pituitary Gland, Pars Distalis Adenoma |
| 169 | Salivary Gland Carcinoma |
| 170 | Subcutis Fibroma |
| 176 | Mononuclear Cell Leukemia |
| 177 | Mononuclear Cell Leukemia |
| 183 | Oral Mucosa Squamous Cell Carcinoma |
| 184 | Spine Osteosarcoma |
| **Group 2 (Amosite 3.3 mg/m$^3$)** | |
| 252 | Pituitary Gland, Pars Distalis Adenoma |
| 256 | Oral Mucosa Squamous Cell Carcinoma |
| 265 | Oral Mucosa Squamous Cell Carcinoma |
| 271 | Mononuclear Cell Leukemia |
| 272 | Mononuclear Cell Leukemia |
| 273 | Undetermined |
| 288 | Oral Mucosa Squamous Cell Carcinoma |
| 292 | Mononuclear Cell Leukemia |
| 295 | Mononuclear Cell Leukemia |
| 297 | Mononuclear Cell Leukemia |
| **Group 3 (LA 1.0 mg/m$^3$)** | |
| | |
| 319 | Mesentery Schwannoma |
| 321 | Pituitary Gland, Pars Distalis Adenoma |
| 349 | Thyroid, Follicular Cell Carcinoma |
| 354 | Undetermined |
| 355 | Oral Mucosa Squamous Cell Carcinoma |
| 357 | Mesothelioma |
| 359 | Oral Mucosa Squamous Cell Carcinoma |
| 367 | Mononuclear Cell Leukemia |
| 371 | Mononuclear Cell Leukemia |

| Animal Number | Cause of Death/Moribund Sacrifice or Found Dead |
|---|---|
| **Group 3 (LA 1.0 mg/m$^3$) cont'd.** | |
| 373 | Oral Mucosa Squamous Cell Carcinoma |
| 374 | Mononuclear Cell Leukemia |
| 379 | Oral Mucosa Squamous Cell Carcinoma |
| 382 | Subcutis Sarcoma |
| 383 | Mesothelioma |
| 386 | Mononuclear Cell Leukemia |
| 387 | Pituitary Gland, Pars Distalis Adenoma |
| 390 | Osteosarcoma Eye Socket |
| 391 | Nephropathy |
| 397 | Mononuclear Cell Leukemia |
| **Group 4 (LA 3.3 mg/m$^3$)** | |
| 419 | Preputial Gland Carcinoma |
| 420 | Preputial Gland Carcinoma |
| 451 | Mononuclear Cell Leukemia |
| 462 | Pituitary Gland, Pars Distalis Adenoma |
| 469 | Adrenal Cortex Carcinoma |
| 470 | Thyroid Follicular Cell Carcinoma |
| 471 | Mesothelioma |
| 473 | Oral Mucosa Squamous Cell Carcinoma |
| 478 | Undetermined due to cannibalism and severe tissue autolysis |
| **Group 5 (LA 10.0 mg/m$^3$)** | |
| 520 | Mononuclear Cell Leukemia |
| 549 | Alveolar Bronchiolar Carcinoma |
| 552 | Mononuclear Cell Leukemia |
| 563 | Mononuclear Cell Leukemia |
| 567 | Meningioma |
| 568 | Mononuclear Cell Leukemia |
| 569 | Mammary Fibroadenoma |
| 574 | Mononuclear Cell Leukemia |
| 578 | Mononuclear Cell Leukemia |
| 582 | Mononuclear Cell Leukemia |
| 590 | Nephropathy |
| 595 | Nephropathy |

# APPENDIX B – 18-MONTHS POST-EXPOSURE

SUMMARY TABLE

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
Necropsy Status: TERMINAL SACRIFICE GROUP (K0), Incl. Deaths

| Sex | Males | | | | |
|---|---|---|---|---|---|
| Dose Group | 1 | 2 | 3 | 4 | 5 |
| No. Animals per Dose Group | 50 | 50 | 50 | 49 | 50 |
| LUNG, LEFT No.Examined | 50 | 50 | 49 | 49 | 50 |
| NAD | 23 | - | 1 | - | - |
| - Chronic Inflammation | 13 | - | - | - | 3 |
| Grade 1 | 12 | - | - | - | 3 |
| Grade 2 | 1 | - | - | - | - |
| - Mononuclear Cell Leukemia | 6 | 8 | 8 | 5 | 8 |
| - Alveolar Epithelium Hyperplasia | 1 | 9 | 6 | 6 | 6 |
| Grade 1 | - | 6 | 5 | 3 | 1 |
| Grade 2 | 1 | 2 | - | 1 | 1 |
| Grade 3 | - | 1 | 1 | 1 | 3 |
| Grade 4 | - | - | - | 1 | 1 |
| - Intravascular Neutrophils | 2 | - | - | - | 1 |
| Grade 2 | 1 | - | - | - | - |
| Grade 3 | 1 | - | - | - | - |
| Grade 4 | - | - | - | - | 1 |
| - Infiltration Mixed Cell | 2 | - | 1 | - | - |
| Grade 1 | 1 | - | - | - | - |
| Grade 2 | 1 | - | 1 | - | - |
| - Pheochromocytoma | 1 | - | - | - | - |
| - Foreign Body | - | 47 | 40 | 48 | 49 |
| - Alveolus Inflammation | - | 45 | 40 | 47 | 48 |
| Grade 1 | - | 42 | 37 | 39 | 40 |
| Grade 2 | - | 3 | 3 | 8 | 8 |
| - Interstitial Fibrosis | - | 42 | 29 | 43 | 42 |
| Grade 1 | - | 42 | 29 | 41 | 39 |
| Grade 2 | - | - | - | 2 | 3 |
| - Bronchiolization | - | 5 | 5 | - | - |
| Grade 1 | - | 5 | 5 | - | - |
| - Alveolar Bronchiolar Hyperplasia | - | - | - | - | 1 |
| Grade 2 | - | - | - | - | 1 |
| - Alveolar Bronchiolar Adenoma | - | 2 | - | 2 | 2 |
| - Congestion | 2 | 1 | - | - | 1 |
| Grade 2 | 1 | - | - | - | - |
| Grade 3 | 1 | 1 | - | - | 1 |
| - Osteosarcoma | 1 | - | 1 | - | - |
| - Infiltrate Mixed Cell Focal | - | - | - | 1 | - |
| Grade 1 | - | - | - | 1 | - |
| - Pigmented Histiocytes | - | - | - | 1 | - |
| Grade 1 | - | - | - | 1 | - |
| - Alveolar Bronchiolar Carcinoma | - | - | - | - | 1 |

NAD = Nothing abnormal discovered
Group 1, AIR CONTROL, males: AMPHIBOLE ASBESTOS (0 mg/mg3)
Group 2, AMOSITE, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 3, LA, males: AMPHIBOLE ASBESTOS (1 mg/mg3)
Group 4, LA, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 5, LA, males: AMPHIBOLE ASBESTOS (10 mg/mg3)

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
Necropsy Status: TERMINAL SACRIFICE GROUP (K0), Incl. Deaths

| Sex | | Males | | | | |
|---|---|---|---|---|---|---|
| Dose Group | | 1 | 2 | 3 | 4 | 5 |
| No. Animals per Dose Group | | 50 | 50 | 50 | 49 | 50 |
| LUNG, LEFT | cont.d | 50 | 50 | 49 | 49 | 50 |
| - Pleura Fibrosis | | - | 25 | 16 | 19 | 22 |
| | Grade 1 | - | 24 | 16 | 19 | 22 |
| | Grade 2 | - | 1 | - | - | - |
| TRACHEA | No.Examined | 50 | 50 | 49 | 49 | 50 |
| | NAD | 50 | 49 | 45 | 47 | 41 |
| - Squamous Metaplasia | | - | 1 | - | - | - |
| | Grade 1 | - | 1 | - | - | - |
| - Chronic Inflammation | | - | - | 4 | 2 | 9 |
| | Grade 1 | - | - | 3 | 1 | 9 |
| | Grade 2 | - | - | 1 | 1 | - |
| EPIDIDYMIS, LEFT | No.Examined | 49 | 50 | 50 | 49 | 50 |
| | NAD | 18 | 14 | 21 | 22 | 24 |
| - Mesothelioma | | 2 | - | 2 | 2 | 1 |
| - Hypospermia | | 28 | 36 | 27 | 25 | 26 |
| | Grade 1 | 1 | - | - | - | - |
| | Grade 2 | 3 | - | 6 | 4 | - |
| | Grade 3 | 8 | 14 | 10 | 11 | 8 |
| | Grade 4 | 15 | 22 | 11 | 10 | 18 |
| | Grade 5 | 1 | - | - | - | - |
| - Sperm Granuloma | | 1 | - | - | - | - |
| | Grade 3 | 1 | - | - | - | - |
| - Blood Vessels Arteritis | | - | - | 1 | - | - |
| | Grade 2 | - | - | 1 | - | - |
| TESTIS, LEFT | No.Examined | 49 | 50 | 49 | 49 | 50 |
| | NAD | 2 | 1 | 3 | 1 | 1 |
| - Interstitial Cell Adenoma | | 31 | 38 | 34 | 33 | 37 |
| - Mesothelioma | | 2 | - | 3 | 2 | - |
| - Tubular Atrophy | | 25 | 16 | 15 | 12 | 14 |
| | Grade 1 | 10 | 5 | 2 | 7 | 10 |
| | Grade 2 | 9 | 4 | 11 | 4 | 2 |
| | Grade 3 | 2 | 2 | 1 | - | - |
| | Grade 4 | 3 | 5 | 1 | 1 | 1 |
| | Grade 5 | 1 | - | - | - | 1 |
| - Edema | | 13 | 6 | 4 | 8 | 8 |
| | Grade 1 | 2 | 4 | 1 | 4 | 5 |
| | Grade 2 | 10 | 2 | 2 | 4 | 3 |
| | Grade 3 | 1 | - | 1 | - | - |
| - Interstitial Cell Hyperplasia | | - | 5 | 1 | 1 | 1 |
| | Grade 1 | - | 3 | - | 1 | - |
| | Grade 2 | - | 2 | - | - | - |
| | Grade 3 | - | - | 1 | - | 1 |

NAD = Nothing abnormal discovered
Group 1, AIR CONTROL, males: AMPHIBOLE ASBESTOS (0 mg/mg3)
Group 2, AMOSITE, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 3, LA, males: AMPHIBOLE ASBESTOS (1 mg/mg3)
Group 4, LA, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 5, LA, males: AMPHIBOLE ASBESTOS (10 mg/mg3)

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
Necropsy Status: TERMINAL SACRIFICE GROUP (K0), Incl. Deaths

| Sex | | Males | | | | |
|---|---|---|---|---|---|---|
| Dose Group | | 1 | 2 | 3 | 4 | 5 |
| No. Animals per Dose Group | | 50 | 50 | 50 | 49 | 50 |
| STERNUM | No.Examined | 50 | 50 | 50 | 48 | 50 |
| | NAD | 50 | 49 | 50 | 48 | 49 |
| - Blood Vessel Arteritis | | - | - | - | - | 1 |
| | Grade 3 | - | - | - | - | 1 |
| - Mononuclear Cell Leukemia | | - | 1 | - | - | - |
| SKIN/SUBCUTIS | No.Examined | 4 | 3 | 4 | 5 | 3 |
| - Squamous Cell Carcinoma | | 2 | - | - | 1 | 1 |
| - Fibroma | | 2 | - | - | - | - |
| - Keratoacanthoma | | - | 1 | 1 | - | 1 |
| - Fat Necrosis | | - | 1 | - | - | - |
| - Epidermal Cyst | | - | - | 2 | 1 | - |
| - Fibrosarcoma | | - | 1 | - | - | - |
| - Sarcoma | | - | - | 1 | 1 | - |
| - Basal Cell Adenoma | | - | - | - | 1 | - |
| - Galactocoele Hemorrhage | | - | - | - | 1 | - |
| - Fibroadenoma | | - | - | - | - | 1 |
| PREPUTIAL GLANDS | No.Examined | 3 | 2 | 3 | 3 | 3 |
| - Adenoma | | 2 | 1 | 1 | 1 | 1 |
| - Carcinoma | | 1 | - | 2 | 2 | 1 |
| - Inflammation Chronic Active | | - | - | - | - | 1 |
| | Grade 2 | - | - | - | - | 1 |
| - Cyst | | - | - | - | - | 1 |
| - Inflammation Suppurative | | - | 1 | - | - | - |
| | Grade 3 | - | 1 | - | - | - |
| SYSTEMIC NEOPLASMS | No.Examined | 6 | 9 | 9 | 5 | 9 |
| - Malignant Lymphoma | | 6 | 9 | 9 | 5 | 9 |
| LIVER | No.Examined | 11 | 19 | 16 | 15 | 20 |
| - Bile Duct Hyperplasia | | 4 | 12 | 7 | 10 | 12 |
| | Grade 1 | - | 1 | 1 | - | 3 |
| | Grade 2 | 4 | 10 | 6 | 10 | 9 |
| | Grade 3 | - | 1 | - | - | - |
| - Mixed Cell Focus | | 1 | 1 | 1 | - | 2 |
| - Mononuclear Cell Leukemia | | 5 | 7 | 8 | 6 | 7 |

NAD = Nothing abnormal discovered
Group 1, AIR CONTROL, males: AMPHIBOLE ASBESTOS (0 mg/mg3)
Group 2, AMOSITE, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 3, LA, males: AMPHIBOLE ASBESTOS (1 mg/mg3)
Group 4, LA, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 5, LA, males: AMPHIBOLE ASBESTOS (10 mg/mg3)

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
Necropsy Status: TERMINAL SACRIFICE GROUP (K0), Incl. Deaths

| Sex | Males | | | | |
|---|---|---|---|---|---|
| Dose Group | 1 | 2 | 3 | 4 | 5 |
| No. Animals per Dose Group | 50 | 50 | 50 | 49 | 50 |
| LIVER cont.d | 11 | 19 | 16 | 15 | 20 |
| - Hepatocellular Adenoma | 1 | 1 | - | - | 1 |
| - Focal Necrosis | - | 2 | - | - | - |
| Grade 2 | - | 1 | - | - | - |
| Grade 3 | - | 1 | - | - | - |
| - Macrovesiculation | - | 1 | 4 | 2 | 3 |
| Grade 1 | - | 1 | - | 2 | - |
| Grade 2 | - | - | 4 | - | 3 |
| - Chronic Inflammation | - | 1 | - | - | - |
| Grade 1 | - | 1 | - | - | - |
| - Basophilic Focus | - | - | - | - | 1 |
| - Hepatodiaphragmatic Nodule | - | 1 | - | 1 | 3 |
| - Eosinophilic Focus | - | 2 | - | 1 | 1 |
| - Granuloma | - | - | - | - | 1 |
| - Mesothelioma | - | - | - | 1 | - |
| - Congestion | 1 | - | - | - | - |
| Grade 3 | 1 | - | - | - | - |
| SPLEEN No.Examined | 11 | 22 | 15 | 15 | 22 |
| - Mononuclear Cell Leukemia | 6 | 9 | 7 | 6 | 9 |
| - Pigment | 2 | - | - | - | - |
| Grade 2 | 2 | - | - | - | - |
| - Extramedullary Hematopoesis | 3 | 11 | 7 | 8 | 11 |
| Grade 2 | 3 | 5 | 4 | 5 | 9 |
| Grade 3 | - | 6 | 2 | 3 | 2 |
| Grade 4 | - | - | 1 | - | - |
| - Lymphoid Depletion | - | 1 | - | - | 1 |
| Grade 2 | - | 1 | - | - | 1 |
| - Stromal Hyperplasia | - | - | - | 1 | - |
| Grade 3 | - | - | - | 1 | - |
| - Congestion | - | 1 | - | - | 1 |
| Grade 2 | - | - | - | - | 1 |
| Grade 3 | - | 1 | - | - | - |
| - Atrophy | - | - | 1 | - | - |
| Grade 3 | - | - | 1 | - | - |
| - Mesothelioma | - | - | 1 | - | - |
| LUNG No.Examined | 2 | 2 | 4 | 2 | 9 |
| - Mononuclear Cell Leukemia | 2 | 2 | 3 | 1 | 4 |

Group 1, AIR CONTROL, males: AMPHIBOLE ASBESTOS (0 mg/mg3)
Group 2, AMOSITE, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 3, LA, males: AMPHIBOLE ASBESTOS (1 mg/mg3)
Group 4, LA, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 5, LA, males: AMPHIBOLE ASBESTOS (10 mg/mg3)

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
Necropsy Status: TERMINAL SACRIFICE GROUP (K0), Incl. Deaths

| Sex | | Males | | | | |
|---|---|---|---|---|---|---|
| Dose Group | | 1 | 2 | 3 | 4 | 5 |
| No. Animals per Dose Group | | 50 | 50 | 50 | 49 | 50 |
| LUNG | cont.d | 2 | 2 | 4 | 2 | 9 |
| - Interstitial Fibrosis | | - | - | - | - | 1 |
| | Grade 3 | - | - | - | - | 1 |
| - Alveolar Epithelium Hyperplasia | | - | - | - | - | 2 |
| | Grade 3 | - | - | - | - | 2 |
| - Alveolar Bronchiolar Adenoma | | - | - | - | - | 1 |
| - Congestion | | - | - | - | 1 | - |
| | Grade 2 | - | - | - | 1 | - |
| - Osteosarcoma | | - | - | 1 | - | - |
| - Alveolar Bronchiolar Carcinoma | | - | - | - | - | 1 |
| - Cystic Keratinizing Epithelioma | | - | - | - | - | 1 |
| TESTES | No.Examined | 26 | 25 | 23 | 26 | 24 |
| - Edema | | 4 | 1 | 1 | 2 | - |
| | Grade 2 | 2 | 1 | 1 | 1 | - |
| | Grade 3 | 2 | - | - | 1 | - |
| - Tubular Atrophy | | 6 | 7 | 9 | 7 | 4 |
| | Grade 1 | 1 | - | - | - | - |
| | Grade 2 | 2 | 1 | 2 | 2 | - |
| | Grade 3 | - | - | 2 | 1 | 2 |
| | Grade 4 | 3 | 6 | 5 | 3 | 1 |
| | Grade 5 | - | - | - | 1 | 1 |
| - Mesothelioma | | 1 | - | 1 | - | 1 |
| - Interstitial Cell Adenoma | | 19 | 18 | 13 | 19 | 20 |
| - Sperm Granuloma | | - | - | 1 | - | - |
| - Interstitial Cell Hyperplasia | | - | - | - | 1 | 1 |
| | Grade 2 | - | - | - | 1 | - |
| | Grade 3 | - | - | - | - | 1 |
| MAMMARY GLAND | No.Examined | 4 | 3 | 3 | 4 | 5 |
| - Secretion | | 4 | 1 | 1 | 2 | 1 |
| | Grade 2 | 3 | - | 1 | 2 | 1 |
| | Grade 3 | 1 | 1 | - | - | - |
| - Fibroadenoma | | - | 1 | 1 | 1 | 1 |
| - Galactocole Hemorrhage | | - | - | 1 | 1 | 2 |
| - Cyst | | 1 | - | - | - | - |
| - Galactocoele | | - | 1 | - | - | 1 |
| - Granuloma | | - | - | - | - | 1 |

Group 1, AIR CONTROL, males: AMPHIBOLE ASBESTOS (0 mg/mg3)
Group 2, AMOSITE, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 3, LA, males: AMPHIBOLE ASBESTOS (1 mg/mg3)
Group 4, LA, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 5, LA, males: AMPHIBOLE ASBESTOS (10 mg/mg3)

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
Necropsy Status: TERMINAL SACRIFICE GROUP (K0), Incl. Deaths

| Sex | | Males | | | | |
|---|---|---|---|---|---|---|
| Dose Group | | 1 | 2 | 3 | 4 | 5 |
| No. Animals per Dose Group | | 50 | 50 | 50 | 49 | 50 |
| MAMMARY GLAND | cont.d | 4 | 3 | 3 | 4 | 5 |
| - Adenocarcinoma | | - | - | 1 | - | - |
| KIDNEYS | No.Examined | 8 | 10 | 10 | 11 | 17 |
| - Nephropathy | | 8 | 10 | 9 | 11 | 14 |
| | Grade 1 | - | - | - | 1 | - |
| | Grade 2 | 2 | 4 | 2 | 3 | 3 |
| | Grade 3 | 5 | 5 | 6 | 7 | 6 |
| | Grade 4 | 1 | 1 | 1 | - | 5 |
| - Cyst | | - | 1 | - | - | - |
| - Mononuclear Cell Leukemia | | 1 | 1 | 1 | - | 2 |
| - Alveolar Bronchiolar Carcinoma | | - | - | - | - | 1 |
| - Tubule Pigment | | - | - | 1 | - | - |
| | Grade 3 | - | - | 1 | - | - |
| ADRENAL GLANDS | No.Examined | 2 | - | - | 3 | 2 |
| - Phaeochromocytoma | | 1 | - | - | - | - |
| - Cortex Vacuolization | | 1 | - | - | - | 1 |
| | Grade 2 | 1 | - | - | - | 1 |
| - Cortex Focal Hyperplasia | | - | - | - | 1 | 1 |
| | Grade 2 | - | - | - | 1 | 1 |
| - Cortex Adenoma | | - | - | - | - | 1 |
| - Medulla Phaeochromocytoma | | - | - | - | 1 | - |
| - Mononuclear Cell Leukemia | | - | - | - | 1 | - |
| - Cortical Carcinoma | | - | - | - | 1 | - |
| MESENTERY | No.Examined | - | - | 2 | 1 | 2 |
| - Mesothelioma | | - | - | 1 | 1 | 1 |
| - Blood Vessel Arteritis | | - | - | - | - | 1 |
| | Grade 3 | - | - | - | - | 1 |
| - Schwannoma | | - | - | 1 | - | - |
| LYMPH NODES | No.Examined | 3 | 4 | 5 | 5 | 8 |
| - Plasma Cell Hyperplasia | | 2 | 4 | 2 | 5 | 2 |
| | Grade 2 | 1 | 3 | 1 | 4 | 1 |
| | Grade 3 | 1 | 1 | 1 | 1 | 1 |
| - Pigment | | - | - | 1 | - | 2 |
| | Grade 2 | - | - | 1 | - | 1 |
| | Grade 3 | - | - | - | - | 1 |
| - Mesothelioma | | - | - | 1 | - | - |

Group 1, AIR CONTROL, males: AMPHIBOLE ASBESTOS (0 mg/mg3)
Group 2, AMOSITE, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 3, LA, males: AMPHIBOLE ASBESTOS (1 mg/mg3)
Group 4, LA, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 5, LA, males: AMPHIBOLE ASBESTOS (10 mg/mg3)

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
Necropsy Status: TERMINAL SACRIFICE GROUP (K0), Incl. Deaths

| Sex | Males | | | | |
|---|---|---|---|---|---|
| Dose Group | 1 | 2 | 3 | 4 | 5 |
| No. Animals per Dose Group | 50 | 50 | 50 | 49 | 50 |
| LYMPH NODES cont.d | 3 | 4 | 5 | 5 | 8 |
| - Mononuclear Cell Leukemia | 1 | - | 1 | - | 3 |
| - Cyst | - | - | - | 1 | - |
| - Sinus Dilation | - | - | - | - | 1 |
| Grade 2 | - | - | - | - | 1 |
| BODY CAVITIES No.Examined | - | - | 2 | 2 | 2 |
| - Mesothelioma | - | - | 2 | 2 | 1 |
| - Alveolar Bronchiolar Carcinoma | - | - | - | - | 1 |
| EYES No.Examined | 3 | 5 | 6 | 2 | 1 |
| - Retinal Degeneration | - | 4 | 1 | - | - |
| Grade 3 | - | 1 | - | - | - |
| Grade 4 | - | 3 | 1 | - | - |
| - Lens Cataract | - | 3 | 1 | - | - |
| Grade 2 | - | 2 | 1 | - | - |
| Grade 3 | - | 1 | - | - | - |
| - Anterior Synechia | - | 2 | 1 | - | - |
| - Cornea Inflammation | - | 2 | 1 | - | - |
| Grade 2 | - | 2 | - | - | - |
| Grade 3 | - | - | 1 | - | - |
| - Phthisis Bulbi | - | - | - | 1 | - |
| - Lens Mineralization | 1 | - | - | - | - |
| Grade 3 | 1 | - | - | - | - |
| - Panophthalmitis | - | 1 | 1 | - | 1 |
| Grade 2 | - | 1 | - | - | - |
| Grade 4 | - | - | 1 | - | 1 |
| - Cornea Ulcer | 2 | 1 | 3 | 1 | 1 |
| Grade 1 | - | - | 1 | - | - |
| Grade 3 | - | - | - | - | 1 |
| Grade 4 | 1 | 1 | 2 | 1 | - |
| Grade 5 | 1 | - | - | - | - |
| - Squamous Cell Carcinoma | 1 | - | 2 | - | - |
| - Socket Osteosarcoma | - | - | 1 | - | - |
| HARDERIAN GLANDS No.Examined | 1 | 1 | 4 | - | 1 |
| - Fibrosis | - | 1 | - | - | - |
| Grade 2 | - | 1 | - | - | - |
| - Inflammation | - | - | 1 | - | 1 |
| Grade 1 | - | - | 1 | - | - |
| Grade 4 | - | - | - | - | 1 |
| - Squamous Cell Carcinoma | - | - | 2 | - | - |

Group 1, AIR CONTROL, males: AMPHIBOLE ASBESTOS (0 mg/mg3)
Group 2, AMOSITE, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 3, LA, males: AMPHIBOLE ASBESTOS (1 mg/mg3)
Group 4, LA, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 5, LA, males: AMPHIBOLE ASBESTOS (10 mg/mg3)

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
Necropsy Status: TERMINAL SACRIFICE GROUP (K0), Incl. Deaths

| Sex | Males | | | | |
|---|---|---|---|---|---|
| Dose Group | 1 | 2 | 3 | 4 | 5 |
| No. Animals per Dose Group | 50 | 50 | 50 | 49 | 50 |
| HARDERIAN GLANDS cont.d | 1 | 1 | 4 | - | 1 |
| - Mononuclear Cell Leukemia | - | - | 1 | - | - |
| - Pigment | 1 | - | - | - | - |
| Grade 2 | 1 | - | - | - | - |
| URINARY BLADDER No.Examined | 1 | - | - | - | - |
| - Distention | 1 | - | - | - | - |
| Grade 3 | 1 | - | - | - | - |
| BONE No.Examined | 1 | - | - | - | 1 |
| - Osteosarcoma | 1 | - | - | - | - |
| - Alveolar Bronchiolar Carcinoma | - | - | - | - | 1 |
| THYROID GLAND No.Examined | 1 | 1 | 1 | 1 | - |
| - Follicular Cell Adenoma | - | 1 | - | - | - |
| - Follicular Cell Carcinoma | - | - | 1 | 1 | - |
| - C Cell Adenoma | 1 | - | - | - | - |
| GANGLION,GASS.,RIGHT No.Examined | 1 | 1 | 2 | 1 | 1 |
| - Squamous Cell Carcinoma | 1 | 1 | 2 | 1 | - |
| - Meningioma Malignant | - | - | - | - | 1 |
| PITUITARY GLAND No.Examined | 3 | 3 | 5 | 2 | 5 |
| - Pars Distalis Adenoma | 3 | 3 | 4 | 2 | 3 |
| - Pars Distalis Hyperplasia Focal | - | - | 1 | - | 1 |
| Grade 3 | - | - | 1 | - | 1 |
| - Pars Distalis Cyst | - | - | - | - | 1 |
| PALATE (ORAL MUCOSA) No.Examined | 3 | 3 | 5 | 1 | 1 |
| NAD | - | - | 1 | - | - |
| - Squamous Cell Papilloma | 1 | - | - | - | - |
| - Squamous Cell Carcinoma | 2 | 3 | 4 | 1 | 1 |
| STOMACH No.Examined | - | - | 1 | - | - |
| - Ulceration | - | - | 1 | - | - |
| Grade 3 | - | - | 1 | - | - |
| INTEST-LG, CECUM No.Examined | - | - | 1 | - | - |
| - Ulceration | - | - | 1 | - | - |
| Grade 4 | - | - | 1 | - | - |

NAD = Nothing abnormal discovered
Group 1, AIR CONTROL, males: AMPHIBOLE ASBESTOS (0 mg/mg3)
Group 2, AMOSITE, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 3, LA, males: AMPHIBOLE ASBESTOS (1 mg/mg3)
Group 4, LA, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 5, LA, males: AMPHIBOLE ASBESTOS (10 mg/mg3)

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

NUMBER OF ANIMALS WITH MICROSCOPIC FINDINGS BY ORGAN/GROUP/SEX
Necropsy Status: TERMINAL SACRIFICE GROUP (K0), Incl. Deaths

| Sex | | Males | | | | |
|---|---|---|---|---|---|---|
| Dose Group | | 1 | 2 | 3 | 4 | 5 |
| No. Animals per Dose Group | | 50 | 50 | 50 | 49 | 50 |
| INTEST-SM, ILEUM | No.Examined | - | - | 1 | - | - |
| - Mononuclear Cell Leukemia | | - | - | 1 | - | - |
| INTEST-LG, COLON | No.Examined | - | - | 1 | - | 1 |
| - Adhesion | | - | - | 1 | - | - |
| - Muscularis Focal Thickening | | - | - | - | - | 1 |
| BRAIN | No.Examined | - | - | 1 | - | - |
| - Mononuclear Cell Leukemia | | - | - | 1 | - | - |
| HEART | No.Examined | 1 | - | - | - | 1 |
| - Fibrosis | | 1 | - | - | - | - |
| | Grade 2 | 1 | - | - | - | - |
| - Alveolar Bronchiolar Carcinoma | | - | - | - | - | 1 |
| DIAPHRAGM | No.Examined | - | - | - | - | 1 |
| - Alveolar Bronchiolar Carcinoma | | - | - | - | - | 1 |
| ADIPOSE TISSUE | No.Examined | - | - | - | 1 | - |
| - Mesothelioma | | - | - | - | 1 | - |
| PANCREAS | No.Examined | - | - | 1 | - | - |
| - Mononuclear Cell Leukemia | | - | - | 1 | - | - |
| GANGLION,GASS.,LEFT | No.Examined | - | - | 2 | - | - |
| - Squamous Cell Carcinoma | | - | - | 2 | - | - |
| EPIDIDYMIDES | No.Examined | - | - | 1 | - | 1 |
| - Mesothelioma | | - | - | 1 | - | 1 |
| SALIVARY GLANDS | No.Examined | 1 | - | - | 1 | - |
| - Sublingual Adenocarcinoma | | 1 | - | - | 1 | - |

Group 1, AIR CONTROL, males: AMPHIBOLE ASBESTOS (0 mg/mg3)
Group 2, AMOSITE, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 3, LA, males: AMPHIBOLE ASBESTOS (1 mg/mg3)
Group 4, LA, males: AMPHIBOLE ASBESTOS (3.3 mg/mg3)
Group 5, LA, males: AMPHIBOLE ASBESTOS (10 mg/mg3)

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 1, AIR CONTROL

| ANIMAL NUMBER : | 137 MK0 | 138 MK0 | 139 MK0 | 140 MK0 | 141 MK0 | 142 MK0 | 143 MK0 | 144 MK0 | 145 MK0+ | 146 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | - | + | + | + | - | + | - | + | + | + |
| - Chronic Inflammation | . | 2. | 1. | . | . | 1. | . | . | 1. | 1. |
| - Mononuclear Cell Leukemia | . | . | . | M45. | . | . | . | . | M45. | . |
| - Alveolar Epithelium Hyperplasia | . | . | . | . | . | . | . | 2. | . | . |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | + | + | - | - | - | + | + | + | + | - |
| - Mesothelioma | . | N0. | . | . | . | . | . | . | . | . |
| - Hypospermia | 4. | . | . | . | . | 4. | 4. | 5. | 2. | . |
| TESTIS, LEFT | +G | +G | +G | + | + | +G | +G | + | +G | +G |
| - Interstitial Cell Adenoma | P. | P. | P. | . | . | P. | P. | . | . | . |
| - Mesothelioma | . | M26. | . | . | . | . | . | . | . | . |
| - Tubular Atrophy | . | . | 1. | 1. | 2. | . | 3. | 5. | 1. | 1. |
| - Edema | . | . | . | 2. | 2. | . | . | . | . | 2. |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | ' | ' | 'G | ' | ' | ' | ' | ' | ' |
| PREPUTIAL GLANDS | +G | ' | ' | + | ' | ' | ' | ' | ' | ' |
| - Adenoma | ( P. | | | ( P. | | | | | | |
| SYSTEMIC NEOPLASMS | ' | ' | ' | + | ' | ' | ' | ' | + | ' |
| - Malignant Lymphoma | | | | N0. | | | | | N0. | |
| LIVER | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Mononuclear Cell Leukemia | | | | | | | | | M45. | |
| SPLEEN | ' | ' | ' | +G | ' | ' | ' | ' | +G | +G |
| - Mononuclear Cell Leukemia | | | | M45. | | | | | M45. | . |
| - Pigment | | | | . | | | | | . | 2. |
| TESTES | +G | +G | ' | ' | ' | +G | +G | ' | ' | ' |
| - Edema | 3. | . | | | | . | . | | | |
| - Tubular Atrophy | ( 2. | . | | | | . | . | | | |
| - Mesothelioma | . | M26. | | | | . | . | | | |
| - Interstitial Cell Adenoma | . | . | | | | P. | P. | | | |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Secretion | | | | | | | | | 2. | |
| KIDNEYS | ' | ' | ' | ' | ' | ' | ' | ' | +G | +G |
| - Nephropathy | | | | | | | | | 3. | 3. |
| PITUITARY GLAND | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Pars Distalis Adenoma | | | | | | | | | P. | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 1, AIR CONTROL

| ANIMAL NUMBER : | 147 MK0 | 148 MK0 | 149 MK0 | 150 MK0 | 151 MK0 | 152 MK0+ | 153 MK0 | 154 MK0+ | 155 MK0 | 156 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | - | + | - | + | - | + | - | + | + | + |
| - Chronic Inflammation | . | 1. | . | 1. | . | 1. | . | . | . | . |
| - Mononuclear Cell Leukemia | . | . | . | . | . | . | . | . | M45. | . |
| - Intravascular Neutrophils | . | . | . | . | . | . | . | . | . | 2. |
| - Congestion | . | . | . | . | . | . | . | 3. | . | . |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | - | - | + | + | + | - | + | - | - | - |
| - Hypospermia | . | . | 4. | 3. | 4. | . | 2. | . | . | . |
| TESTIS, LEFT | + | + | +G | +G | +G | - | +G | + | + | +G |
| - Interstitial Cell Adenoma | . | . | P. | . | P. | . | P. | . | . | P. |
| - Tubular Atrophy. | 2. | 1. | . | 2. | 4. | . | 2. | 1. | 2. | 1. |
| - Edema | . | 1. | . | . | 2. | . | . | 2. | 2. | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Squamous Cell Carcinoma | | | | | | | | | P. | |
| SYSTEMIC NEOPLASMS | ' | ' | ' | ' | ' | + | ' | ' | + | ' |
| - Malignant Lymphoma. | | | | | | N0. | | | N0. | |
| LIVER | ' | ' | ' | +G | ' | ' | ' | +G | +G | ' |
| - Bile Duct Hyperplasia. | | | | 2. | | | | . | . | |
| - Mixed Cell Focus | | | | P. | | | | . | . | |
| - Mononuclear Cell Leukemia | | | | . | | | | . | M45. | |
| - Congestion | | | | . | | | | 3. | . | |
| SPLEEN | ' | ' | ' | +G | ' | ' | ' | ' | +G | ' |
| - Mononuclear Cell Leukemia | | | | . | | | | | M45. | |
| - Pigment | | | | 2. | | | | | . | |
| TESTES | ' | ' | +G | +G | +G | ' | +G | +G | ' | +G |
| - Edema | | | 2. | . | . | | . | . | | 2. |
| - Tubular Atrophy. | | | ( 4. | . | . | | . | 1. | | 2. |
| - Interstitial Cell Adenoma | | | | . ( P. | P. | | P. | . | | . |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Secretion. | | | | | | | | 2. | | |
| - Cyst | | | | | | | | P. | | |
| KIDNEYS | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Nephropathy | | | | | | | | 4. | | |
| ADRENAL GLANDS | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Cortex Vacuolization | | | | | | | | 2. | | |
| EYES | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Cornea Ulcer. | | | | | | ( 5. | | | | |
| - Squamous Cell Carcinoma | | | | | | M45. | | | | |
| HARDERIAN GLANDS | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Pigment | | | | | | ( 2. | | | | |
| PITUITARY GLAND | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Pars Distalis Adenoma. | | | | | | | | P. | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 1, AIR CONTROL

| ANIMAL NUMBER : | 147 MK0 | 148 MK0 | 149 MK0 | 150 MK0 | 151 MK0 | 152 MK0+ | 153 MK0 | 154 MK0+ | 155 MK0 | 156 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| PALATE (ORAL MUCOSA) | ' | ' | ' | ' | ' | + | ' | ' | ' | ' |
| - Squamous Cell Carcinoma | | | | | | M45. | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 1, AIR CONTROL

| ANIMAL NUMBER : | 157 MK0+ | 158 MK0 | 159 MK0 | 160 MK0 | 161 MK0 | 162 MK0 | 163 MK0 | 164 MK0 | 165 MK0 | 166 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | - | + | - | - | - | + | + | + | + |
| - Chronic Inflammation | . | . | . | . | . | . | 1. | 1. | 1. | 1. |
| - Infiltration Mixed Cell | . | . | 1. | . | . | . | . | . | . | . |
| - Congestion | 2. | . | . | . | . | . | . | . | . | . |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | 0 | + | - | + | + | + | + | + | + | + |
| - Hypospermia | . | . | . | 4. | 3. | 4. | 4. | 3. | 3. | 4. |
| - Sperm Granuloma | . | 3. | . | . | . | . | . | . | . | . |
| TESTIS, LEFT | 0 | +G | + | +G | +G | +G | +G | + | +G | +G |
| - Interstitial Cell Adenoma | . | P. | . | P. | P. | P. | P. | . | P. | P. |
| - Tubular Atrophy | . | . | . | 3. | . | . | . | 2. | . | . |
| - Edema | . | . | 2. | . | . | . | . | 2. | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | ' | ' | ' | ' | ' | ' | ' | ' | +G |
| - Squamous Cell Carcinoma | | | | | | | | | | P. |
| TESTES | ' | ' | ' | +G | +G | +G | +G | ' | ' | +G |
| - Interstitial Cell Adenoma | | | | P. | P. | P. | P. | | | P. |
| MAMMARY GLAND | +G | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| - Secretion | 3. | | | | | | | | | |
| PITUITARY GLAND | +G | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| - Pars Distalis Adenoma | P. | | | | | | | | | |
| PALATE (ORAL MUCOSA) | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Squamous Cell Papilloma | | | | | | | | | P. | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 1, AIR CONTROL

| ANIMAL NUMBER : | 167 MK0 | 168 MK0 | 169 MK0+ | 170 MK0+ | 171 MK0 | 172 MK0 | 173 MK0 | 174 MK0 | 175 MK0 | 176 MK0+ |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | - | - | - | + | - | - | - | - | - | + |
| - Mononuclear Cell Leukemia | . | . | . | . | . | . | . | . | . | M45. |
| - Intravascular Neutrophils | . | . | . | 3. | . | . | . | . | . | . |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | - | + | - | + | + | + | + | + | + | - |
| - Hypospermia | . | 3. | . | 3. | 4. | 4. | 4. | 3. | 4. | . |
| TESTIS, LEFT | +G | +G | +G | +G | +G | +G | +G | +G | + | - |
| - Interstitial Cell Adenoma | . | P. | P. | P. | P. | P. | P. | P. | . | . |
| - Tubular Atrophy. | 2. | . | 1. | . | . | . | . | . | 4. | . |
| - Edema | 2. | . | . | . | . | . | . | . | 3. | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | ' | ' | +G | ' | ' | +G | ' | ' | ' |
| - Fibroma | | | | P. | | | P. | | | |
| PREPUTIAL GLANDS | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Carcinoma. | | | | | | | | | P. | |
| SYSTEMIC NEOPLASMS | ' | ' | ' | ' | ' | ' | ' | ' | ' | + |
| - Malignant Lymphoma. | | | | | | | | | | N0. |
| LIVER | ' | ' | +G | G | ' | ' | ' | +G | ' | +G |
| - Bile Duct Hyperplasia. | | | 2. | . | | | | . | | . |
| - Mononuclear Cell Leukemia | | | . | . | | | | . | | M45. |
| - Hepatocellular Adenoma | | | . | . | | | | P. | | . |
| SPLEEN | ' | ' | ' | ' | ' | ' | +G | +G | ' | +G |
| - Mononuclear Cell Leukemia | | | | | | | . | . | | M45. |
| - Extramedullary Hematopoesis. | | | | | | | 2. | 2. | | . |
| LUNG | ' | ' | ' | G | ' | ' | ' | ' | ' | +G |
| - Mononuclear Cell Leukemia | | | | . | | | | | | M45. |
| TESTES | ' | +G | ' | ' | +G | +G | +G | +G | ' | ' |
| - Tubular Atrophy. | | . | | | ( 4. | . | . | . | | |
| - Interstitial Cell Adenoma | | P. | | | . | P. | P. | P. | | |
| KIDNEYS | ' | ' | +G | ' | ' | ' | ' | +G | ' | +G |
| - Nephropathy | | | 2. | | | | | 3. | | 2. |
| - Mononuclear Cell Leukemia | | | . | | | | | . | | M45. |
| LYMPH NODES | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Plasma Cell Hyperplasia | | | | | | | | ( 2. | | |
| BODY CAVITIES | ' | ' | 'G | ' | ' | ' | ' | ' | ' | ' |
| EYES | ' | ' | +G | ' | ' | ' | ' | ' | ' | ' |
| - Lens Mineralization | | | ( 3. | | | | | | | |
| SALIVARY GLANDS | ' | ' | + | ' | ' | ' | ' | ' | ' | ' |
| - Sublingual Adenocarcinoma | | | ( P. | | | | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 1, AIR CONTROL

| ANIMAL NUMBER : | 177 MK0+ | 178 MK0 | 179 MK0 | 180 MK0 | 181 MK0 | 182 MK0 | 183 MK0+ | 184 MK0+ | 185 MK0 | 186 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | - | - | + | - | + | + | - | + |
| - Chronic Inflammation | . | 1. | . | . | . | . | . | . | . | . |
| - Mononuclear Cell Leukemia | M45. | . | . | . | . | . | . | . | . | M26. |
| - Infiltration Mixed Cell | . | . | . | . | . | . | 2. | . | . | . |
| - Pheochromocytoma | . | . | . | . | M44. | . | . | . | . | . |
| - Osteosarcoma. | . | . | . | . | . | . | . | M59. | . | . |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | + | + | + | - | + | - | - | - | + | +G |
| - Mesothelioma. | . | . | . | . | . | . | . | . | . | N0. |
| - Hypospermia | 4. | 4. | 2. | . | 1. | . | . | . | 3. | . |
| TESTIS, LEFT | +G | +G | + | + | +G | +G | +G | + | +G | +G |
| - Interstitial Cell Adenoma | . | P. | P. | P. | P. | P. | . | P. | P. | P. |
| - Mesothelioma. | . | . | . | . | . | . | . | . | . | M26. |
| - Tubular Atrophy. | 4. | . | 2. | . | . | 1. | 2. | 1. | . | . |
| - Edema | . | . | 2. | . | . | . | 1. | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SYSTEMIC NEOPLASMS | + | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| - Malignant Lymphoma. | N0. | | | | | | | | | |
| LIVER | +G | ' | ' | ' | +G | ' | +G | ' | ' | +G |
| - Bile Duct Hyperplasia. | . | | | | 2. | | 2. | | | . |
| - Mononuclear Cell Leukemia | M45. | | | | . | | . | | | M26. |
| SPLEEN | +G | ' | ' | ' | +G | ' | ' | ' | ' | +G |
| - Mononuclear Cell Leukemia | M45. | | | | . | | | | | M26. |
| - Extramedullary Hematopoesis. | . | | | | 2. | | | | | . |
| LUNG | +G | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | M45. | | | | | | | | | |
| TESTES | ' | +G | +G | ' | +G | +G | ' | ' | +G | +G |
| - Edema | | . | 3. | | . | . | | | . | . |
| - Tubular Atrophy. | | . | 4. | | . | . | | | . | . |
| - Interstitial Cell Adenoma | | P. | . | | P. | P. | | | P. | P. |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Secretion. | | | | | | | 2. | | | |
| KIDNEYS | ' | ' | ' | ' | +G | ' | +G | ' | ' | ' |
| - Nephropathy | | | | | 3. | | 3. | | | |
| ADRENAL GLANDS | ' | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Phaeochromocytoma | | | | | N0. | | | | | |
| PARATHYROID GLAND | ' | ' | ' | ' | 'G | ' | ' | ' | ' | ' |
| LYMPH NODES | +G | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Plasma Cell Hyperplasia | . | | | | | | 3. | | | |
| - Mononuclear Cell Leukemia | M45. | | | | | | . | | | |
| EYES | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Cornea Ulcer. | | | | | | | ( 4. | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 1, AIR CONTROL

| ANIMAL NUMBER : | 177 MK0+ | 178 MK0 | 179 MK0 | 180 MK0 | 181 MK0 | 182 MK0 | 183 MK0+ | 184 MK0+ | 185 MK0 | 186 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| URINARY BLADDER | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Distention | | | | | | | | 3. | | |
| PENIS | ' | ' | ' | ' | ' | ' | ' | G | ' | ' |
| BONE | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Osteosarcoma. | | | | | | | | N0. | | |
| THYROID GLAND | ' | ' | ' | ' | + | ' | ' | ' | ' | ' |
| - C Cell Adenoma | | | | | ( P. | | | | | |
| GANGLION,GASS.,RIGHT | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Squamous Cell Carcinoma | | | | | | | M10. | | | |
| PALATE (ORAL MUCOSA) | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Squamous Cell Carcinoma | | | | | | | N0. | | | |
| HEART | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Fibrosis | | | | | | | | | 2. | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 2, AMOSITE

| ANIMAL NUMBER : | 249 MK0 | 250 MK0 | 251 MK0 | 252 MK0+ | 253 MK0 | 254 MK0 | 255 MK0 | 256 MK0+ | 257 MK0 | 258 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | 1. | . | 1. | 1. | 1. | 1. | 1. | 1. |
| - Bronchiolization | . | . | . | . | . | 1. | . | . | 1. | . |
| - Congestion | . | . | . | 3. | . | . | . | . | . | . |
| - Pleura Fibrosis. | 1. | 1. | . | . | 1. | . | . | . | 1. | 1. |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | + | + | + | - | + | - | - | - | + | - |
| - Hypospermia | 3. | 4. | 4. | . | 4. | . | . | . | 3. | . |
| TESTIS, LEFT | +G | +G | +G | - | +G | + | +G | +G | +G | + |
| - Interstitial Cell Adenoma | P. | . | P. | . | P. | . | P. | P. | P. | . |
| - Tubular Atrophy. | . | 3. | . | . | . | 2. | . | 2. | . | 2. |
| - Edema | . | 1. | . | . | . | 1. | . | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | +G | ' | ' | ' | ' | ' | +G | G | ' | ' |
| - Keratoacanthoma. | P. | | | | | | . | . | | |
| - Fibrosarcoma. | . | | | | | | P. | . | | |
| LIVER | ' | ' | ' | ' | ' | +G | +G | +G | ' | ' |
| - Bile Duct Hyperplasia. | | | | | | 2. | . | 2. | | |
| - Focal Necrosis | | | | | | . | 3. | . | | |
| SPLEEN | ' | +G | ' | ' | ' | +G | +G | ' | +G | ' |
| - Extramedullary Hematopoesis. | | 2. | | | | 2. | 3. | | . | |
| - Lymphoid Depletion. | | . | | | | . | . | | 2. | |
| TESTES | ' | +G | +G | ' | +G | ' | +G | ' | +G | ' |
| - Interstitial Cell Adenoma | | ( P. | P. | | P. | | P. | | P. | |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | ' | + | ' | ' |
| - Fibroadenoma. | | | | | | | | P. | | |
| KIDNEYS | +G | ' | ' | ' | ' | ' | +G | ' | +G | ' |
| - Nephropathy | 2. | | | | | | 3. | | 4. | |
| - Cyst | P. | | | | | | . | | . | |
| LYMPH NODES | ' | +G | ' | ' | ' | ' | +G | +G | ' | ' |
| - Plasma Cell Hyperplasia | | 2. | | | | | 2. | ( 2. | | |
| EYES | +G | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Retinal Degeneration | 3. | | | | | | | . | | |
| - Lens Cataract | ( 2. | | | | | | | . | | |
| - Panophthalmitis. | . | | | | | | | 2. | | |
| - Cornea Ulcer. | . | | | | | | | ( 4. | | |
| HARDERIAN GLANDS | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Fibrosis | | | | | | | | ( 2. | | |
| THYROID GLAND | ' | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Follicular Cell Adenoma | | | | ( P. | | | | | | |
| GANGLION,GASS.,RIGHT | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Squamous Cell Carcinoma | | | | | | | | P. | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 2, AMOSITE

| ANIMAL NUMBER : | 249 MK0 | 250 MK0 | 251 MK0 | 252 MK0+ | 253 MK0 | 254 MK0 | 255 MK0 | 256 MK0+ | 257 MK0 | 258 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| PITUITARY GLAND | ' | ' | ' | +G | ' | ' | ' | +G | ' | ' |
| - Pars Distalis Adenoma. . . . . | | | | P. | | | | P. | | |
| PALATE (ORAL MUCOSA) | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Squamous Cell Carcinoma . . . . . | | | | | | | | N0. | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 2, AMOSITE

| ANIMAL NUMBER : | 259 MK0 | 260 MK0 | 261 MK0 | 262 MK0 | 263 MK0 | 264 MK0 | 265 MK0+ | 266 MK0 | 267 MK0 | 268 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Alveolar Epithelium Hyperplasia | 2. | . | 1. | . | 1. | 1. | . | . | 1. | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| - Pleura Fibrosis. | 1. | . | 1. | 1. | . | 1. | . | 1. | . | . |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | - | + | - | + | - | + | + | + | + | + |
| - Hypospermia | . | 3. | . | 4. | . | 3. | 3. | 4. | 4. | 4. |
| TESTIS, LEFT | + | +G | + | +G | + | +G | +G | +G | +G | +G |
| - Interstitial Cell Adenoma | . | P. | . | P. | P. | P. | P. | P. | P. | P. |
| - Tubular Atrophy. | 1. | . | 1. | . | . | . | 3. | . | . | . |
| - Edema | 2. | . | 1. | . | . | . | . | . | . | . |
| - Interstitial Cell Hyperplasia | . | . | 1. | . | . | . | . | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SYSTEMIC NEOPLASMS | + | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| - Malignant Lymphoma. | N0. | | | | | | | | | |
| LIVER | +G | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Bile Duct Hyperplasia. | . | | | | | | 2. | | | |
| - Mononuclear Cell Leukemia | M45. | | | | | | . | | | |
| SPLEEN | +G | ' | ' | ' | ' | +G | +G | ' | ' | ' |
| - Mononuclear Cell Leukemia | M45. | | | | | . | . | | | |
| - Extramedullary Hematopoesis. | . | | | | | 2. | . | | | |
| - Congestion | . | | | | | . | 3. | | | |
| TESTES | ' | +G | ' | +G | ' | +G | ' | +G | +G | +G |
| - Interstitial Cell Adenoma | | P. | | P. | | P. | | P. | P. | P. |
| KIDNEYS | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Nephropathy | | | | | | 3. | | | | |
| EYES | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Retinal Degeneration | | | | | | | | | 4. | |
| - Lens Cataract | | | | | | | | | ( 3. | |
| - Anterior Synechia | | | | | | | | | P. | |
| PALATE (ORAL MUCOSA) | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Squamous Cell Carcinoma | | | | | | | N0. | | | |
| INTEST-SM, ILEUM | ' | ' | ' | ' | ' | ' | G | ' | ' | ' |
| INTEST-SM, JEJUNUM | ' | ' | ' | ' | ' | ' | G | ' | ' | ' |
| INTEST-SM, DUODENUM | ' | ' | ' | ' | ' | ' | G | ' | ' | ' |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 2, AMOSITE

| ANIMAL NUMBER : | 269 MK0 | 270 MK0 | 271 MK0+ | 272 MK0+ | 273 MK0+ | 274 MK0 | 275 MK0 | 276 MK0 | 277 MK0 | 278 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | +G | + | + | + | + | + |
| - Mononuclear Cell Leukemia | . | . | M45. | M45. | . | M45. | . | . | . | . |
| - Alveolar Epithelium Hyperplasia | . | . | . | . | 3. | . | . | . | . | . |
| - Foreign Body. | P. | P. | P. | P. | P. | . | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | 1. | . | . | 1. | 1. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | . | . | . | . | 1. | 1. | 1. | 1. |
| - Bronchiolization | . | . | . | 1. | . | . | . | . | . | . |
| - Alveolar Bronchiolar Adenoma | . | . | . | . | P. | . | . | . | . | . |
| - Pleura Fibrosis. | . | 1. | . | . | . | . | 2. | 1. | 1. | 1. |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | + | + | - | + | + | + | + | + | + | + |
| - Hypospermia | 4. | 3. | . | 4. | 3. | 3. | 3. | 3. | 3. | 4. |
| TESTIS, LEFT | +G | +G | + | +G | +G | +G | +G | +G | +G | +G |
| - Interstitial Cell Adenoma | P. | P. | . | P. | P. | P. | P. | . | P. | P. |
| - Tubular Atrophy. | . | . | 1. | 4. | 4. | . | . | 4. | . | . |
| - Interstitial Cell Hyperplasia | . | . | 1. | . | . | . | . | . | . | . |
| STERNUM | - | - | + | - | - | - | - | - | - | - |
| - Mononuclear Cell Leukemia | . | . | M45. | . | . | . | . | . | . | . |
| SYSTEMIC NEOPLASMS | ' | ' | + | + | ' | + | ' | ' | ' | ' |
| - Malignant Lymphoma. | | | N0. | N0. | | N0. | | | | |
| LIVER | ' | ' | ' | +G | +G | +G | +G | ' | ' | ' |
| - Bile Duct Hyperplasia. | | | | . | 3. | . | 2. | | | |
| - Mononuclear Cell Leukemia | | | | M45. | . | M45. | . | | | |
| - Hepatocellular Adenoma | | | | P. | . | . | . | | | |
| - Focal Necrosis | | | | . | . | . | 2. | | | |
| - Macrovesiculation | | | | . | . | . | 1. | | | |
| - Eosinophilic Focus. | | | | . | P. | . | . | | | |
| SPLEEN | ' | ' | +G | +G | ' | +G | +G | ' | ' | ' |
| - Mononuclear Cell Leukemia | | | M45. | M45. | | M45. | . | | | |
| - Extramedullary Hematopoesis. | | | . | . | | . | 2. | | | |
| LUNG | ' | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | | | | M45. | | | | | | |
| TESTES | +G | +G | ' | ' | ' | ' | ' | +G | +G | +G |
| - Tubular Atrophy. | . | . | | | | | | . | ( 4. | . |
| - Interstitial Cell Adenoma | P. | P. | | | | | | ( P. | . | P. |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Secretion. | | | | | | | | 3. | | |
| KIDNEYS | ' | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Nephropathy | | | | 2. | | | | | | |
| BODY CAVITIES | ' | ' | ' | G | ' | ' | ' | ' | ' | ' |
| PITUITARY GLAND | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Pars Distalis Adenoma. | | | | | | | | P. | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 2, AMOSITE

| ANIMAL NUMBER : | 279 MK0 | 280 MK0 | 281 MK0 | 282 MK0 | 283 MK0 | 284 MK0 | 285 MK0 | 286 MK0 | 287 MK0 | 288 MK0+ |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Mononuclear Cell Leukemia | . | . | . | . | . | . | . | M45. | . | . |
| - Alveolar Epithelium Hyperplasia | . | . | . | . | 1. | . | . | . | . | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 2. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| - Bronchiolization | . | . | . | . | . | . | . | . | . | 1. |
| - Alveolar Bronchiolar Adenoma | . | . | P. | . | . | . | . | . | . | . |
| - Pleura Fibrosis. | 1. | . | 1. | 1. | 1. | 1. | . | . | 1. | . |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | - | - | - | + | + | + | + | + | + | - |
| - Hypospermia | . | . | . | 4. | 3. | 4. | 4. | 4. | 4. | . |
| TESTIS, LEFT | + | +G | + | +G | +G | +G | +G | +G | +G | + |
| - Interstitial Cell Adenoma | . | P. | . | P. | P. | P. | P. | P. | P. | . |
| - Tubular Atrophy. | 1. | . | . | . | . | . | . | . | . | 1. |
| - Edema | 1. | . | 2. | . | . | . | . | . | . | . |
| - Interstitial Cell Hyperplasia | 1. | . | 2. | . | . | . | . | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | ' | +G | ' | ' | ' | ' | ' | ' | ' |
| - Fat Necrosis. | | | P. | | | | | | | |
| SYSTEMIC NEOPLASMS | ' | ' | ' | ' | ' | ' | ' | + | ' | ' |
| - Malignant Lymphoma. | | | | | | | | N0. | | |
| LIVER | ' | ' | +G | ' | +G | ' | ' | +G | +G | +G |
| - Bile Duct Hyperplasia. | | | 1. | | 2. | | | 2. | 2. | 2. |
| - Mixed Cell Focus | | | . | | P. | | | . | . | . |
| - Mononuclear Cell Leukemia | | | . | | . | | | M45. | . | . |
| - Chronic Inflammation | | | 1. | | . | | | . | . | . |
| SPLEEN | ' | ' | +G | ' | +G | ' | +G | +G | +G | +G |
| - Mononuclear Cell Leukemia | | | . | | . | | . | M45. | . | . |
| - Extramedullary Hematopoesis. | | | 3. | | 3. | | 2. | . | 3. | 3. |
| TESTES | +G | ' | ' | +G | +G | ' | +G | +G | +G | ' |
| - Edema | . | | | . | 2. | | . | . | . | |
| - Tubular Atrophy. | 2. | | | . | ( 4. | | . | ( 4. | ( 4. | |
| - Interstitial Cell Adenoma | . | | | P. | . | | P. | . | . | |
| EYES | +G | ' | ' | ' | +G | ' | ' | ' | ' | 'G |
| - Retinal Degeneration | 4. | | | | 4. | | | | | |
| - Lens Cataract | ( 2. | | | | . | | | | | |
| - Anterior Synechia | . | | | | P. | | | | | |
| - Cornea Inflammation | 2. | | | | ( 2. | | | | | |
| PALATE (ORAL MUCOSA) | ' | ' | ' | ' | ' | ' | ' | ' | ' | + |
| - Squamous Cell Carcinoma | | | | | | | | | | N0. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 2, AMOSITE

| ANIMAL NUMBER : | 289 MK0 | 290 MK0 | 291 MK0 | 292 MK0+ | 293 MK0 | 294 MK0 | 295 MK0+ | 296 MK0 | 297 MK0+ | 298 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | +G | + | +G | + |
| - Mononuclear Cell Leukemia | . | . | M45. | M45. | . | . | M45. | . | M45. | . |
| - Alveolar Epithelium Hyperplasia | . | . | . | . | . | . | . | 1. | . | 2. |
| - Foreign Body. | P. | P. | . | P. | P. | P. | . | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | . | 1. | 1. | 2. | . | 1. | . | 2. |
| - Interstitial Fibrosis. | 1. | 1. | . | 1. | 1. | 1. | . | 1. | . | 1. |
| - Bronchiolization | . | . | . | 1. | . | . | . | . | . | . |
| - Pleura Fibrosis. | . | . | . | . | 1. | 1. | . | 1. | . | 1. |
| TRACHEA | - | - | - | - | - | + | - | - | - | - |
| - Squamous Metaplasia | . | . | . | . | . | 1. | . | . | . | . |
| EPIDIDYMIS, LEFT | + | + | + | + | + | + | - | + | + | + |
| - Hypospermia | 3. | 4. | 3. | 4. | 4. | 4. | . | 4. | 4. | 4. |
| TESTIS, LEFT | +G | +G | + | +G | +G | +G | +G | +G | +G | +G |
| - Interstitial Cell Adenoma | P. | P. | . | P. | P. | P. | P. | P. | P. | P. |
| - Tubular Atrophy. | . | . | 2. | 4. | . | . | . | . | 4. | . |
| - Interstitial Cell Hyperplasia | . | . | 2. | . | . | . | . | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | ' | ' | ' | ' | G | ' | ' | ' | ' |
| PREPUTIAL GLANDS | ' | ' | +G | +G | ' | ' | ' | ' | ' | ' |
| - Adenoma | | | P. | . | | | | | | |
| - Inflammation Suppurative. | | | . | 3. | | | | | | |
| SYSTEMIC NEOPLASMS | ' | ' | + | + | ' | ' | + | ' | + | ' |
| - Malignant Lymphoma. | | | N0. | N0. | | | N0. | | N0. | |
| LIVER | ' | ' | +G | +G | +G | +G | +G | ' | ' | ' |
| - Bile Duct Hyperplasia. | | | . | . | 2. | 2. | . | | | |
| - Mononuclear Cell Leukemia | | | M45. | M45. | . | . | M45. | | | |
| - Hepatodiaphragmatic Nodule | | | . | . | . | P. | . | | | |
| - Eosinophilic Focus. | | | . | . | P. | . | . | | | |
| SPLEEN | ' | ' | +G | +G | +G | ' | +G | ' | +G | ' |
| - Mononuclear Cell Leukemia | | | M45. | M45. | . | | M45. | | M45. | |
| - Extramedullary Hematopoesis. | | | . | . | 3. | | . | | . | |
| LUNG | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Mononuclear Cell Leukemia | | | | | | | M45. | | | |
| TESTES | ' | +G | ' | ' | +G | +G | G | ' | ' | ' |
| - Tubular Atrophy. | | . | | | ( 4. | ( 4. | . | | | |
| - Interstitial Cell Adenoma | | P. | | | . | . | . | | | |
| MAMMARY GLAND | ' | ' | ' | ' | ' | + | ' | ' | ' | ' |
| - Galactocoele. | | | | | | P. | | | | |
| KIDNEYS | ' | ' | ' | +G | +G | +G | +G | ' | +G | ' |
| - Nephropathy | | | | 2. | 3. | 3. | 2. | | 3. | |
| - Mononuclear Cell Leukemia | | | | . | . | . | M45. | | . | |
| LYMPH NODES | ' | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Plasma Cell Hyperplasia | | | | | 3. | | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 3, LA

| ANIMAL NUMBER : | 307 MK0 | 319 MK0+ | 321 MK0+ | 349 MK0+ | 350 MK0 | 351 MK0 | 352 MK0 | 353 MK0 | 354 MK0+ | 355 MK0+ |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Mononuclear Cell Leukemia | . | . | . | . | . | . | M45. | . | . | . |
| - Alveolar Epithelium Hyperplasia | . | 1. | . | . | . | . | . | . | . | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | . | . | 1. | 1. | 1. | 1. | . | . | 1. |
| - Bronchiolization | . | . | . | 1. | . | . | . | . | 1. | 1. |
| - Pleura Fibrosis. | 1. | . | . | . | . | . | 1. | 1. | . | . |
| TRACHEA | - | - | - | - | - | + | - | - | - | - |
| - Chronic Inflammation | . | . | . | . | . | 1. | . | . | . | . |
| EPIDIDYMIS, LEFT | + | + | - | - | + | + | + | - | - | - |
| - Hypospermia | 3. | 4. | . | . | 3. | 3. | 4. | . | . | . |
| TESTIS, LEFT | + | +G | + | +G | +G | +G | +G | + | - | +G |
| - Interstitial Cell Adenoma | P. | P. | . | . | P. | P. | P. | . | . | . |
| - Tubular Atrophy. | . | . | 2. | 2. | . | . | . | 2. | . | 1. |
| - Edema | . | . | . | . | . | . | . | 2. | . | . |
| - Interstitial Cell Hyperplasia | . | . | . | . | . | . | . | . | . | 3. |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| PREPUTIAL GLANDS | ' | +G | ' | ' | ' | ' | ' | ' | ' | ' |
| - Carcinoma. | | P. | | | | | | | | |
| SYSTEMIC NEOPLASMS | ' | ' | ' | ' | ' | ' | + | ' | ' | ' |
| - Malignant Lymphoma. | | | | | | | N0. | | | |
| LIVER | ' | ' | ' | +G | ' | ' | +G | ' | ' | +G |
| - Bile Duct Hyperplasia. | | | | 2. | | | 2. | | | 2. |
| - Mononuclear Cell Leukemia | | | | . | | | M45. | | | . |
| SPLEEN | ' | +G | ' | ' | ' | ' | +G | ' | ' | ' |
| - Mononuclear Cell Leukemia | | . | | | | | M45. | | | |
| - Extramedullary Hematopoesis. | | 4. | | | | | . | | | |
| LUNG | ' | G | ' | ' | ' | ' | ' | ' | ' | ' |
| TESTES | ' | ' | ' | ' | +G | +G | +G | +G | ' | ' |
| - Edema | | | | | . | . | 2. | . | | |
| - Tubular Atrophy. | | | | | . | . | 4. | . | | |
| - Interstitial Cell Adenoma | | | | | P. | P. | . | ( P. | | |
| KIDNEYS | ' | ' | +G | ' | ' | ' | ' | ' | ' | ' |
| - Nephropathy | | | 3. | | | | | | | |
| MESENTERY | ' | + | ' | ' | ' | ' | ' | ' | ' | ' |
| - Schwannoma | | P. | | | | | | | | |
| BODY CAVITIES | ' | G | ' | ' | ' | ' | ' | ' | ' | ' |
| EYES | ' | ' | ' | ' | ' | ' | ' | ' | ' | +G |
| - Cornea Ulcer. | | | | | | | | | | ( 4. |
| - Squamous Cell Carcinoma | | | | | | | | | | M10. |
| HARDERIAN GLANDS | ' | ' | ' | +G | ' | ' | ' | ' | ' | +G |
| - Inflammation. | | | | ( 1. | | | | | | . |
| - Squamous Cell Carcinoma | | | | . | | | | | | M10. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 3, LA

| ANIMAL NUMBER : | 307 MK0 | 319 MK0+ | 321 MK0+ | 349 MK0+ | 350 MK0 | 351 MK0 | 352 MK0 | 353 MK0 | 354 MK0+ | 355 MK0+ |
|---|---|---|---|---|---|---|---|---|---|---|
| THYROID GLAND | ' | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Follicular Cell Carcinoma | | | | ( P. | | | | | | |
| GANGLION,GASS.,RIGHT | ' | ' | ' | ' | ' | ' | ' | ' | ' | +G |
| - Squamous Cell Carcinoma | | | | | | | | | | M10. |
| PITUITARY GLAND | ' | ' | +G | ' | ' | ' | ' | ' | ' | +G |
| - Pars Distalis Adenoma. | | | P. | | | | | | | . |
| - Pars Distalis Hyperplasia Focal | | | . | | | | | | | 3. |
| PALATE (ORAL MUCOSA) | ' | ' | ' | -G | ' | ' | ' | ' | ' | +G |
| - Squamous Cell Carcinoma | | | | . | | | | | | N0. |
| STOMACH | ' | ' | ' | ' | ' | ' | ' | ' | ' | G |
| INTEST-LG, CECUM | ' | ' | ' | ' | ' | ' | ' | ' | ' | G |
| INTEST-SM, ILEUM | ' | ' | ' | ' | ' | ' | ' | ' | ' | G |
| INTEST-LG, COLON | ' | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Adhesion | | | | P. | | | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 3, LA

| ANIMAL NUMBER : | 356 MK0 | 357 MK0+ | 358 MK0 | 359 MK0+ | 360 MK0 | 361 MK0 | 362 MK0 | 363 MK0 | 365 MK0 | 366 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Mononuclear Cell Leukemia | . | . | . | . | . | . | . | . | M45. | M45. |
| - Alveolar Epithelium Hyperplasia | . | . | 1. | . | . | . | 3. | . | . | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | . | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | . | 1. | 1. | . | 1. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | 1. | . | 1. | 1. | . | 1. | 1. | 1. |
| - Pleura Fibrosis. | 1. | . | 1. | . | 1. | 1. | . | . | . | . |
| TRACHEA | + | - | - | - | - | - | - | - | - | - |
| - Chronic Inflammation | 1. | . | . | . | . | . | . | . | . | . |
| EPIDIDYMIS, LEFT | + | +G | + | - | - | + | - | +G | + | - |
| - Mesothelioma. | . | M45. | . | . | . | . | . | . | . | . |
| - Hypospermia | 3. | . | 4. | . | . | 4. | . | 4. | 3. | . |
| TESTIS, LEFT | +G | +G | +G | + | + | +G | +G | +G | +G | + |
| - Interstitial Cell Adenoma | P. | P. | P. | . | P. | P. | P. | P. | P. | P. |
| - Mesothelioma. | . | M45. | . | . | . | . | . | M26. | . | . |
| - Tubular Atrophy. | . | . | . | 1. | . | . | . | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| PREPUTIAL GLANDS | ' | ' | ' | ' | ' | ' | ' | ' | ' | +G |
| - Carcinoma. | | | | | | | | | | ( P. |
| SYSTEMIC NEOPLASMS | ' | + | ' | ' | ' | ' | ' | ' | + | + |
| - Malignant Lymphoma. | | N0. | | | | | | | N0. | N0. |
| LIVER | ' | ' | ' | ' | ' | +G | ' | +G | +G | ' |
| - Mononuclear Cell Leukemia | | | | | | . | | M26. | M45. | |
| - Macrovesiculation | | | | | | 2. | | . | . | |
| SPLEEN | ' | ' | ' | ' | ' | +G | ' | +G | +G | ' |
| - Mononuclear Cell Leukemia | | | | | | . | | . | M45. | |
| - Extramedullary Hematopoesis. | | | | | | 2. | | 3. | . | |
| TESTES | +G | ' | +G | G | ' | +G | +G | +G | ' | +G |
| - Mesothelioma. | . | | . | . | | . | . | M26. | | . |
| - Interstitial Cell Adenoma | P. | | P. | . | | P. | P. | . | | P. |
| KIDNEYS | ' | +G | ' | ' | ' | ' | ' | ' | +G | ' |
| - Nephropathy | | 2. | | | | | | | 3. | |
| MESENTERY | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Mesothelioma. | | | | | | | | M26. | | |
| PARATHYROID GLAND | ' | ' | ' | ' | ' | G | ' | ' | ' | ' |
| LYMPH NODES | ' | ' | ' | ' | ' | +G | ' | +G | ' | ' |
| - Pigment | | | | | | 2. | | . | | |
| - Mesothelioma. | | | | | | . | | M26. | | |
| BODY CAVITIES | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Mesothelioma. | | | | | | | | M26. | | |
| EYES | ' | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Cornea Ulcer. | | | | ( 4. | | | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 3, LA

| ANIMAL NUMBER : | 356 MK0 | 357 MK0+ | 358 MK0 | 359 MK0+ | 360 MK0 | 361 MK0 | 362 MK0 | 363 MK0 | 365 MK0 | 366 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| PALATE (ORAL MUCOSA) | ' | ' | ' | + | ' | ' | ' | ' | ' | ' |
| - Squamous Cell Carcinoma | | | | N0. | | | | | | |
| GANGLION,GASS.,LEFT | ' | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Squamous Cell Carcinoma | | | | M10. | | | | | | |
| EPIDIDYMIDES | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Mesothelioma. | | | | | | | | N0. | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 3, LA

| ANIMAL NUMBER : | 367 MK0+ | 368 MK0 | 369 MK0 | 370 MK0 | 371 MK0+ | 372 MK0 | 373 MK0+ | 374 MK0+ | 375 MK0 | 376 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| GENERAL OBSERVATIONS | G | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| LUNG, LEFT | +G | - | + | + | +G | +G | + | + | + | + |
| - Mononuclear Cell Leukemia | M45. | . | . | . | M45. | . | . | M45. | . | . |
| - Alveolar Epithelium Hyperplasia | . | . | . | 1. | . | 1. | . | . | . | . |
| - Foreign Body. | . | . | . | P. | . | P. | P. | . | P. | P. |
| - Alveolus Inflammation. | . | . | 1. | 1. | . | 2. | 1. | . | 1. | 1. |
| - Interstitial Fibrosis. | . | . | . | 1. | . | 1. | . | . | 1. | 1. |
| - Pleura Fibrosis. | . | . | . | 1. | . | 1. | . | . | . | . |
| TRACHEA | - | - | - | - | - | - | - | - | - | + |
| - Chronic Inflammation | . | . | . | . | . | . | . | . | . | 1. |
| EPIDIDYMIS, LEFT | + | + | - | - | - | + | - | - | + | + |
| - Hypospermia | 4. | 3. | . | . | . | 3. | . | . | 3. | 4. |
| TESTIS, LEFT | +G | +G | + | + | 0 | +G | +G | -G | +G | +G |
| - Interstitial Cell Adenoma | P. | P. | . | . | . | P. | P. | . | P. | P. |
| - Tubular Atrophy. | 3. | . | 2. | 2. | . | . | 2. | . | . | . |
| - Edema | . | . | . | 2. | . | . | . | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | G | ' | ' | ' | ' | ' | ' | ' | ' |
| SYSTEMIC NEOPLASMS | + | ' | ' | ' | + | ' | ' | + | ' | ' |
| - Malignant Lymphoma. | N0. | | | | N0. | | | N0. | | |
| LIVER | +G | +G | ' | ' | +G | ' | ' | +G | ' | ' |
| - Bile Duct Hyperplasia. | . | 2. | | | . | | | . | | |
| - Mixed Cell Focus | . | P. | | | . | | | . | | |
| - Mononuclear Cell Leukemia | M45. | . | | | M45. | | | M45. | | |
| - Macrovesiculation | . | 2. | | | . | | | . | | |
| SPLEEN | +G | +G | ' | ' | +G | ' | ' | +G | ' | ' |
| - Mononuclear Cell Leukemia | M45. | . | | | M45. | | | M45. | | |
| - Extramedullary Hematopoesis. | . | 2. | | | . | | | . | | |
| LUNG | +G | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | M45. | | | | M45. | | | | | |
| TESTES | G | +G | +G | ' | ' | +G | ' | ' | +G | ' |
| - Tubular Atrophy. | . | ( 4. | . | | | . | | ( 4. | | |
| - Interstitial Cell Adenoma | . | . | ( P. | | | P. | | | . | |
| MAMMARY GLAND | ' | +G | ' | ' | ' | ' | ' | ' | ' | ' |
| - Fibroadenoma. | | P. | | | | | | | | |
| - Adenocarcinoma | | P. | | | | | | | | |
| KIDNEYS | +G | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| - Nephropathy | 2. | | | | | | | | | |
| - Mononuclear Cell Leukemia | M45. | | | | | | | | | |
| LYMPH NODES | ' | ' | ' | G | +G | ' | +G | ' | ' | ' |
| - Plasma Cell Hyperplasia | | | | . | . | | 3. | | | |
| - Mononuclear Cell Leukemia | | | | . | M45. | | . | | | |
| EYES | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Squamous Cell Carcinoma | | | | | | | M10. | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 3, LA

| ANIMAL NUMBER : | 367 MK0+ | 368 MK0 | 369 MK0 | 370 MK0 | 371 MK0+ | 372 MK0 | 373 MK0+ | 374 MK0+ | 375 MK0 | 376 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDERIAN GLANDS | ' | ' | ' | ' | +G | ' | +G | ' | ' | ' |
| - Squamous Cell Carcinoma | | | | | . | | M10. | | | |
| - Mononuclear Cell Leukemia | | | | | M45. | | . | | | |
| GANGLION,GASS.,RIGHT | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Squamous Cell Carcinoma | | | | | | | M10. | | | |
| PALATE (ORAL MUCOSA) | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Squamous Cell Carcinoma | | | | | | | N0. | | | |
| STOMACH | ' | ' | ' | ' | G | ' | ' | ' | ' | ' |
| INTEST-LG, CECUM | ' | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Ulceration | | | | | 4. | | | | | |
| INTEST-SM, ILEUM | ' | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | | | | | M45. | | | | | |
| BRAIN | ' | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | | | | | M45. | | | | | |
| PANCREAS | ' | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | | | | | M45. | | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 3, LA

| ANIMAL NUMBER : | 377 MK0 | 378 MK0 | 379 MK0+ | 380 MK0 | 381 MK0 | 382 MK0+ | 383 MK0+ | 384 MK0 | 385 MK0 | 386 MK0+ |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | 0 | + | + | + | + |
| - Mononuclear Cell Leukemia | . | . | . | . | . | . | . | . | . | M45. |
| - Alveolar Epithelium Hyperplasia | 1. | . | . | . | . | . | . | . | . | . |
| - Infiltration Mixed Cell | . | . | 2. | . | . | . | . | . | . | . |
| - Foreign Body. | P. | P. | . | P. | P. | . | P. | P. | P. | P. |
| - Alveolus Inflammation. | 2. | 1. | . | 1. | 1. | . | 1. | 1. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | . | 1. | . | . | 1. | 1. | 1. | . |
| - Bronchiolization | . | . | . | . | . | . | 1. | . | . | . |
| - Pleura Fibrosis. | . | . | . | . | 1. | . | . | 1. | 1. | . |
| TRACHEA | - | - | - | - | - | 0 | - | - | - | - |
| EPIDIDYMIS, LEFT | + | + | + | + | - | + | +G | +G | + | - |
| - Mesothelioma. | . | . | . | . | . | . | N0. | . | . | . |
| - Hypospermia | 2. | 3. | 4. | 2. | . | 4. | 4. | . | 4. | . |
| - Blood Vessels Arteritis | . | . | . | . | . | . | . | 2. | . | . |
| TESTIS, LEFT | +G | +G | +G | +G | - | + | +G | +G | +G | +G |
| - Interstitial Cell Adenoma | P. | P. | P. | P. | . | . | P. | P. | P. | . |
| - Mesothelioma. | . | . | . | . | . | . | M26. | . | . | . |
| - Tubular Atrophy. | . | . | 2. | . | . | 4. | . | . | . | 2. |
| - Edema | . | . | . | . | . | . | 3. | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Sarcoma | | | | | | P. | | | | |
| PREPUTIAL GLANDS | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Adenoma | | | | | | | | ( P. | | |
| SYSTEMIC NEOPLASMS | ' | ' | ' | ' | ' | ' | ' | ' | ' | + |
| - Malignant Lymphoma. | | | | | | | | | | N0. |
| LIVER | ' | ' | ' | ' | ' | ' | ' | ' | ' | +G |
| - Mononuclear Cell Leukemia | | | | | | | | | | M45. |
| SPLEEN | ' | ' | ' | ' | ' | AG | +G | ' | ' | +G |
| - Mononuclear Cell Leukemia | | | | | | . | . | | | M45. |
| - Extramedullary Hematopoesis. | | | | | | . | 3. | | | . |
| - Mesothelioma. | | | | | | . | M26. | | | . |
| LUNG | ' | ' | ' | ' | ' | ' | G | ' | ' | +G |
| - Mononuclear Cell Leukemia | | | | | | | . | | | M45. |
| TESTES | +G | ' | G | +G | ' | +G | G | +G | ' | +G |
| - Tubular Atrophy. | . | | . | ( 2. | | 4. | . | ( 4. | | 2. |
| - Interstitial Cell Adenoma | P. | | . | . | | . | . | . | | . |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | ' | ' | ' | +G |
| - Secretion. | | | | | | | | | | 2. |
| KIDNEYS | ' | ' | ' | ' | ' | ' | +G | ' | ' | +G |
| - Nephropathy | | | | | | | . | | | 3. |
| - Tubule Pigment | | | | | | | 3. | | | . |
| BODY CAVITIES | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Mesothelioma. | | | | | | | M26. | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 3, LA

| ANIMAL NUMBER : | 377 MK0 | 378 MK0 | 379 MK0+ | 380 MK0 | 381 MK0 | 382 MK0+ | 383 MK0+ | 384 MK0 | 385 MK0 | 386 MK0+ |
|---|---|---|---|---|---|---|---|---|---|---|
| EYES | ' | ' | +G | ' | +G | ' | ' | ' | ' | ' |
| - Retinal Degeneration | | | . | | 4. | | | | | |
| - Lens Cataract | | | . | | ( 2. | | | | | |
| - Anterior Synechia | | | . | | P. | | | | | |
| - Cornea Inflammation | | | . | | 3. | | | | | |
| - Panophthalmitis. | | | 4. | | . | | | | | |
| PITUITARY GLAND | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Pars Distalis Adenoma. | | | | | | | P. | | | |
| PALATE (ORAL MUCOSA) | ' | ' | +G | ' | ' | ' | ' | ' | ' | ' |
| - Squamous Cell Carcinoma | | | N0. | | | | | | | |
| GANGLION,GASS.,LEFT | ' | ' | +G | ' | ' | ' | ' | ' | ' | ' |
| - Squamous Cell Carcinoma | | | M10. | | | | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 3, LA

| ANIMAL NUMBER : | 387 MK0+ | 388 MK0 | 389 MK0 | 390 MK0+ | 391 MK0+ | 392 MK0 | 393 MK0 | 394 MK0 | 395 MK0 | 397 MK0+ |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Mononuclear Cell Leukemia | . | . | . | . | . | . | . | . | . | M45. |
| - Foreign Body. | P. | P. | P. | . | P. | P. | P. | P. | P. | . |
| - Alveolus Inflammation. | 1. | 1. | 1. | . | 1. | 2. | 1. | 1. | 1. | . |
| - Interstitial Fibrosis. | 1. | 1. | 1. | . | . | . | 1. | 1. | . | . |
| - Bronchiolization | 1. | . | . | . | . | . | . | . | . | . |
| - Osteosarcoma. | . | . | . | M65. | . | . | . | . | . | . |
| - Pleura Fibrosis. | . | 1. | 1. | . | . | . | . | 1. | 1. | . |
| TRACHEA | - | - | + | - | - | - | - | - | - | - |
| - Chronic Inflammation | . | . | 2. | . | . | . | . | . | . | . |
| EPIDIDYMIS, LEFT | - | + | + | - | + | - | + | + | - | - |
| - Hypospermia | . | 2. | 2. | . | 2. | . | 3. | 2. | . | . |
| TESTIS, LEFT | +G | +G | +G | + | +G | +G | +G | +G | +G | +G |
| - Interstitial Cell Adenoma | . | P. | P. | . | . | P. | P. | P. | P. | P. |
| - Tubular Atrophy. | . | . | . | 2. | 2. | . | . | . | . | 2. |
| - Edema | 1. | . | . | . | . | . | . | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | +G | +G | ' | ' | ' | ' | ' | ' | +G |
| - Keratoacanthoma. | | . | P. | | | | | | | . |
| - Epidermal Cyst | | P. | . | | | | | | | P. |
| SYSTEMIC NEOPLASMS | ' | ' | ' | ' | ' | ' | ' | ' | ' | + |
| - Malignant Lymphoma. | | | | | | | | | | N0. |
| LIVER | ' | ' | ' | +G | +G | ' | +G | +G | ' | +G |
| - Bile Duct Hyperplasia. | | | | 1. | . | | 2. | 2. | | . |
| - Mononuclear Cell Leukemia | | | | . | . | | . | . | | M45. |
| - Macrovesiculation | | | | . | 2. | | . | 2. | | . |
| SPLEEN | ' | ' | ' | ' | +G | ' | +G | +G | ' | +G |
| - Mononuclear Cell Leukemia | | | | | . | | . | . | | M45. |
| - Extramedullary Hematopoesis. | | | | | . | | 2. | 2. | | . |
| - Atrophy | | | | | 3. | | . | . | | . |
| LUNG | ' | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Osteosarcoma. | | | | M65. | | | | | | |
| TESTES | ' | ' | +G | ' | 0G | ' | +G | +G | +G | ' |
| - Tubular Atrophy. | | | ( 3. | | . | | ( 3. | . | . | |
| - Interstitial Cell Adenoma | | | . | | . | | . | P. | P. | |
| - Sperm Granuloma. | | | P. | | . | | . | . | . | |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Galactocole Hemorrhage | | | | | | | | P. | | |
| KIDNEYS | +G | ' | ' | ' | +G | ' | +G | ' | ' | +G |
| - Nephropathy | 3. | | | | 4. | | 3. | | | 3. |
| ADRENAL GLANDS | ' | ' | ' | ' | G | ' | ' | ' | ' | ' |
| LYMPH NODES | ' | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Plasma Cell Hyperplasia | | | | 2. | | | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 3, LA

| ANIMAL NUMBER : | 387 MK0+ | 388 MK0 | 389 MK0 | 390 MK0+ | 391 MK0+ | 392 MK0 | 393 MK0 | 394 MK0 | 395 MK0 | 397 MK0+ |
|---|---|---|---|---|---|---|---|---|---|---|
| EYES | ' | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Cornea Ulcer. | | | | 1. | | | | | | |
| - Socket Osteosarcoma | | | | (N0. | | | | | | |
| PITUITARY GLAND | +G | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Pars Distalis Adenoma. | P. | | | | P. | | | | | |
| STOMACH | ' | ' | ' | G | +G | ' | ' | ' | ' | ' |
| - Ulceration | | | | . | 3. | | | | | |
| INTEST-LG, CECUM | ' | ' | ' | G | ' | ' | ' | ' | ' | ' |
| INTEST-SM, ILEUM | ' | ' | ' | G | ' | ' | ' | ' | ' | ' |
| INTEST-SM, JEJUNUM | ' | ' | ' | G | ' | ' | ' | ' | ' | ' |
| INTEST-LG, COLON | ' | ' | ' | G | ' | ' | ' | ' | ' | ' |
| BRAIN | ' | ' | ' | ' | . | ' | ' | ' | ' | ' |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 4, LA

| ANIMAL NUMBER : | 419 MK0+ | 420 MK0+ | 423 MK0 | 449 MK0 | 450 MK0 | 451 MK0+ | 452 MK0 | 453 MK0 | 454 MK0 | 455 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | +G | + | + | + |
| - Mononuclear Cell Leukemia | . | . | M45. | . | . | M26. | . | . | . | . |
| - Foreign Body. | . | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | . | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 2. |
| - Interstitial Fibrosis. | . | . | 1. | 1. | . | . | 1. | 1. | 1. | 1. |
| - Alveolar Bronchiolar Adenoma | . | . | . | . | . | . | P. | . | . | P. |
| - Infiltrate Mixed Cell Focal. | 1. | . | . | . | . | . | . | . | . | . |
| - Pleura Fibrosis. | . | . | . | 1. | . | . | 1. | 1. | . | . |
| TRACHEA | - | - | - | - | + | - | - | - | - | - |
| - Chronic Inflammation | . | . | . | . | 1. | . | . | . | . | . |
| EPIDIDYMIS, LEFT | + | - | + | + | + | +G | - | - | - | + |
| - Mesothelioma. | . | . | . | . | . | N0. | . | . | . | . |
| - Hypospermia | 4. | . | 3. | 4. | 4. | . | . | . | . | 4. |
| TESTIS, LEFT | +G | +G | +G | +G | + | +G | + | +G | + | +G |
| - Interstitial Cell Adenoma | P. | . | P. | P. | P. | P. | . | . | P. | P. |
| - Mesothelioma. | . | . | . | . | . | M26. | . | . | . | . |
| - Tubular Atrophy. | . | 1. | . | . | . | . | 2. | . | . | . |
| - Edema | . | . | . | . | . | . | . | 2. | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| PREPUTIAL GLANDS | +G | +G | ' | ' | ' | ' | ' | ' | ' | +G |
| - Adenoma | . | . | | | | | | | | P. |
| - Carcinoma. | P. | ( P. | | | | | | | | . |
| SYSTEMIC NEOPLASMS | ' | ' | + | ' | ' | ' | ' | ' | ' | ' |
| - Malignant Lymphoma. | | | N0. | | | | | | | |
| LIVER | ' | +G | +G | ' | ' | +G | +G | ' | ' | ' |
| - Bile Duct Hyperplasia. | | . | . | | | . | 2. | | | |
| - Mononuclear Cell Leukemia | | . | M45. | | | P. | . | | | |
| - Macrovesiculation | | . | . | | | . | 1. | | | |
| - Hepatodiaphragmatic Nodule | | . | . | | | P. | . | | | |
| - Eosinophilic Focus. | | P. | . | | | . | . | | | |
| SPLEEN | ' | +G | +G | ' | ' | +G | +G | ' | ' | ' |
| - Mononuclear Cell Leukemia | | . | M45. | | | M26. | . | | | |
| - Extramedullary Hematopoesis. | | 3. | . | | | . | 2. | | | |
| LUNG | G | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | . | | | | | M26. | | | | |
| TESTES | 0G | 0G | +G | +G | +G | 0G | +G | ' | ' | +G |
| - Tubular Atrophy. | . | . | ( 4. | . | . | . | . | | | . |
| - Interstitial Cell Adenoma | . | . | . | P. | P. | . | P. | | | ( P. |
| MAMMARY GLAND | ' | ' | +G | ' | ' | ' | ' | ' | ' | ' |
| - Fibroadenoma. | | | P. | | | | | | | |
| KIDNEYS | +G | ' | +G | ' | ' | +G | +G | ' | ' | ' |
| - Nephropathy | 3. | | 3. | | | 2. | 3. | | | |
| ADRENAL GLANDS | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | | | | | | M26. | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 4, LA

| ANIMAL NUMBER : | 419 MK0+ | 420 MK0+ | 423 MK0 | 449 MK0 | 450 MK0 | 451 MK0+ | 452 MK0 | 453 MK0 | 454 MK0 | 455 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| MESENTERY | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Mesothelioma. | | | | | | M26. | | | | |
| LYMPH NODES | ' | ' | +G | ' | ' | ' | +G | ' | ' | ' |
| - Plasma Cell Hyperplasia | | | 2. | | | | 2. | | | |
| BODY CAVITIES | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Mesothelioma. | | | | | | M26. | | | | |
| URINARY BLADDER | ' | ' | ' | ' | ' | G | ' | ' | ' | ' |
| ADIPOSE TISSUE | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Mesothelioma. | | | | | | M26. | | | | |
| SALIVARY GLANDS | ' | ' | ' | ' | ' | ' | G | ' | ' | ' |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 4, LA

| ANIMAL NUMBER : | 456 MK0 | 457 MK0 | 458 MK0 | 459 MK0 | 460 MK0 | 461 MK0 | 462 MK0+ | 463 MK0 | 464 MK0 | 465 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Mononuclear Cell Leukemia | . | . | M45. | . | M45. | . | . | . | . | . |
| - Alveolar Epithelium Hyperplasia | 2. | . | . | . | . | . | . | . | . | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 2. | 2. | 1. | 2. | 1. | 1. | 1. | 1. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| - Pleura Fibrosis. | 1. | 1. | . | 1. | . | . | . | . | 1. | . |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | + | + | - | + | + | + | - | - | + | - |
| - Hypospermia | 4. | 4. | . | 4. | 3. | 2. | . | . | 3. | . |
| TESTIS, LEFT | +G | +G | + | +G | +G | +G | + | + | +G | + |
| - Interstitial Cell Adenoma | P. | P. | P. | P. | P. | P. | . | . | P. | . |
| - Tubular Atrophy. | . | . | . | . | . | . | 1. | . | . | 1. |
| - Edema | . | . | . | . | . | . | . | 1. | . | 2. |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | +G | +G | ' | +G | ' | ' | ' | ' | ' |
| - Epidermal Cyst | | . | P. | | . | | | | | |
| - Sarcoma | | P. | . | | . | | | | | |
| - Basal Cell Adenoma. | | . | . | | P. | | | | | |
| SYSTEMIC NEOPLASMS | ' | ' | + | ' | + | ' | ' | ' | ' | ' |
| - Malignant Lymphoma. | | | N0. | | N0. | | | | | |
| LIVER | ' | ' | +G | +G | +G | ' | ' | ' | +G | ' |
| - Bile Duct Hyperplasia. | | | 2. | 2. | 2. | | | | 2. | |
| - Mononuclear Cell Leukemia | | | M45. | . | M45. | | | | . | |
| - Macrovesiculation | | | . | 1. | . | | | | . | |
| SPLEEN | +G | ' | +G | +G | +G | ' | ' | ' | +G | ' |
| - Mononuclear Cell Leukemia | . | | M45. | . | M45. | | | | . | |
| - Extramedullary Hematopoesis. | 2. | | . | 2. | . | | | | 2. | |
| TESTES | +G | +G | ' | +G | +G | +G | 0G | ' | +G | ' |
| - Tubular Atrophy. | ( 5. | 2. | | . | . | . | . | ( 3. | | |
| - Interstitial Cell Adenoma | . | . | | P. | P. | P. | . | | . | |
| - Interstitial Cell Hyperplasia | | . ( 2. | | . | . | . | . | | . | |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Secretion. | | | | | | | 2. | | | |
| KIDNEYS | ' | ' | ' | ' | +G | +G | +G | ' | +G | ' |
| - Nephropathy | | | | | 3. | 3. | 3. | | 3. | |
| ADRENAL GLANDS | ' | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Cortex Focal Hyperplasia. | | | | | 2. | | | | | |
| - Medulla Phaeochromocytoma | | | | | ( P. | | | | | |
| PITUITARY GLAND | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Pars Distalis Adenoma. | | | | | | | P. | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 4, LA

| ANIMAL NUMBER : | 466 MK0 | 467 MK0 | 468 MK0 | 469 MK0+ | 470 MK0+ | 471 MK0+ | 472 MK0 | 473 MK0+ | 474 MK0 | 475 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Mononuclear Cell Leukemia | M45. | . | . | . | . | . | . | . | . | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | 1. | . | 2. | 1. | 1. | 2. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | 1. | 1. | . | 1. | 1. | 1. | 1. | 2. |
| - Pigmented Histiocytes. | . | . | . | 1. | . | . | . | . | . | . |
| - Pleura Fibrosis. | . | . | . | . | . | . | 1. | . | . | . |
| TRACHEA | - | - | - | - | - | - | - | - | + | - |
| - Chronic Inflammation | . | . | . | . | . | . | . | . | 2. | . |
| EPIDIDYMIS, LEFT | - | + | + | - | - | + | + | - | + | - |
| - Mesothelioma. | . | . | . | . | . | M25. | . | . | . | . |
| - Hypospermia | . | 3. | 2. | . | . | . | 2. | . | 2. | . |
| TESTIS, LEFT | + | +G | +G | + | - | +G | +G | +G | +G | + |
| - Interstitial Cell Adenoma | . | P. | P. | . | . | P. | P. | . | P. | . |
| - Mesothelioma. | . | . | . | . | . | N0. | . | . | . | . |
| - Tubular Atrophy. | 1. | . | . | 2. | . | . | . | . | . | . |
| - Edema | 2. | . | . | . | . | . | . | 1. | . | . |
| - Interstitial Cell Hyperplasia | . | . | . | . | . | . | . | . | . | 1. |
| STERNUM | - | - | - | - | - | - | 0 | - | - | - |
| SKIN/SUBCUTIS | +G | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| - Squamous Cell Carcinoma | P. | | | | | | | | | |
| SYSTEMIC NEOPLASMS | + | ' | ' | ' | ' | ' | ' | ' | ' | + |
| - Malignant Lymphoma. | N0. | | | | | | | | | N0. |
| LIVER | +G | ' | ' | ' | ' | +G | ' | +G | ' | +G |
| - Bile Duct Hyperplasia. | . | | | | | . | | 2. | | 2. |
| - Mononuclear Cell Leukemia | M45. | | | | | . | | . | | M45. |
| - Mesothelioma. | . | | | | | M25. | | . | | . |
| SPLEEN | +G | ' | ' | ' | ' | ' | ' | +G | ' | +G |
| - Mononuclear Cell Leukemia | M45. | | | | | | | . | | M45. |
| - Extramedullary Hematopoesis. | . | | | | | | | 3. | | . |
| TESTES | ' | +G | ' | ' | ' | ' | +G | 0G | ' | ' |
| - Interstitial Cell Adenoma | | P. | | | | | P. | . | | |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Secretion. | | | | | | | | 2. | | |
| KIDNEYS | ' | ' | ' | +G | ' | +G | ' | +G | ' | ' |
| - Nephropathy | | | | 1. | | 2. | | 2. | | |
| ADRENAL GLANDS | ' | ' | ' | + | ' | ' | ' | ' | ' | ' |
| - Cortical Carcinoma. | | | | ( P. | | | | | | |
| LYMPH NODES | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Plasma Cell Hyperplasia | | | | | | | | 3. | | |
| - Cyst | | | | | | | | P. | | |
| BODY CAVITIES | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Mesothelioma. | | | | | | M25. | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 4, LA

| ANIMAL NUMBER : | 466 MK0 | 467 MK0 | 468 MK0 | 469 MK0+ | 470 MK0+ | 471 MK0+ | 472 MK0 | 473 MK0+ | 474 MK0 | 475 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| EYES | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Cornea Ulcer. | | | | | | | | 4. | | |
| THYROID GLAND | ' | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Follicular Cell Carcinoma | | | | | (N0. | | | | | |
| GANGLION,GASS.,RIGHT | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Squamous Cell Carcinoma | | | | | | | | M10. | | |
| PITUITARY GLAND | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Pars Distalis Adenoma. | | | | | | | | P. | | |
| PALATE (ORAL MUCOSA) | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Squamous Cell Carcinoma | | | | | | | | N0. | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 4, LA

| ANIMAL NUMBER : | 476 MK0 | 477 MK0 | 479 MK0 | 480 MK0 | 481 MK0 | 482 MK0 | 483 MK0 | 484 MK0 | 485 MK0 | 486 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Alveolar Epithelium Hyperplasia | . | 1. | . | . | . | . | . | 1. | 1. | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 2. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | 2. | 1. | 1. | 1. | 1. | 1. | . | 1. | 1. |
| - Pleura Fibrosis. | 1. | 1. | 1. | 1. | 1. | 1. | . | . | . | 1. |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | - | + | - | - | - | - | + | + | + | - |
| - Hypospermia | . | 3. | . | . | . | . | 4. | 3. | 3. | . |
| TESTIS, LEFT | + | +G | + | +G | + | +G | +G | + | +G | + |
| - Interstitial Cell Adenoma | . | P. | . | P. | P. | P. | P. | P. | P. | . |
| - Tubular Atrophy. | 2. | . | 1. | 2. | . | . | . | . | . | 1. |
| - Edema | . | . | 2. | . | . | . | . | . | . | 1. |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | ' | ' | ' | ' | ' | G | ' | ' | ' |
| LIVER | ' | ' | ' | ' | ' | ' | ' | +G | ' | +G |
| - Bile Duct Hyperplasia. | | | | | | | | 2. | | 2. |
| SPLEEN | ' | ' | ' | ' | ' | ' | +G | +G | ' | ' |
| - Extramedullary Hematopoesis. | | | | | | | . | 3. | | |
| - Stromal Hyperplasia | | | | | | | 3. | . | | |
| TESTES | ' | +G | ' | +G | ' | +G | +G | +G | +G | +G |
| - Interstitial Cell Adenoma | | P. | | P. | | P. | P. | P. | P. | ( P. |
| LYMPH NODES | ' | ' | ' | +G | ' | ' | 0G | ' | ' | ' |
| - Plasma Cell Hyperplasia | | | | 2. | | | . | | | |
| EYES | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Phthisis Bulbi | | | | | | ( P. | | | | |
| SALIVARY GLANDS | ' | ' | ' | ' | ' | ' | + | ' | ' | ' |
| - Sublingual Adenocarcinoma | | | | | | | ( P. | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 4, LA

| ANIMAL NUMBER : | 487 MK0 | 488 MK0 | 489 MK0 | 490 MK0 | 491 MK0 | 492 MK0 | 493 MK0 | 494 MK0 | 496 MK0 |
|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + |
| - Alveolar Epithelium Hyperplasia | . | 4. | . | . | 3. | . | . | . | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | 1. | 1. | 1. | 2. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| - Pleura Fibrosis. | 1. | . | . | 1. | . | 1. | . | . | 1. |
| TRACHEA | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | + | + | + | + | + | - | + | - | - |
| - Hypospermia | 3. | 4. | 3. | 3. | 4. | . | 3. | . | . |
| TESTIS, LEFT | +G | +G | +G | +G | +G | + | +G | + | + |
| - Interstitial Cell Adenoma | P. | P. | P. | P. | P. | . | P. | . | P. |
| - Tubular Atrophy. | . | . | . | . | . | 4. | . | 1. | . |
| - Edema | . | . | . | . | . | . | . | 1. | . |
| STERNUM | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | +G | ' | ' | ' | ' | ' | ' | ' |
| - Galactocoele Hemorrhage | | P. | | | | | | | |
| LIVER | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Bile Duct Hyperplasia. | | | | 2. | | | | | |
| SPLEEN | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Extramedullary Hematopoesis. | | | | 2. | | | | | |
| LUNG | ' | ' | +G | ' | ' | ' | ' | ' | ' |
| - Congestion | | | 2. | | | | | | |
| TESTES | +G | +G | +G | +G | +G | ' | +G | ' | ' |
| - Edema | . | 3. | 2. | . | . | | . | | |
| - Tubular Atrophy. | ( 4. | 4. | ( 2. | . | . | | . | | |
| - Interstitial Cell Adenoma | . | . | . | P. | P. | | P. | | |
| MAMMARY GLAND | ' | + | ' | ' | ' | ' | ' | ' | ' |
| - Galactocole Hemorrhage | | P. | | | | | | | |
| LYMPH NODES | G | +G | ' | ' | ' | ' | ' | ' | ' |
| - Plasma Cell Hyperplasia | . | 2. | | | | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 5, LA

| ANIMAL NUMBER : | 520 MK0+ | 549 MK0+ | 550 MK0 | 551 MK0 | 552 MK0+ | 553 MK0 | 554 MK0 | 555 MK0 | 556 MK0 | 557 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | +G | + | + | + | + | + | + | + | + | + |
| - Chronic Inflammation | . | . | . | . | . | . | . | . | 1. | 1. |
| - Mononuclear Cell Leukemia | M45. | . | . | . | M45. | . | . | . | . | . |
| - Alveolar Epithelium Hyperplasia | . | . | . | . | . | . | . | 3. | . | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | 1. | . | 1. | 1. | 2. | 1. | 1. |
| - Interstitial Fibrosis. | . | 1. | 1. | 1. | . | . | 1. | 1. | 1. | 1. |
| - Alveolar Bronchiolar Adenoma | . | . | . | . | . | P. | . | . | . | . |
| - Congestion | . | . | . | . | 3. | . | . | . | . | . |
| - Alveolar Bronchiolar Carcinoma. | . | P. | . | . | . | . | . | . | . | . |
| - Pleura Fibrosis. | . | 1. | . | 1. | . | 1. | 1. | . | . | 1. |
| TRACHEA | - | - | - | - | - | - | - | - | - | - |
| EPIDIDYMIS, LEFT | - | + | - | + | - | + | + | - | - | + |
| - Mesothelioma. | . | . | . | . | . | . | M26. | . | . | . |
| - Hypospermia | . | 4. | . | 4. | . | 4. | 3. | . | . | 4. |
| TESTIS, LEFT | +G | +G | + | +G | -G | +G | +G | + | +G | +G |
| - Interstitial Cell Adenoma | P. | P. | . | P. | . | P. | P. | . | P. | P. |
| - Tubular Atrophy. | 1. | 2. | 1. | . | . | . | . | 2. | . | . |
| - Edema | . | . | 1. | . | . | . | . | 1. | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| PREPUTIAL GLANDS | +G | ' | ' | ' | +G | ' | ' | +G | ' | ' |
| - Adenoma | P. | | | | . | | | . | | |
| - Carcinoma. | . | | | | ( P. | | | . | | |
| - Inflammation Chronic Active. | . | | | | . | | | 2. | | |
| - Cyst | . | | | | . | | | P. | | |
| SYSTEMIC NEOPLASMS | + | ' | ' | ' | + | ' | ' | ' | ' | ' |
| - Malignant Lymphoma. | N0. | | | | N0. | | | | | |
| LIVER | +G | +G | ' | ' | +G | ' | +G | +G | +G | ' |
| - Bile Duct Hyperplasia. | . | 2. | | | . | | 2. | . | 2. | |
| - Mononuclear Cell Leukemia | M45. | . | | | M45. | | . | . | . | |
| - Macrovesiculation | . | . | | | . | | . | . | 2. | |
| - Basophilic Focus | . | . | | | . | | P. | . | . | |
| - Hepatodiaphragmatic Nodule | . | . | | | . | | . | P. | . | |
| - Eosinophilic Focus. | . | . | | | . | | . | P. | . | |
| SPLEEN | +G | +G | ' | +G | +G | ' | +G | ' | ' | +G |
| - Mononuclear Cell Leukemia | M45. | . | | . | M45. | | . | | | . |
| - Extramedullary Hematopoesis. | . | . | | 2. | . | | 3. | | | 2. |
| - Lymphoid Depletion. | . | 2. | | . | . | | . | | | . |
| LUNG | +G | +G | ' | ' | +G | ' | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | M45. | . | | | M45. | | | | | |
| - Alveolar Bronchiolar Carcinoma. | . | N0. | | | . | | | | | |
| - Cystic Keratinizing Epithelioma | . | P. | | | . | | | | | |
| TESTES | 0 | 0G | ' | +G | ' | +G | +G | ' | +G | +G |
| - Tubular Atrophy. | . | . | | . | | ( 3. | 3. | | . | . |
| - Mesothelioma. | . | . | | . | | . | M26. | | . | . |
| - Interstitial Cell Adenoma | . | . | | P. | | . | . | | P. | P. |
| - Interstitial Cell Hyperplasia | . | . | | . | | . | 3. | | . | . |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 5, LA

| ANIMAL NUMBER : | 520 MK0+ | 549 MK0+ | 550 MK0 | 551 MK0 | 552 MK0+ | 553 MK0 | 554 MK0 | 555 MK0 | 556 MK0 | 557 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| MAMMARY GLAND | ' | ' | ' | ' | +G | ' | ' | G | ' | ' |
| - Secretion. | | | | | 2. | | | . | | |
| KIDNEYS | +G | +G | ' | ' | +G | ' | ' | ' | +G | ' |
| - Nephropathy | 2. | . | | | 4. | | | | 3. | |
| - Alveolar Bronchiolar Carcinoma. | . | M09. | | | . | | | | . | |
| ADRENAL GLANDS | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Cortex Vacuolization | | | | | | | | | 2. | |
| - Cortex Focal Hyperplasia. | | | | | | | | | 2. | |
| MESENTERY | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Mesothelioma. | | | | | | | M26. | | | |
| LYMPH NODES | ' | +G | ' | ' | ' | ' | +G | ' | G | ' |
| - Pigment | | . | | | | | 3. | | . | |
| - Sinus Dilation | | 2. | | | | | . | | . | |
| BODY CAVITIES | G | +G | ' | ' | ' | ' | +G | ' | ' | ' |
| - Mesothelioma. | . | . | | | | | M26. | | | |
| - Alveolar Bronchiolar Carcinoma. | . | M09. | | | | | . | | | |
| BONE | ' | +G | ' | ' | ' | ' | ' | ' | ' | ' |
| - Alveolar Bronchiolar Carcinoma. | | M09. | | | | | | | | |
| SEMINAL VESICLES | ' | G | ' | ' | ' | ' | ' | ' | ' | ' |
| PITUITARY GLAND | +G | +G | ' | ' | +G | ' | ' | +G | ' | ' |
| - Pars Distalis Adenoma. | . | . | | | P. | | | P. | | |
| - Pars Distalis Hyperplasia Focal | 3. | . | | | . | | | . | | |
| - Pars Distalis Cyst. | . | P. | | | . | | | . | | |
| INTEST-LG, COLON | ' | +G | ' | ' | ' | ' | ' | ' | ' | ' |
| - Muscularis Focal Thickening. | | P. | | | | | | | | |
| HEART | ' | +G | ' | ' | ' | ' | ' | ' | ' | ' |
| - Alveolar Bronchiolar Carcinoma. | | M09. | | | | | | | | |
| DIAPHRAGM | ' | +G | ' | ' | ' | ' | ' | ' | ' | ' |
| - Alveolar Bronchiolar Carcinoma. | | M09. | | | | | | | | |
| EPIDIDYMIDES | ' | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Mesothelioma. | | | | | | | (N0. | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 5, LA

| ANIMAL NUMBER : | 558 MK0 | 559 MK0 | 560 MK0 | 561 MK0 | 562 MK0 | 563 MK0+ | 564 MK0 | 565 MK0 | 566 MK0 | 567 MK0+ |
|---|---|---|---|---|---|---|---|---|---|---|
| GENERAL OBSERVATIONS | ' | ' | ' | ' | ' | G | ' | ' | ' | ' |
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Chronic Inflammation | 1. | . | . | . | . | . | . | . | . | . |
| - Mononuclear Cell Leukemia | . | . | . | . | . | M45. | . | . | . | . |
| - Alveolar Epithelium Hyperplasia | 1. | 3. | . | . | 4. | . | . | . | . | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | . | 1. | 1. |
| - Alveolar Bronchiolar Hyperplasia | . | . | . | . | . | . | . | . | 2. | . |
| - Pleura Fibrosis. | 1. | . | 1. | 1. | 1. | . | 1. | . | . | . |
| TRACHEA | + | - | - | - | - | - | - | - | - | - |
| - Chronic Inflammation | 1. | . | . | . | . | . | . | . | . | . |
| EPIDIDYMIS, LEFT | + | + | + | - | + | - | + | - | + | - |
| - Hypospermia | 3. | 4. | 4. | . | 3. | . | 3. | . | 3. | . |
| TESTIS, LEFT | +G | +G | +G | +G | +G | + | +G | + | +G | +G |
| - Interstitial Cell Adenoma | P. | P. | P. | P. | P. | P. | P. | . | P. | P. |
| - Tubular Atrophy. | . | . | . | . | . | 1. | . | 1. | . | . |
| - Edema | . | . | . | 1. | . | . | . | 2. | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | +G | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| - Squamous Cell Carcinoma | P. | | | | | | | | | |
| PREPUTIAL GLANDS | 0G | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| SYSTEMIC NEOPLASMS | ' | + | ' | ' | ' | + | ' | ' | ' | ' |
| - Malignant Lymphoma. | | N0. | | | | N0. | | | | |
| LIVER | ' | ' | ' | ' | ' | +G | ' | ' | ' | +G |
| - Mononuclear Cell Leukemia | | | | | | M45. | | | | . |
| - Hepatodiaphragmatic Nodule | | | | | | . | | | | P. |
| SPLEEN | +G | +G | ' | ' | ' | +G | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | . | M45. | | | | M45. | | | | |
| - Extramedullary Hematopoesis. | 2. | . | | | | . | | | | |
| TESTES | +G | +G | +G | +G | +G | ' | +G | ' | ' | ' |
| - Tubular Atrophy. | ( 4. | . | . | . | . | | . | | | |
| - Interstitial Cell Adenoma | . | P. | P. | P. | P. | | P. | | | |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Galactocoele. | | | | | | | | | P. | |
| - Granuloma. | | | | | | | | | P. | |
| KIDNEYS | +G | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Nephropathy | 2. | | | | | 2. | | | | |
| LYMPH NODES | +G | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| - Pigment | 2. | | | | | | | | | |
| EYES | ' | ' | ' | ' | ' | ' | ' | ' | ' | +G |
| - Panophthalmitis. | | | | | | | | | | 4. |
| - Cornea Ulcer. | | | | | | | | | | ( 3. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 5, LA

| ANIMAL NUMBER : | 558 MK0 | 559 MK0 | 560 MK0 | 561 MK0 | 562 MK0 | 563 MK0+ | 564 MK0 | 565 MK0 | 566 MK0 | 567 MK0+ |
|---|---|---|---|---|---|---|---|---|---|---|
| HARDERIAN GLANDS | ' | ' | ' | ' | ' | ' | ' | ' | ' | +G |
| - Inflammation. | | | | | | | | | | ( 4. |
| GANGLION,GASS.,RIGHT | ' | ' | ' | ' | ' | ' | ' | ' | ' | +G |
| - Meningioma Malignant | | | | | | | | | | P. |
| PITUITARY GLAND | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Pars Distalis Adenoma. | | | | | | P. | | | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 5, LA

| ANIMAL NUMBER : | 568 MK0+ | 569 MK0+ | 570 MK0 | 571 MK0 | 572 MK0 | 573 MK0 | 574 MK0+ | 575 MK0 | 576 MK0 | 577 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | +G | + | + | + | + | + |
| - Mononuclear Cell Leukemia | M45. | . | . | . | . | . | M45. | . | . | . |
| - Alveolar Epithelium Hyperplasia | . | . | . | . | 3. | . | . | . | . | . |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 1. | 1. | 1. | 2. | 1. | 1. | 1. | 1. | 2. |
| - Interstitial Fibrosis. | 1. | 1. | 1. | 1. | 1. | 1. | . | 1. | 1. | 1. |
| - Pleura Fibrosis. | . | . | . | . | 1. | . | . | 1. | 1. | 1. |
| TRACHEA | - | - | - | + | - | - | - | - | - | + |
| - Chronic Inflammation | . | . | . | 1. | . | . | . | . | . | 1. |
| EPIDIDYMIS, LEFT | + | + | - | + | - | + | - | + | - | - |
| - Hypospermia | 4. | 4. | . | 4. | . | 4. | . | 4. | . | . |
| TESTIS, LEFT | +G | +G | + | +G | + | +G | + | +G | + | + |
| - Interstitial Cell Adenoma | P. | P. | . | P. | . | P. | . | P. | P. | . |
| - Tubular Atrophy. | 4. | . | 1. | . | . | . | 1. | . | . | 1. |
| - Edema | . | . | 2. | . | 1. | . | . | . | . | 1. |
| STERNUM | - | - | - | - | - | - | - | +G | - | - |
| - Blood Vessel Arteritis | . | . | . | . | . | . | . | 3. | . | . |
| SKIN/SUBCUTIS | ' | +G | ' | ' | ' | ' | ' | ' | ' | ' |
| - Fibroadenoma. | | P. | | | | | | | | |
| SYSTEMIC NEOPLASMS | + | ' | ' | ' | ' | ' | + | ' | ' | ' |
| - Malignant Lymphoma. | N0. | | | | | | N0. | | | |
| LIVER | +G | +G | ' | ' | +G | ' | +G | +G | ' | ' |
| - Bile Duct Hyperplasia. | . | 2. | | | 1. | | . | 2. | | |
| - Mixed Cell Focus | . | P. | | | . | | . | . | | |
| - Mononuclear Cell Leukemia | M45. | . | | | . | | M45. | . | | |
| - Macrovesiculation | . | . | | | 2. | | . | . | | |
| - Hepatodiaphragmatic Nodule | . | P. | | | . | | . | . | | |
| - Granuloma. | . | . | | | 2. | | . | . | | |
| SPLEEN | +G | +G | ' | ' | +G | ' | +G | +G | ' | ' |
| - Mononuclear Cell Leukemia | M45. | . | | | . | | M45. | . | | |
| - Extramedullary Hematopoesis. | . | 2. | | | 2. | | . | 3. | | |
| LUNG | +G | ' | ' | ' | ' | ' | +G | ' | ' | ' |
| - Mononuclear Cell Leukemia | M45. | | | | | | M45. | | | |
| TESTES | ' | ' | ' | +G | ' | +G | ' | +G | +G | ' |
| - Interstitial Cell Adenoma | | | | P. | | P. | | P. | P. | |
| MAMMARY GLAND | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Galactocole Hemorrhage | | | | | | P. | | | | |
| KIDNEYS | +G | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Nephropathy | . | | | | | | | 3. | | |
| - Mononuclear Cell Leukemia | M45. | | | | | | | . | | |
| ADRENAL GLANDS | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Cortex Adenoma | | | | | | | | ( P. | | |
| MESENTERY | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Blood Vessel Arteritis | | | | | | | | 3. | | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 5, LA

| ANIMAL NUMBER : | 568 MK0+ | 569 MK0+ | 570 MK0 | 571 MK0 | 572 MK0 | 573 MK0 | 574 MK0+ | 575 MK0 | 576 MK0 | 577 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LYMPH NODES | +G | ' | ' | ' | ' | ' | +G | +G | ' | ' |
| - Plasma Cell Hyperplasia | . | | | | | | . | 2. | | |
| - Mononuclear Cell Leukemia | M45. | | | | | | M45. | . | | |
| SEMINAL VESICLES | ' | ' | ' | ' | ' | ' | G | ' | ' | ' |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 5, LA

| ANIMAL NUMBER : | 578 MK0+ | 579 MK0 | 580 MK0 | 581 MK0 | 582 MK0+ | 583 MK0 | 584 MK0 | 585 MK0 | 586 MK0 | 587 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | +G | + | + | + | +G |
| - Mononuclear Cell Leukemia | M45. | . | . | . | M45. | . | . | . | . | M45. |
| - Foreign Body. | P. | P. | P. | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 2. | 1. | 1. | 1. | 2. | 1. | 1. | 2. | 1. | 1. |
| - Interstitial Fibrosis. | 2. | 1. | . | 1. | 2. | 1. | 1. | 1. | 1. | . |
| - Alveolar Bronchiolar Adenoma | . | . | . | . | . | P. | . | . | . | . |
| - Pleura Fibrosis. | . | 1. | . | 1. | . | . | . | 1. | 1. | . |
| TRACHEA | - | - | - | - | - | - | - | + | + | - |
| - Chronic Inflammation | . | . | . | . | . | . | . | 1. | 1. | . |
| EPIDIDYMIS, LEFT | - | + | - | - | - | - | + | + | + | + |
| - Hypospermia | . | 4. | . | . | . | . | 4. | 3. | 4. | 4. |
| TESTIS, LEFT | + | +G | + | +G | + | + | +G | +G | +G | +G |
| - Interstitial Cell Adenoma | . | P. | . | P. | . | P. | P. | P. | P. | P. |
| - Tubular Atrophy. | 1. | . | . | . | 1. | . | . | . | . | . |
| - Interstitial Cell Hyperplasia | . | . | 3. | . | . | . | . | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| SKIN/SUBCUTIS | ' | ' | ' | ' | ' | ' | ' | +G | ' | ' |
| - Keratoacanthoma. | | | | | | | | P. | | |
| SYSTEMIC NEOPLASMS | + | ' | ' | ' | + | ' | ' | ' | ' | + |
| - Malignant Lymphoma. | N0. | | | | N0. | | | | | N0. |
| LIVER | +G | ' | ' | ' | ' | ' | +G | ' | +G | +G |
| - Bile Duct Hyperplasia. | . | | | | | | 1. | | 2. | 1. |
| - Mixed Cell Focus | . | | | | | | P. | | . | . |
| - Mononuclear Cell Leukemia | M45. | | | | | | . | | . | M45. |
| - Hepatocellular Adenoma | . | | | | | | . | | P. | . |
| SPLEEN | +G | ' | ' | +G | +G | ' | +G | ' | ' | +G |
| - Mononuclear Cell Leukemia | M45. | | | . | M45. | | . | | | M45. |
| - Extramedullary Hematopoesis. | . | | | 2. | . | | . | | | . |
| - Congestion | . | | | . | . | | 2. | | | . |
| LUNG | ' | ' | ' | ' | ' | +G | ' | ' | +G | ' |
| - Interstitial Fibrosis. | | | | | | 3. | | | . | |
| - Alveolar Epithelium Hyperplasia | | | | | | . | | | 3. | |
| TESTES | ' | +G | +G | ' | ' | ' | +G | +G | ' | +G |
| - Tubular Atrophy. | | . | . | | | | . | ( 5. | | . |
| - Interstitial Cell Adenoma | | P. | ( P. | | | | P. | . | | P. |
| MAMMARY GLAND | ' | ' | ' | ' | ' | ' | ' | ' | ' | +G |
| - Galactocole Hemorrhage | | | | | | | | | | P. |
| KIDNEYS | +G | ' | ' | +G | ' | ' | +G | ' | +G | +G |
| - Nephropathy | . | | | 3. | | | 3. | | 3. | 3. |
| - Mononuclear Cell Leukemia | M45. | | | . | | | . | | . | . |
| LYMPH NODES | +G | ' | ' | ' | ' | ' | ' | ' | ' | ' |
| - Mononuclear Cell Leukemia | M45. | | | | | | | | | |
| PALATE (ORAL MUCOSA) | ' | ' | ' | ' | ' | ' | ' | ' | +G | ' |
| - Squamous Cell Carcinoma | | | | | | | | | P. | |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

TABLE OF INDIVIDUAL MICROSCOPIC FINDINGS (AOFT)
DOSE GROUP : 5, LA

| ANIMAL NUMBER : | 588 MK0 | 589 MK0 | 590 MK0+ | 591 MK0 | 592 MK0 | 593 MK0 | 594 MK0 | 595 MK0+ | 596 MK0 | 597 MK0 |
|---|---|---|---|---|---|---|---|---|---|---|
| LUNG, LEFT | + | + | + | + | + | + | + | + | + | + |
| - Alveolar Epithelium Hyperplasia | . | . | . | . | . | 2. | . | . | . | . |
| - Intravascular Neutrophils | . | . | 4. | . | . | . | . | . | . | . |
| - Foreign Body. | P. | P. | . | P. | P. | P. | P. | P. | P. | P. |
| - Alveolus Inflammation. | 1. | 2. | . | 1. | 1. | 2. | 1. | 1. | 1. | 1. |
| - Interstitial Fibrosis. | 1. | 1. | . | 1. | 1. | 2. | 1. | 1. | 1. | 1. |
| - Pleura Fibrosis. | . | . | . | . | 1. | . | 1. | . | 1. | 1. |
| TRACHEA | - | + | - | + | - | - | + | - | + | - |
| - Chronic Inflammation | . | 1. | . | 1. | . | . | 1. | . | 1. | . |
| EPIDIDYMIS, LEFT | + | - | - | - | + | - | + | - | + | + |
| - Hypospermia | 3. | . | . | . | 4. | . | 4. | . | 3. | 4. |
| TESTIS, LEFT | +G | + | + | +G | +G | +G | +G | + | +G | +G |
| - Interstitial Cell Adenoma | P. | . | P. | P. | P. | P. | . | P. | P. | P. |
| - Tubular Atrophy. | . | 1. | . | . | . | . | 5. | . | . | . |
| - Edema | . | 2. | . | . | . | . | . | . | . | . |
| STERNUM | - | - | - | - | - | - | - | - | - | - |
| LIVER | ' | ' | ' | ' | ' | ' | +G | ' | +G | +G |
| - Bile Duct Hyperplasia. | | | | | | | 2. | | 2. | 2. |
| - Macrovesiculation | | | | | | | . | | 2. | . |
| SPLEEN | ' | ' | ' | ' | ' | ' | +G | ' | +G | +G |
| - Extramedullary Hematopoesis. | | | | | | | 2. | | 2. | 2. |
| LUNG | ' | +G | ' | ' | ' | +G | ' | ' | ' | ' |
| - Alveolar Epithelium Hyperplasia | | 3. | | | | . | | | | |
| - Alveolar Bronchiolar Adenoma | | . | | | | P. | | | | |
| TESTES | +G | ' | ' | ' | ' | ' | +G | ' | +G | +G |
| - Interstitial Cell Adenoma | P. | | | | | | ( P. | | P. | P. |
| MAMMARY GLAND | ' | ' | ' | ' | ' | +G | ' | ' | ' | ' |
| - Fibroadenoma. | | | | | | P. | | | | |
| KIDNEYS | ' | ' | ' | +G | ' | +G | ' | +G | +G | ' |
| - Nephropathy | | | | 4. | | 4. | | 4. | 4. | |
| LYMPH NODES | ' | ' | ' | ' | +G | ' | ' | ' | ' | ' |
| - Plasma Cell Hyperplasia | | | | | 3. | | | | | |

MACRO/MICRO CORRELATION TABLE

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 1, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 137 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 2.5 x 1.5 1.5 mm. | - Interstitial Cell Adenoma. |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Right preputial gland, enlarged, 1.2 x 0.9 x 0.7 cm, green,soft. | - Adenoma, unilateral. |
| TESTES | |
| - 01: Right, small. | - Tubular Atrophy, unilateral, grade 2. |
| ANIMAL NO: 138 | |
| TESTIS (LEFT) | |
| - 01: Multiple pale nodules, 2-4mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, multiple pale nodules, 2mm-4mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| - 02: Right, pale mass, 8 x 5 x 4 mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| ANIMAL NO: 139 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 4 x 4 mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 140 | |
| SKIN/SUBCUTIS | |
| - 01: Skin anterior to scrotum, ulceration, 14 x 10 mm. | - SEE UNDER: PREPUTIAL GLANDS (INGUINAL GLANDS). |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| Finding 01 in SKIN/SUBCUTIS | - Adenoma, unilateral. |
| SPLEEN | |
| - 01: Spleen enlarged, 60 x 15 x 10 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 142 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 30 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right testis, pale mass, 20 x 10 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 1, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 143 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 33 x 20 x 18 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 3 x 2 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 145 | |
| TESTIS (LEFT) | |
| - 01: Flacid. | - Tubular Atrophy, grade 1. |
| LIVER | |
| - 01: Mottled and rough pitted surface on dorsal side. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged- 55 x 15 x 8 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| MAMMARY GLAND | |
| - 01: Lactating. | - Secretion, grade 2. |
| KIDNEYS | |
| - 01: Dark brown with granular pitted surface. | - Nephropathy, bilateral, grade 3. |
| PITUITARY GLAND | |
| - 01: Mass- 10 x 7 x 5 mm. Black and red. | - Pars Distalis Adenoma. |
| ANIMAL NO: 146 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 2 x 2mm. | - Tubular Atrophy, grade 1. |
| SPLEEN | |
| - 01: Dark area 2 mm x 1 mm. | - Pigment, grade 2. |
| KIDNEYS | |
| - 01: Pale and slightly pitted. | - Nephropathy, bilateral, grade 3. |
| ANIMAL NO: 149 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 30 x 15 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, small, 17 x 8 x 8 mm. | - Tubular Atrophy, unilateral, grade 4. |
| - 02: Right, pale area, 2 x 2 mm. | - Tubular Atrophy, unilateral, grade 4. |
| ANIMAL NO: 150 | |
| TESTIS (LEFT) | |
| - 01: Small, 15 x 9 x 4 mm. | - Tubular Atrophy, grade 2. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Mottled, surface irregular. | - Pigment, grade 2. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 1, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| TESTES | |
| - 01: Right, pale mass, 25 x 15 x 9 mm. | - Interstitial Cell Adenoma, unilateral. |
| ANIMAL NO: 151 | |
| TESTIS (LEFT) | |
| - 01: Small, 16 x 8 x 4 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 30 x 17 x 15 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 152 | |
| EYES | |
| - 01: Protruding right eye, enlarged and crusted over. | - Cornea Ulcer, unilateral, grade 5. |
| - 02: Right eye socket, pale firm area that extends to hard palate of mouth. .5 cm on roof of mouth visible. | - Squamous Cell Carcinoma (site of primary neoplasm:SYSTEMIC NEOPLASMS). SEE UNDER: PALATE (ORAL MUCOSA). |
| HARDERIAN GLANDS | |
| - 01: Right, discolored, pale to reddish areas. | - Pigment, unilateral, grade 2. |
| PALATE (ORAL MUCOSA) | |
| Finding 02 in EYES | - Squamous Cell Carcinoma (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 153 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 10 x 9 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 15 x 11 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 154 | |
| LIVER | |
| - 01: Appeared to be 3 x normal size. | - Congestion, grade 3. |
| TESTES | |
| - 01: Right, flaccid, smaller than left. | - Tubular Atrophy, bilateral, grade 1. |
| MAMMARY GLAND | |
| - 01: Mass, 8 x 12 x 20 mm, white, contained white soft material,found in right inguinal area. | - Cyst. |
| - 02: prominent, lactating. | - Secretion, grade 2. |
| KIDNEYS | |
| - 01: Appeared to be 3 x normal size. | - Nephropathy, bilateral, grade 4. |
| ADRENAL GLANDS | |
| - 01: appeared to be 3 x normal size. | - Cortex Vacuolization, Vacuolization, focal, bilateral, grade 2. |
| PITUITARY GLAND | |
| - 01: Mass, 4 x 5 x 7 mm, red, lobulated. | - Pars Distalis Adenoma. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
PATHOL. NO.: 90188 GAW
DATE : 29-AUG-13
PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 1, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 155 | |
| SKIN/SUBCUTIS | |
| - 01: Left, inguinal, area mass 15 x 10 10 mm. | - Squamous Cell Carcinoma. |
| LIVER | |
| - 01: Surface irregular and pale. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 48 x 10 x 7 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 156 | |
| TESTIS (LEFT) | |
| - 01: Pale, mass 20 x 15 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right testis, small, flaccid 18 x 10 x 7 mm. | - Tubular Atrophy, bilateral, grade 2. |
| ANIMAL NO: 157 | |
| MAMMARY GLAND | |
| - 01: Prominent, lactating. | - Secretion, grade 3. |
| PITUITARY GLAND | |
| - 01: Mass, 10 x 8 x 5 m, red. | - Pars Distalis Adenoma. |
| ANIMAL NO: 158 | |
| TESTIS (LEFT) | |
| - 01: Pale area 16 x 11 mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 160 | |
| TESTIS (LEFT) | |
| - 01: Pale area 5 x 4 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale, mass 20 x 10 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 161 | |
| TESTIS (LEFT) | |
| - 01: Pale mass 20 x 10 x 7 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 23 x 15 x 7 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 1, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 162 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 12 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 25 x 15 x 11 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 163 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 14 x 13 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 15 x 10 x 9 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 165 | |
| TESTIS (LEFT) | |
| - 01: Left testis, pale, mass 20 x 10 x 9 mm. | - Interstitial Cell Adenoma. |
| PALATE (ORAL MUCOSA) | |
| - 01: Pale area, 8 x 6 mm. | - Squamous Cell Papilloma. |
| ANIMAL NO: 166 | |
| TESTIS (LEFT) | |
| - 01: Left, testis, pale mass 20 x 13 x 12 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Right, ventral scrotum, pale, ulcerated mass, 20 x 18 x 7 mm. | - Squamous Cell Carcinoma. |
| TESTES | |
| - 01: Right, pale area, 15 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 167 | |
| TESTIS (LEFT) | |
| - 01: Left testis, pale mass 15 x 15 x 7 mm. | - Tubular Atrophy, grade 2. |
| ANIMAL NO: 168 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 15 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 5 x 5 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 1, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 169 | |
| TESTIS (LEFT) | |
| - 01: Yellow and white focal discoloration. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| - 02: Appeared smaller than normal. | - No corresponding finding. |
| KIDNEYS | |
| - 01: Bilateral, focal area, tan, 2 mm, midway between poles. | - Nephropathy, bilateral, grade 2. |
| BODY CAVITIES | |
| - 01: Oral cavity, lesion, 4 x 8 x 17 mm, tan, rough surface, located beneath the tongue, left attached to lower jaw. | - SEE UNDER: SALIVARY GLANDS. |
| EYES | |
| - 01: Right, white and opaque. | - Lens Mineralization, unilateral, grade 3. |
| SALIVARY GLANDS | |
| Finding 01 in BODY CAVITIES | - Sublingual Adenocarcinoma, unilateral. |
| ANIMAL NO: 170 | |
| TESTIS (LEFT) | |
| - 01: Firm, yellow, white and black focal areas, bilateral. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Left axillary region, mass, 23 x 19 x 12 mm, firm, white, smooth (interior and exterior). | - Fibroma. |
| LIVER | |
| - 01: Pale. | - No corresponding finding. |
| LUNG | |
| - 01: Pale. | - No corresponding finding. |
| ANIMAL NO: 171 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 17 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, small, flaccid, 15 x 9 x 6 mm. | - Tubular Atrophy, unilateral, grade 4. |
| ANIMAL NO: 172 | |
| TESTIS (LEFT) | |
| - 01: Pale area 9 x 7 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Pale mass, 20 x 15 x 11 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 1, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 173 | |
| TESTIS (LEFT) | |
| - 01: Pale area 4 x 5 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Right, lateral thoracic, pale subcutaneal mass, 20 x 15 x 7mm. Cut surface firm and white. | - Fibroma. |
| SPLEEN | |
| - 01: Slightly glandular surface. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right testis, pale mass 23 x 14 11 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 174 | |
| TESTIS (LEFT) | |
| - 01: Pale mass 22 x 18 x 14 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale mass, left median 10 x 9 x 7 mm. | - Hepatocellular Adenoma. |
| SPLEEN | |
| - 01: Surface irregular. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right testis, pale area 2 x 2 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Slightly mottled. | - Nephropathy, bilateral, grade 3. |
| LYMPH NODES | |
| - 01: Adjacent pancreas, enlarged 5 x 3 x 2 mm. | - Plasma Cell Hyperplasia, unilateral, grade 2. |
| ANIMAL NO: 175 | |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Ventral scrotum, ulcerated mass, 20 x 12 x 10 mm. | - Carcinoma, bilateral. |
| ANIMAL NO: 176 | |
| LIVER | |
| - 01: Red, with 1-2 mm raised, pale areas. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 85 x 25 x 18 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LUNG | |
| - 01: 1-3 red focal areas throughout. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Black, bilateral. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 1, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 177 | |
| TESTIS (LEFT) | |
| - 01: Flaccid, with red discoloration. Small. | - Tubular Atrophy, grade 4. |
| LIVER | |
| - 01: Enlarged. Weighed 30.2 g, pale and mottled. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged and pale. 6.5 cm x 1.8 cm x 1.3 cm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LUNG | |
| - 01: Pale and mottled. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LYMPH NODES | |
| - 01: Mandibular Lymph Node- Enlarged and red. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 178 | |
| TESTIS (LEFT) | |
| - 01: Pale mass 25 x 15 x 14 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 12 x 10 x 8 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 179 | |
| TESTES | |
| - 01: Right, small, 18 x 10 x 7 mm. | - Tubular Atrophy, bilateral, grade 4. |
| ANIMAL NO: 181 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 15 x 14 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Slightly pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 45 x 12 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, pale mass, 25 x 15 x 14 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Granular surface. | - Nephropathy, bilateral, grade 3. |
| ADRENAL GLANDS | |
| - 01: Right, dark. | - Phaeochromocytoma, Malignant, bilateral (malignant neoplasm). |
| - 02: Left, enlarged, irregular, 10 x 7 x 7 mm. | - Phaeochromocytoma, Malignant, bilateral (malignant neoplasm). |
| PARATHYROID GLAND | |
| - 01: Red foci 1mm. | - SEE UNDER: THYROID GLAND (BOTH LOBES). |
| THYROID GLAND (BOTH LOBES) | |
| Finding 01 in PARATHYROID GLAND | - C Cell Adenoma, unilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 1, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 182 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 3 x 4 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 15 x 10 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 183 | |
| TESTIS (LEFT) | |
| - 01: Yellow and white focal discoloration; contained fluid. | - Tubular Atrophy, grade 2. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| MAMMARY GLAND | |
| - 01: Lactating. | - Secretion, grade 2. |
| KIDNEYS | |
| - 01: Bilateral, granular, pitted surface. | - Nephropathy, bilateral, grade 3. |
| LYMPH NODES | |
| - 01: Mandibular LN, enlarged, 10 x 4 x 3 mm. | - Plasma Cell Hyperplasia, bilateral, grade 3. |
| EYES | |
| - 01: Right, protruded, red. | - Cornea Ulcer, unilateral, grade 4. |
| GASSERIAN GANGLION (RIGHT) | |
| - 01: Enlarged, 13 x 4 x 3 mm, appears to be pressing on right side of pituitary gland. | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |
| PALATE (ORAL MUCOSA) | |
| - 01: Right, lesion, 10 x 6 x 2 mm, firm. | - Squamous Cell Carcinoma (malignant neoplasm). |
| ANIMAL NO: 184 | |
| URINARY BLADDER | |
| - 01: Bladder full, urinary bladder distended, ~2.5 cm. | - Distention, grade 3. |
| PENIS | |
| - 01: Crusty whitish precipitate around prepuce. | - No corresponding finding. |
| BONE | |
| - 01: Mass located inside right rib cage, attached to spinal column. | - Osteosarcoma (malignant neoplasm). |
| ANIMAL NO: 185 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 15 x 14 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 4 x 3 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
PATHOL. NO.: 90188 GAW
DATE : 29-AUG-13
PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 1, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| HEART | |
| - 01: Pale area, 3 x 4 mm. | - Fibrosis, grade 2. |
| ANIMAL NO: 186 | |
| EPIDIDYMIS (LEFT) | |
| - 01: Multiple pale nodules, 1 - 2 mm. | - Mesothelioma (malignant neoplasm). |
| TESTIS (LEFT) | |
| - 01: Multiple pale nodules, surface, 1-2mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| - 02: Pale mass 15 x 8 x 7 mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| LIVER | |
| - 01: Surface granular. | - Mononuclear Cell Leukemia (site of primary neoplasm:EPIDIDYMIS, LEFT). |
| SPLEEN | |
| - 01: Enlarged, 60 x 15 x 7 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:EPIDIDYMIS, LEFT). |
| TESTES | |
| - 01: Right, pale mass 28 x 15 x 11 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
PATHOL. NO.: 90188 GAW
DATE : 29-AUG-13
PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 249 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 2 x 1.2 x 1.0 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Scrotum ulceration, 1.8 x 1.2 1.2 cm. | - Keratoacanthoma. |
| KIDNEYS | |
| - 01: Right, pale cyst, 3 x 3 x 3 mm. | - Nephropathy, bilateral, grade 2. |
| EYES | |
| - 01: Left, opacity, 3 x 2 mm. | - Lens Cataract, unilateral, grade 2. |
| ANIMAL NO: 250 | |
| TESTIS (LEFT) | |
| - 01: Small. | - Tubular Atrophy, grade 3. |
| SPLEEN | |
| - 01: Surface granular, enlarged 40 x 10 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, pale mass, 25 x 15 x 14mm. | - Interstitial Cell Adenoma, unilateral. |
| LYMPH NODES | |
| - 01: Mediastinal, prominent. | - Plasma Cell Hyperplasia, bilateral, grade 2. |
| ANIMAL NO: 251 | |
| TESTIS (LEFT) | |
| - 01: Left, pale mass, 30 x 15 x 15 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 10 x 10 x 8 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 252 | |
| THYROID GLAND (BOTH LOBES) | |
| - 01: Left, enlarged, 5 x 4 x 3 mm. | - Follicular Cell Adenoma, unilateral. |
| PITUITARY GLAND | |
| - 01: mass, 10 x 6 x 4 mm, red and tan. | - Pars Distalis Adenoma. |
| ANIMAL NO: 253 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 7 x 7 x 5 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 30 x 17 x 12 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 254 | |
| LIVER | |
| - 01: Pale with lobes rounded. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, slight 32 x 10 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| ANIMAL NO: 255 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 3 x 3 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Base of tail, ulcerated area, 18 x 15 x 8 mm. | - Fibrosarcoma. |
| LIVER | |
| - 01: Left lobe nodule 3 x 3 mm. | - Focal Necrosis, grade 3. |
| SPLEEN | |
| - 01: Enlarged 40 x 10 x 6 mm. | - Extramedullary Hematopoesis, grade 3. |
| TESTES | |
| - 01: Pale area, 4 x 4 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Granular and pale. | - Nephropathy, bilateral, grade 3. |
| LYMPH NODES | |
| - 01: Mediastinal, prominent. | - Plasma Cell Hyperplasia, bilateral, grade 2. |
| ANIMAL NO: 256 | |
| TESTIS (LEFT) | |
| - 01: Black and white discoloration, focal; (near rete end). | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Mass, below left axillary, 47 x 38 x 18 mm, firm, lobulated, pale tan. | - SEE UNDER: MAMMARY GLAND. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| MAMMARY GLAND | |
| Finding 01 in SKIN/SUBCUTIS | - Fibroadenoma. |
| LYMPH NODES | |
| - 01: Mandibular, left, enlarged, 8 x 4 x 3 mm. | - Plasma Cell Hyperplasia, unilateral, grade 2. |
| - 02: Mandibular, right enlarged, 10 x 8 x 4 mm, cystic. | - Plasma Cell Hyperplasia, unilateral, grade 2. |
| EYES | |
| - 01: Right, red, bulged out of socket. | - Cornea Ulcer, ulcer, unilateral, grade 4. |
| HARDERIAN GLANDS | |
| - 01: Right, enlarged, 8 x 5 x 3 mm, pale areas. | - Fibrosis, unilateral, grade 2. |
| GASSERIAN GANGLION (RIGHT) | |
| - 01: Right, enlarged, 14 x 4 x 2 mm. | - Squamous Cell Carcinoma. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| PITUITARY GLAND | |
| - 01: Focus, white, raised, 2 mm dia, right side. | - Pars Distalis Adenoma. |
| PALATE (ORAL MUCOSA) | |
| - 01: distorted area, smooth, 15 x 5 x 1 mm. | - Squamous Cell Carcinoma (malignant neoplasm). |
| ANIMAL NO: 257 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 13 x 10 mm. | - Interstitial Cell Adenoma. |
| SPLEEN | |
| - 01: Enlarged, 48 x 13 x 7 mm. | - Lymphoid Depletion, grade 2. |
| TESTES | |
| - 01: Pale mass, 25 x 16 x 11 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Pale, granular. | - Nephropathy, bilateral, grade 4. |
| ANIMAL NO: 259 | |
| LIVER | |
| - 01: Left median lobe, pale, irregular surfaces. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 45 x 15 x 7 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 260 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 28 x 12 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 4 x 5 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 262 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 4 x 4 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 264 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 12 x 10 mm. | - Interstitial Cell Adenoma. |
| SPLEEN | |
| - 01: Enlarged, 50 x 12 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, small, 20 x 10 x 8 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
PATHOL. NO.: 90188 GAW
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CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| KIDNEYS | |
| - 01: Slightly pitted. | - Nephropathy, bilateral, grade 3. |
| ANIMAL NO: 265 | |
| TESTIS (LEFT) | |
| - 01: Yellow, white and black focal discoloration, firm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Irregular, pale areas throughout. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 50 x 14 x 7 mm. | - Congestion, grade 3. |
| PALATE (ORAL MUCOSA) | |
| - 01: Left side, has a raised firm area, 7 x 6 x 2 mm, extends up into the left eye socket. | - Squamous Cell Carcinoma (malignant neoplasm). |
| INTESTINE-SMALL, ILEUM | |
| - 01: Yellowish in color. | - No corresponding finding. |
| INTESTINE-SMALL, JEJUNUM | |
| - 01: Yellowish in color. | - No corresponding finding. |
| INTESTINE-SMALL, DUODENUM | |
| - 01: Yellowish in color. | - No corresponding finding. |
| ANIMAL NO: 266 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 15 x 11 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 4 x 5 x mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 267 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 34 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 7 x 5 x 4 mm. | - Interstitial Cell Adenoma, bilateral. |
| EYES | |
| - 01: Left, opacity, 3 x 4 mm. | - Lens Cataract, unilateral, grade 3. |
| ANIMAL NO: 268 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 11 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Pale mass 25 x 14 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 269 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 12 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 22 x 15 x 14 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 270 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 15 x 15 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale areas, few, 2-4mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 271 | |
| SPLEEN | |
| - 01: Enlarged, 43 x 12 x 5 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 272 | |
| TESTIS (LEFT) | |
| - 01: Fluid filled. White, yellow and black discoloration, focal. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Mottled. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Left median lobe, raised area, 3 x 2 x 1 mm dia. | - Hepatocellular Adenoma. |
| - 03: Caudate lobe, tan focal area, 2 mm dia. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 75 x 22 x 15 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LUNG | |
| - 01: Pale, 1-2 mm red foci throughout. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Dark. | - Nephropathy, bilateral, grade 2. |
| BODY CAVITIES | |
| - 01: Thoracic cavity, red fluid, small amount. | - No corresponding finding. |
| - 02: Abdominal cavity, red fluid, small amount. | - No corresponding finding. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 273 | |
| LUNG, LEFT | |
| - 01: Red. | - Alveolar Epithelium Hyperplasia, grade 3. |
| - 02: Cranial lobe (ventral), focal area, tan, 3 mm dia. | - Alveolar Bronchiolar Adenoma. |
| TESTIS (LEFT) | |
| - 01: Black and white discoloration, focal; filled with fluid. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Red. | - No corresponding finding. |
| - 02: Right posterior lobe, tan area, 3 mm dia. | - Bile Duct Hyperplasia, grade 3. |
| - 03: Caudate lobes, 3 x 4 (? units), tan areas. | - Eosinophilic Focus. |
| ANIMAL NO: 274 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 10 x 10 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Mottled edges, rounded. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged 75 x 22 x 20 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 275 | |
| TESTIS (LEFT) | |
| - 01: 20 x 13 x 11 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Slightly pale. | - Focal Necrosis, grade 2. |
| SPLEEN | |
| - 01: Slightly irregular. | - Extramedullary Hematopoesis, grade 2. |
| ANIMAL NO: 276 | |
| TESTIS (LEFT) | |
| - 01: Flaccid, small 14 x 6 x 3 mm. | - Tubular Atrophy, grade 4. |
| TESTES | |
| - 01: Right, pale mass, 24 x 15 x 12 mm. | - Interstitial Cell Adenoma, unilateral. |
| MAMMARY GLAND | |
| - 01: Promiment. | - Secretion, grade 3. |
| PITUITARY GLAND | |
| - 01: Enlarged, 4 x 3 x 3 mm, red. | - Pars Distalis Adenoma. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 277 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 15 x 15 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Small, flaccid 14 x 9 x 7 mm. | - Tubular Atrophy, unilateral, grade 4. |
| ANIMAL NO: 278 | |
| TESTIS (LEFT) | |
| - 01: Pale mass 25 x 15 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Pale mass, 20 x 12 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 279 | |
| TESTES | |
| - 01: Small, 15 x 8 x 7 mm. | - Tubular Atrophy, bilateral, grade 2. |
| EYES | |
| - 01: Left, Opacity. | - Lens Cataract, unilateral, grade 2. |
| ANIMAL NO: 280 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 15 x 10mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 281 | |
| SKIN/SUBCUTIS | |
| - 01: Right, lateral mass, 10 x 9 x 5 cm. Cut surface firm, pale tissue. | - Fat Necrosis. |
| LIVER | |
| - 01: Slightly pale. | - Bile Duct Hyperplasia, grade 1. |
| SPLEEN | |
| - 01: Enlarged, 50 x 12 x 5 mm. | - Extramedullary Hematopoesis, grade 3. |
| ANIMAL NO: 282 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Pale area, 9 x 7 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
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CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 283 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 16 x 14 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Slightly enlarged, 42 x 10 x 7 mm. | - Extramedullary Hematopoesis, grade 3. |
| TESTES | |
| - 01: Small, 16 x 7 x 7 mm. | - Tubular Atrophy, unilateral, grade 4. |
| EYES | |
| - 01: Opacity. | - Cornea Inflammation, unilateral, grade 2. |
| ANIMAL NO: 284 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 14 x 15 mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 285 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 18 x 11 mm. | - Interstitial Cell Adenoma. |
| SPLEEN | |
| - 01: Slightly granular. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Pale mass, 22 x 17 x 12 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 286 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 15 x 11 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Granular, pale. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 95 x 20 x 10 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTES | |
| - 01: Small, 15 x 9 x 9 mm. | - Tubular Atrophy, unilateral, grade 4. |
| ANIMAL NO: 287 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 14 x 13 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Slightly rounded edges. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Slightly enlarged, 45 x 11 x 7 mm. | - Extramedullary Hematopoesis, grade 3. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
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CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| TESTES | |
| - 01: Small, 15 x 10 x 7 mm. | - Tubular Atrophy, unilateral, grade 4. |
| ANIMAL NO: 288 | |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Dark. | - Extramedullary Hematopoesis, grade 3. |
| EYES | |
| - 01: Left eye socket, tan lesion, 6 x 4 x 3 mm. Cranial portion of lesion (located next to Harderian gland) was soft. The caudal end (next to molars teeth) was hard. | - SEE UNDER: PALATE (ORAL MUCOSA). |
| PALATE (ORAL MUCOSA) | |
| Finding 01 in EYES | - Squamous Cell Carcinoma (malignant neoplasm). |
| ANIMAL NO: 289 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 10 x 9 x 8 mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 290 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 10 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 20 x 15 x 11 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 291 | |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Scrotum mass, 20 x 10 x 8 mm. | - Adenoma, bilateral. |
| LIVER | |
| - 01: Pale. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 77 x 20 x 11 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 292 | |
| TESTIS (LEFT) | |
| - 01: Yellow and white discoloration, focal. | - Interstitial Cell Adenoma. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
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SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Lesion in area of right preputial gland, 15 x 13 x 5 mm, a portion of lesion was hollow, red and green material inside. | - Inflammation Suppurative, bilateral, grade 3. |
| LIVER | |
| - 01: Pale. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 60 x 16 x 6 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Discolored, dark brown, mottled. | - Nephropathy, bilateral, grade 2. |
| ANIMAL NO: 293 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 9 x 9 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Mottled, surface granular. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 58 x 11 x 10 mm. | - Extramedullary Hematopoesis, grade 3. |
| TESTES | |
| - 01: Right, small, 10 x 6 x 6 mm. | - Tubular Atrophy, unilateral, grade 4. |
| KIDNEYS | |
| - 01: Slightly pitted. | - Nephropathy, bilateral, grade 3. |
| LYMPH NODES | |
| - 01: Mandibular LN, prominent. | - Plasma Cell Hyperplasia, bilateral, grade 3. |
| ANIMAL NO: 294 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 3 x 3 mm. | - Interstitial Cell Adenoma. |
| - 02: Small, 20 x 9 x 9 mm. | - No corresponding finding. |
| SKIN/SUBCUTIS | |
| - 01: Ventral abdomen, red nodule, two, 2 x 2 x 2 mm each. | - SEE UNDER: MAMMARY GLAND. |
| LIVER | |
| - 01: Nodule, 7 x 6 x 5 mm. | - Bile Duct Hyperplasia, grade 2. |
| TESTES | |
| - 01: Right, small, 17 x 9 x 7 mm. | - Tubular Atrophy, unilateral, grade 4. |
| MAMMARY GLAND | |
| Finding 01 in SKIN/SUBCUTIS | - Galactocoele. |
| KIDNEYS | |
| - 01: Pale, mottled. | - Nephropathy, bilateral, grade 3. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 2, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 295 | |
| LUNG, LEFT | |
| - 01: Pale. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTIS (LEFT) | |
| - 01: Black, yellow and white, focal, discoloration. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pitted, granular surface. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 24 x 75 x 22 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LUNG | |
| - 01: Pale. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTES | |
| - 01: Right, flaccid. | - No corresponding finding. |
| KIDNEYS | |
| - 01: Black, bilateral. | - Nephropathy, bilateral, grade 2. |
| ANIMAL NO: 296 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 27 x 15 x 14 mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 297 | |
| LUNG, LEFT | |
| - 01: Pale, irregular white areas throughout. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTIS (LEFT) | |
| - 01: Yellow and white discoloration, focal; bilateral. | - Interstitial Cell Adenoma. |
| SPLEEN | |
| - 01: Enlarged, 70 x 20 x 20 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Black, granular. | - Nephropathy, bilateral, grade 3. |
| ANIMAL NO: 298 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 15 x 14 mm. | - Interstitial Cell Adenoma. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 319 | |
| TESTIS (LEFT) | |
| - 01: Flaccid, with yellow and white, focal discoloration. | - Interstitial Cell Adenoma. |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Mass, 27 x 13 x 10 mm, bilateral. Mass is filled with soft,tan, caseous material. | - Carcinoma, bilateral. |
| SPLEEN | |
| - 01: Enlarged; 60 x 17 x 8 mm, red. | - Extramedullary Hematopoesis, grade 4. |
| LUNG | |
| - 01: Pale. | - No corresponding finding. |
| MESENTERY | |
| Finding 01 in BODY CAVITIES | - Schwannoma. |
| BODY CAVITIES | |
| - 01: Mass in Abdominal Cavity, 100 x 67 x 38 mm. Firm to soft; cystic. Contained red fluid. Mass is tan, red, yellow. | - SEE UNDER: MESENTERY. |
| ANIMAL NO: 321 | |
| KIDNEYS | |
| - 01: Brown; Bilateral. | - Nephropathy, bilateral, grade 3. |
| PITUITARY GLAND | |
| - 01: Mass; 12 x 7 x 5 mm, black. | - Pars Distalis Adenoma. |
| ANIMAL NO: 349 | |
| TESTIS (LEFT) | |
| - 01: Flaccid. | - Tubular Atrophy, grade 2. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| HARDERIAN GLANDS | |
| - 01: Right, dark area, 2 mm dia. | - Inflammation, focal, unilateral, grade 1. |
| THYROID GLAND (BOTH LOBES) | |
| - 01: Right, mass, 7 x 4 x 3 mm, firm, red. | - Follicular Cell Carcinoma, unilateral. |
| PALATE (ORAL MUCOSA) | |
| - 01: Dark red area, 5 mm dia, in center of hard palate. | - No corresponding finding. |
| - 02: Dark red area, 5 mm dia, on the tongue. | - No corresponding finding. |
| INTESTINE-LARGE, COLON | |
| - 01: Hard area adhered to duodenum, 30 mm dia. | - Adhesion. |
| ANIMAL NO: 350 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 17 x 10 mm. | - Interstitial Cell Adenoma. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
PATHOL. NO.: 90188 GAW
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CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| TESTES | |
| - 01: Right, small. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 351 | |
| TESTIS (LEFT) | |
| - 01: pale mass, 10 x 10 x 8 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 3 x 4 x 3 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 352 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 22 x 12 x 7 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Edges rounded, slightly granular. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 60 x 12 x 10 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTES | |
| - 01: Right, small and flaccid. | - Tubular Atrophy, bilateral, grade 4. |
| ANIMAL NO: 353 | |
| TESTES | |
| - 01: Right, 12 x 10 x 7 mm, mass. | - Interstitial Cell Adenoma, unilateral. |
| ANIMAL NO: 355 | |
| TESTIS (LEFT) | |
| - 01: Yellow discoloration area, 3 x 4 mm. | - Interstitial Cell Hyperplasia, grade 3. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| EYES | |
| - 01: Right eye, crusted over with blood. | - Cornea Ulcer, unilateral, grade 4. |
| - 02: Right eye socket, some pale soft tissue remained. | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |
| HARDERIAN GLANDS | |
| - 01: Pale, smooth, firm, 9 x 5 x 6 mm with dark 2 mm near center. | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |
| GASSERIAN GANGLION (RIGHT) | |
| - 01: Enlarged, two times size of left. | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |
| PITUITARY GLAND | |
| - 01: Small, pale, >1 mm black focus in center. | - Pars Distalis Hyperplasia Focal, Hyperplasia, focal, grade 3. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
PATHOL. NO.: 90188 GAW
DATE : 29-AUG-13
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CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| PALATE (ORAL MUCOSA) | |
| - 01: There is a dark discoloration on right hard palate in area of rear molar teeth. That area appears distorted. | - Squamous Cell Carcinoma (malignant neoplasm). |
| STOMACH | |
| - 01: Contents black and bloody. | - No corresponding finding. |
| INTESTINE-LARGE, CECUM | |
| - 01: Black contents. | - No corresponding finding. |
| INTESTINE-SMALL, ILEUM | |
| - 01: Black contents. | - No corresponding finding. |
| ANIMAL NO: 356 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 30 x 16 x 14 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 27 x 16 x 15 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 357 | |
| EPIDIDYMIS (LEFT) | |
| - 01: Brown nodules, 1-4 mm. | - Mesothelioma (site of primary neoplasm: SYSTEMIC NEOPLASMS). |
| TESTIS (LEFT) | |
| - 01: Brown nodules, 1-4 mm. | - Mesothelioma (site of primary neoplasm: SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Black, bilateral, 1-4 mm. | - Nephropathy, bilateral, grade 2. |
| ANIMAL NO: 358 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 15 x 11 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Pale mass, 25 x 15 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 359 | |
| TESTES | |
| - 01: Right, flaccid. | - No corresponding finding. |
| EYES | |
| - 01: Left, bulging, red, crusted over. | - Cornea Ulcer, ulcer, unilateral, grade 4. |
| GASSERIAN GANGLION (LEFT) | |
| - 01: Enlarged, 5 x 10 x 3 mm. | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 361 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 23 x 13 x 7 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale foci, 1 mm dia, few. | - Macrovesiculation, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 42 x 10 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, pale area, 4 x 4 mm. | - Interstitial Cell Adenoma, bilateral. |
| PARATHYROID GLAND | |
| - 01: Left parathyroid, prominent. | - No corresponding finding. |
| LYMPH NODES | |
| - 01: Mediastinal LN, dark. | - Pigment, bilateral, grade 2. |
| ANIMAL NO: 362 | |
| TESTIS (LEFT) | |
| - 01: Pale area 10 x 7 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 10 x 6 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 363 | |
| EPIDIDYMIS (LEFT) | |
| - 01: Pale nodules, 1-3 mm. | - No corresponding finding. |
| TESTIS (LEFT) | |
| - 01: Many pale nodules, 1-3mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIDES). |
| - 02: Pale mass, 14 x 15 x 9 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale. | - Mononuclear Cell Leukemia (site of primary neoplasm:EPIDIDYMIDES). |
| SPLEEN | |
| - 01: Slightly mottled. | - Extramedullary Hematopoesis, grade 3. |
| TESTES | |
| - 01: Right, fluid filled. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIDES). |
| - 02: Right, many nodules, 1-3 mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIDES). |
| MESENTERY | |
| - 01: Pale nodules, 1-2 mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIDES). |
| LYMPH NODES | |
| - 01: Mesentery LN, dark red. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIDES). |
| BODY CAVITIES | |
| - 01: Abdominal wall, multiple pale nodules, 1-3 mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIDES). |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
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CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| EPIDIDYMIDES | |
| - 01: Right, pale nodules, 1-3mm. | - Mesothelioma, bilateral (malignant neoplasm). |
| ANIMAL NO: 365 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 30 x 14 x 13 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Granular surface. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 66 x 18 x 8 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Slightly pitted. | - Nephropathy, bilateral, grade 3. |
| ANIMAL NO: 366 | |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Left inguinal area, ulcerated mass, 17 x 14 x 7 mm. | - Carcinoma, unilateral. |
| TESTES | |
| - 01: Right, pale mass, 14 x 15 x 8 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 367 | |
| GENERAL OBSERVATIONS | |
| - 01: All fat, skin, organs have yellow tint. | - Nothing abnormal discovered. |
| LUNG, LEFT | |
| - 01: Red, irregular pale areas throughout. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTIS (LEFT) | |
| - 01: Flaccid. | - Tubular Atrophy, grade 3. |
| - 02: White and yellow discoloration, focal. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Mottled. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Raised nodules throughout, 1-3 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: 95 x 26 x 20 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LUNG | |
| - 01: Red, irregular pale areas throughout. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTES | |
| - 01: White and yellow discoloration, focal. Flaccid. | - No corresponding finding. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
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CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| KIDNEYS | |
| - 01: Black. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 368 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 12 x 10 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Left, inguinal area mass, 20 x 10 x 7 mm. | - SEE UNDER: MAMMARY GLAND. |
| LIVER | |
| - 01: Granular, pale. | - Macrovesiculation, grade 2. |
| SPLEEN | |
| - 01: Irregular surface. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, small, 12 x 7 x 4 mm, flaccid. | - Tubular Atrophy, unilateral, grade 4. |
| MAMMARY GLAND | |
| - 01: Mammary tissue prominent. | - Fibroadenoma. |
| Finding 01 in SKIN/SUBCUTIS | - Adenocarcinoma. |
| ANIMAL NO: 369 | |
| TESTES | |
| - 01: Right, pale mass, 30 x 15 x 12 mm. | - Interstitial Cell Adenoma, unilateral. |
| ANIMAL NO: 370 | |
| LYMPH NODES | |
| - 01: Mediastinal, prominent. | - No corresponding finding. |
| ANIMAL NO: 371 | |
| LUNG, LEFT | |
| - 01: Red, abnormal consistency. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Appeared firm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LIVER | |
| - 01: Red, mottled. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 3 times. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LUNG | |
| - 01: Red. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Abnormal consistency, appeared firm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
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CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| LYMPH NODES | |
| - 01: Mesenteric lymph node, enlarged, 2 times. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Thymic lymph node, enlarged, red. | - No corresponding finding. |
| HARDERIAN GLANDS | |
| - 01: Dark. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| STOMACH | |
| - 01: Abnormal contents, dark, filled with air. | - No corresponding finding. |
| INTESTINE-LARGE, CECUM | |
| - 01: Abnormal contents, dark. | - Ulceration, grade 4. |
| INTESTINE-SMALL, ILEUM | |
| - 01: Abnormal content, dark. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| BRAIN | |
| - 01: Dark foci, less than a pin-point in size, frontal cerebral cortex (ventral). | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Dorsal side cerebral, dark area, 3 x 4 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| PANCREAS | |
| - 01: Abnormal color, dark. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Very small. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 372 | |
| LUNG, LEFT | |
| - 01: Red foci, 2mm. | - Alveolar Epithelium Hyperplasia, grade 1. |
| TESTIS (LEFT) | |
| - 01: Pale area, 6 x 4 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 8 x 8 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 373 | |
| TESTIS (LEFT) | |
| - 01: Flaccid. | - Tubular Atrophy, grade 2. |
| - 02: White discoloration, focal. | - Interstitial Cell Adenoma. |
| LYMPH NODES | |
| - 01: Mandibular, enlarged, 7 x 6 x 3 mm. | - Plasma Cell Hyperplasia, bilateral, grade 3. |
| EYES | |
| - 01: Right, bulging out of socket. | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |
| - 02: Socket has some paleness. | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |
| HARDERIAN GLANDS | |
| - 01: Right, mass, 12 x 8 x 4 (units), pale, firm. | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
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CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| GASSERIAN GANGLION (RIGHT) | |
| - 01: Two times size of left. | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |
| PALATE (ORAL MUCOSA) | |
| - 01: Right, concave lesion, 12 x 5 mm, center is red, firm. | - Squamous Cell Carcinoma (malignant neoplasm). |
| ANIMAL NO: 374 | |
| TESTIS (LEFT) | |
| - 01: Yellow and black focal discoloration. | - No corresponding finding. |
| LIVER | |
| - 01: Caudate lobe, mottled, two pale areas, approximately 7 x 5 mm and 3 x 4 mm, appear firm, extend down into the lobe. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 75 x 25 x 14 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Tear. | - No corresponding finding. |
| ANIMAL NO: 375 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 30 x 15 x 14 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Small, 15 x 9 x 4 mm. | - Tubular Atrophy, unilateral, grade 4. |
| ANIMAL NO: 376 | |
| TESTIS (LEFT) | |
| - 01: pale mass, 15 x 11 x 10 mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 377 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 6 x 5 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 378 | |
| TESTIS (LEFT) | |
| - 01: 25 x 14 x 12 mm. | - Interstitial Cell Adenoma. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
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CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 379 | |
| TESTIS (LEFT) | |
| - 01: Yellow, black and white discoloration, focal. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, flaccid. | - No corresponding finding. |
| EYES | |
| - 01: Left, bulging, red, crusted over. | - Panophthalmitis, bilateral, grade 4. |
| PALATE (ORAL MUCOSA) | |
| - 01: Left, lesion, 10 x 7 x 2 mm. | - Squamous Cell Carcinoma (malignant neoplasm). |
| GASSERIAN GANGLION (LEFT) | |
| - 01: Enlarged, 12 x 4 x 3 mm. | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |
| ANIMAL NO: 380 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 30 x 15 x 14 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Small, 15 x 10 x 6 mm. | - Tubular Atrophy, unilateral, grade 2. |
| ANIMAL NO: 381 | |
| EYES | |
| - 01: Left, opacity. | - Lens Cataract, unilateral, grade 2. |
| ANIMAL NO: 382 | |
| SKIN/SUBCUTIS | |
| - 01: Mass, 30 x 20 x 10, soft, pale. Located upper Lt. abdominal area beneath skin. | - Sarcoma. |
| SPLEEN | - Autolytic |
| - 01: Enlarged, 56 x 13 x 10 mm. | - No corresponding finding. |
| TESTES | |
| - 01: Shrunken to flatness. | - Tubular Atrophy, bilateral, grade 4. |
| ANIMAL NO: 383 | |
| EPIDIDYMIS (LEFT) | |
| - 01: Brown nodules attached. | - Mesothelioma (malignant neoplasm). |
| TESTIS (LEFT) | |
| - 01: Fluid filled. | - Edema, grade 3. |
| - 02: Yellow and white discoloration, focal. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| SPLEEN | |
| - 01: Enlarged. | - Extramedullary Hematopoesis, grade 3. |

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SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| LUNG | |
| - 01: Pale. | - No corresponding finding. |
| TESTES | |
| - 01: Fluid filled. | - No corresponding finding. |
| - 02: white and yellow focal discolorations. | - No corresponding finding. |
| KIDNEYS | |
| - 01: Black. | - Tubule Pigment, bilateral, grade 3. |
| BODY CAVITIES | |
| - 01: Abdominal cavity, fluid filled, clear, dark brown fluid. | - No corresponding finding. |
| - 02: Abdominal cavity, muscle wall, brown raised nodules, 1-3 mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| - 03: Peritoneal cavity, fluid filled, clear, dark brown fluid. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| - 04: Peritoneal cavity, muscle wall, brown raised nodules, 1-3 mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| PITUITARY GLAND | |
| - 01: Mass, 2 x 3 x 4 mm, black. | - Pars Distalis Adenoma. |
| ANIMAL NO: 384 | |
| EPIDIDYMIS (LEFT) | |
| - 01: Fat, pale nodule, 5 x 5 mm. | - Blood Vessels Arteritis, grade 2. |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Ventral scrotal, area mass, 15 x 11 x 6 mm. | - Adenoma, unilateral. |
| TESTES | |
| - 01: Right, small, flaccid, 15 x 7 x 4 mm. | - Tubular Atrophy, unilateral, grade 4. |
| ANIMAL NO: 385 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 15 x 11 mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 386 | |
| TESTIS (LEFT) | |
| - 01: Small 15 x 10 x 5 mm. | - Tubular Atrophy, grade 2. |
| LIVER | |
| - 01: Mottled, pale, rounded edges. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Dark, slightly enlarged 50 x 20 x 10 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LUNG | |
| - 01: Right, congested. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTES | |
| - 01: Right, small, 15 x 10 x 5 mm. | - Tubular Atrophy, bilateral, grade 2. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| MAMMARY GLAND | |
| - 01: Left side, secretion. | - Secretion, grade 2. |
| KIDNEYS | |
| - 01: Dark, pitted. | - Nephropathy, bilateral, grade 3. |
| ANIMAL NO: 387 | |
| TESTIS (LEFT) | |
| - 01: Flaccid, bilateral. | - Edema, grade 1. |
| KIDNEYS | |
| - 01: Dark brown, pitted surface, bilateral. | - Nephropathy, bilateral, grade 3. |
| PITUITARY GLAND | |
| - 01: Mass, 8 x 5 x 3 mm, black. | - Pars Distalis Adenoma. |
| ANIMAL NO: 388 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 10 x 9 x 7 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Right, ventral scrotum mass, 20 x 20 x 15 mm. | - Epidermal Cyst. |
| ANIMAL NO: 389 | |
| TESTIS (LEFT) | |
| - 01: Pale, mass 15 x 13 x 9 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Right forelimb, pale mass, 25 x 14 x 10 mm. | - Keratoacanthoma. |
| TESTES | |
| - 01: Right, small, flaccid, 11 x 7 x 3 mm. | - Tubular Atrophy, unilateral, grade 3. |
| ANIMAL NO: 390 | |
| LIVER | |
| - 01: Small, pale. | - Bile Duct Hyperplasia, grade 1. |
| LUNG | |
| - 01: Right cranial lobe, has 2 mm white focus, dorsal side close to bifurcation. | - Osteosarcoma (site of primary neoplasm: EYES). |
| LYMPH NODES | |
| - 01: Mandibular lymph node, right, enlarged. | - Plasma Cell Hyperplasia, bilateral, grade 2. |
| - 02: Mesenteric lymph node, enlarged. | - Plasma Cell Hyperplasia, bilateral, grade 2. |
| EYES | |
| - 01: Right Eye, 10 x 5 mm mass, tan, extending down into hard palate. | - Socket Osteosarcoma, unilateral (malignant neoplasm). |
| STOMACH | |
| - 01: Stomach contained bedding and dark fluid. | - No corresponding finding. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| INTESTINE-LARGE, CECUM | |
| - 01: Contained dark black contents. | - No corresponding finding. |
| INTESTINE-SMALL, ILEUM | |
| - 01: Contained dark black contents. | - No corresponding finding. |
| INTESTINE-SMALL, JEJUNUM | |
| - 01: Contained dark black contents. | - No corresponding finding. |
| INTESTINE-LARGE, COLON | |
| - 01: Contained dark black contents. | - No corresponding finding. |
| ANIMAL NO: 391 | |
| TESTIS (LEFT) | |
| - 01: Dehydrated and flaccid. | - Tubular Atrophy, grade 2. |
| LIVER | |
| - 01: Pale. | - Macrovesiculation, grade 2. |
| SPLEEN | |
| - 01: Small. | - Atrophy, grade 3. |
| TESTES | |
| - 01: Dehydrated and flaccid. | - No corresponding finding. |
| KIDNEYS | |
| - 01: Pale with granular pitted surface. | - Nephropathy, bilateral, grade 4. |
| ADRENAL GLANDS | |
| - 01: Enlarged. | - Nothing abnormal discovered. |
| PITUITARY GLAND | |
| - 01: Mass, black, 5 x 6 x 3 mm. | - Pars Distalis Adenoma. |
| - 02: Indention in brain from pituitary mass. | - Pars Distalis Adenoma. |
| STOMACH | |
| - 01: Glandular, contained a small amount of black substance. | - No corresponding finding. |
| - 02: Non-glandular, surface raised, erosions. | - Ulceration, grade 3. |
| ANIMAL NO: 392 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 12 x 10 x 7 mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 393 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 13 x 12 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 40 x 10 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, small, 15 x 10 x 4 mm. | - Tubular Atrophy, unilateral, grade 3. |
| KIDNEYS | |
| - 01: Slightly pitted. | - Nephropathy, bilateral, grade 3. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 3, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 394 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 15 x 12 x 9 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Slightly enlarged, 37 x 10 x 9 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, pale mass, 25 x 15 x 12 mm. | - Interstitial Cell Adenoma, bilateral. |
| MAMMARY GLAND | |
| - 01: Thorax, subcutis, red, nodule, 10 x 5 x 4 mm. | - Galactocole Hemorrhage. |
| ANIMAL NO: 395 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 9 x 9 x 7 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 20 x 14 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 397 | |
| TESTIS (LEFT) | |
| - 01: Yellow and white discoloration, focal. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Mass, 4 x 6 x 10 (units), firm, epidermis. | - Epidermal Cyst. |
| LIVER | |
| - 01: Enlarged. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Granular, pitted surface. Margins of lobes are uneven. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 15 x 30 x 90 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Black. | - Nephropathy, bilateral, grade 3. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 4, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 419 | |
| TESTIS (LEFT) | |
| - 01: Yellow and white focal discoloration. | - Interstitial Cell Adenoma. |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Mass is 30 x 30 x 15 mm. Round and firm with a black crusted surface. Inside cuts-tan with some green exudate inside. | - Carcinoma, bilateral. |
| LUNG | |
| - 01: Pale. | - No corresponding finding. |
| TESTES | |
| - 01: Dark area. | - No corresponding finding. |
| KIDNEYS | |
| - 01: Granular, pitted surface. | - Nephropathy, bilateral, grade 3. |
| ANIMAL NO: 420 | |
| TESTIS (LEFT) | |
| - 01: Soft with white and yellow focal discoloration. | - Tubular Atrophy, grade 1. |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Right, mass, 25 x 18 x 10 mm. Tan; raw and exposed. Mass is firm with hard area raised above the skin (white exudate inside when sliced open). | - Carcinoma, unilateral. |
| LIVER | |
| - 01: Pale, friable, and appeared smaller than normal. | - Eosinophilic Focus. |
| SPLEEN | |
| - 01: Slightly enlarged, 40 x 11 x 7 mm. | - Extramedullary Hematopoesis, grade 3. |
| TESTES | |
| - 01: Right, Flaccid. | - No corresponding finding. |
| ANIMAL NO: 423 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 11 x 10 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Mottled, granular surface. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 88 x 25 x 15 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTES | |
| - 01: Right, small, 13 x 6 x 5 mm. | - Tubular Atrophy, unilateral, grade 4. |
| MAMMARY GLAND | |
| - 01: Right, ascilla subcutaneous mass, 40 x 25 x 10 mm. | - Fibroadenoma. |
| KIDNEYS | |
| - 01: Dark. | - Nephropathy, bilateral, grade 3. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 4, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| LYMPH NODES | |
| - 01: Mediastinal LN, prominent. | - Plasma Cell Hyperplasia, bilateral, grade 2. |
| ANIMAL NO: 449 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 2.0 x 1.4 x 1.3 cm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 3.0 x 1.5 x 1.5 cm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 450 | |
| TESTES | |
| - 01: Right, enlarged, pale mass, 23 x 15 x 12 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 451 | |
| EPIDIDYMIS (LEFT) | |
| - 01: Nodules, tan, 1-2 mm. | - Mesothelioma (malignant neoplasm). |
| TESTIS (LEFT) | |
| - 01: Firm, yellow, white and black discoloration, focal. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| - 02: Tunical vaginalis, nodules, tan, 1-2 mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| LIVER | |
| - 01: Dark brown. | - Mononuclear Cell Leukemia. |
| - 02: Dark red, focal areas throughout, 1-2 mm. | - Mononuclear Cell Leukemia. |
| - 03: Raised areas, tan, 2-3 mm. | - Mononuclear Cell Leukemia. |
| - 04: Diaphragmatic hernia, two, 8 x 4 x 2 mm, and 5 x 3 x 2 mm. | - Hepatodiaphragmatic Nodule. |
| SPLEEN | |
| - 01: Enlarged, 87 x 25 x 15 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:EPIDIDYMIS, LEFT). |
| LUNG | |
| - 01: Red. | - Mononuclear Cell Leukemia (site of primary neoplasm:EPIDIDYMIS, LEFT). |
| - 02: Cranial lobe, focus, dark red, 2 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:EPIDIDYMIS, LEFT). |
| TESTES | |
| - 01: Firm, focal, yellow, white and black discolorations. | - No corresponding finding. |
| KIDNEYS | |
| - 01: Black. | - Nephropathy, bilateral, grade 2. |
| ADRENAL GLANDS | |
| - 01: Enlarged, red. | - Mononuclear Cell Leukemia (site of primary neoplasm:EPIDIDYMIS, LEFT). |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
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SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 4, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| MESENTERY | |
| - 01: Fat, brown granules. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| BODY CAVITIES | |
| - 01: Thoracic cavity, red fluid filled. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| URINARY BLADDER | |
| - 01: Distended, with brown fluid. | - No corresponding finding. |
| ADIPOSE TISSUE | |
| - 01: Scrotal fat, nodules, tan, 1-2 mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIS, LEFT). |
| ANIMAL NO: 452 | |
| LUNG, LEFT | |
| - 01: Pale area, 9 x 5mm. | - Alveolar Bronchiolar Adenoma. |
| LIVER | |
| - 01: Pale, rounded edges to lobes. | - Macrovesiculation, grade 1. |
| SPLEEN | |
| - 01: Enlarged, 44 x 12 x 9 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, pale area, 12 x 10 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Surface pitted, pale. | - Nephropathy, bilateral, grade 3. |
| LYMPH NODES | |
| - 01: Mediastinal, prominent. | - No corresponding finding. |
| - 02: Mesentery, prominent. | - Plasma Cell Hyperplasia, bilateral, grade 2. |
| SALIVARY GLANDS | |
| - 01: Right, dark area, 3 x 3mm. | - No corresponding finding. |
| ANIMAL NO: 453 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 12 x 9 x 7 mm. | - Edema, grade 2. |
| ANIMAL NO: 455 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 14 x 12 mm. | - Interstitial Cell Adenoma. |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Right, inguinal area mass, 20 x 13 x 7 mm. | - Adenoma, bilateral. |
| TESTES | |
| - 01: Right, pale mass, 12 x 11 x 10 mm. | - Interstitial Cell Adenoma, unilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 4, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 456 | |
| TESTIS (LEFT) | |
| - 01: Enlarged, pale mass, 28 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| SPLEEN | |
| - 01: Enlarged, 45 x 10 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, small and flaccid, 14 x 7 x 3 mm. | - Tubular Atrophy, unilateral, grade 5. |
| ANIMAL NO: 457 | |
| TESTIS (LEFT) | |
| - 01: Mass, 25 x 15 x 10 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Right, lateral abdomen mass 45 x 40 x 20 mm. | - Sarcoma. |
| TESTES | |
| - 01: Right, dark area, 4 x 3 mm. | - Interstitial Cell Hyperplasia, unilateral, grade 2. |
| ANIMAL NO: 458 | |
| SKIN/SUBCUTIS | |
| - 01: Left inguinal area, mass, 25 x 25 x 10 mm, fluid filled. | - Epidermal Cyst. |
| LIVER | |
| - 01: Granular surface, pale. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 83 x 22 x 8 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 459 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 11 x 10 x 7 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Granular, pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 46 x 11 x 6 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, mass, pale, 20 x 15 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 460 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 10 x 10 mm. | - Interstitial Cell Adenoma. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
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CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 4, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| SKIN/SUBCUTIS | |
| - 01: Nodule, 7 x 3 x 2mm, neck, below ear, right. | - Basal Cell Adenoma. |
| LIVER | |
| - 01: Slightly pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 60 x 15 x 10 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTES | |
| - 01: Right, pale mass, 25 x 15 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Pitted, slight. | - Nephropathy, bilateral, grade 3. |
| ADRENAL GLANDS | |
| - 01: Pale 1mm foci, few. | - Medulla Phaeochromocytoma, Phaeochromocytoma, unilateral. |
| ANIMAL NO: 461 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 15 x 8 x 7 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Pitted. | - Nephropathy, bilateral, grade 3. |
| ANIMAL NO: 462 | |
| TESTES | |
| - 01: Right, white and yellow discolorations. | - No corresponding finding. |
| MAMMARY GLAND | |
| - 01: Prominent, lactating. | - Secretion, grade 2. |
| KIDNEYS | |
| - 01: Granular, pitted surface. | - Nephropathy, bilateral, grade 3. |
| PITUITARY GLAND | |
| - 01: Mass, 8 x 6 x 6 mm, black. | - Pars Distalis Adenoma. |
| ANIMAL NO: 464 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 27 x 15 x 11 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale edges, slightly rounded. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Slightly irregular. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, small, 17 x 10 x 6 mm. | - Tubular Atrophy, unilateral, grade 3. |
| KIDNEYS | |
| - 01: Slightly pitted. | - Nephropathy, bilateral, grade 3. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 4, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 466 | |
| SKIN/SUBCUTIS | |
| - 01: Right, inguinal area, pale mass, 15 x 11 x 9 mm. | - Squamous Cell Carcinoma. |
| LIVER | |
| - 01: Mottled surface, irregular. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 68 x 17 x 10 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 467 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 14 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 20 x 14 x 12 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 468 | |
| TESTIS (LEFT) | |
| - 01: pale mass, 15 x 12 x 12 mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 469 | |
| KIDNEYS | |
| - 01: Dark brown. | - Nephropathy, bilateral, grade 1. |
| - 02: Left, mass, 30 x 25 x 18 mm. | - SEE UNDER: ADRENAL GLANDS. |
| ADRENAL GLANDS | |
| Finding 02 in KIDNEYS | - Cortical Carcinoma, unilateral. |
| ANIMAL NO: 470 | |
| THYROID GLAND (BOTH LOBES) | |
| - 01: Left, mass 10 x 7 x 5 mm. Firm, appears to be lobulated. There is also a (10 x 7 x 4 mm) similar mass adjacent to Thyroid mass. | - Follicular Cell Carcinoma, unilateral (malignant neoplasm). |
| ANIMAL NO: 471 | |
| TESTIS (LEFT) | |
| - 01: Filled with fluid; firm yellow lesions. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale and friable, some adherence of nodules. | - Mesothelioma (site of primary neoplasm: TESTIS, LEFT). |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 4, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| KIDNEYS | |
| - 01: Black. | - Nephropathy, bilateral, grade 2. |
| BODY CAVITIES | |
| - 01: Animal's abdominal cavity was filled with brown fluid and all muscle wall, mesentery, fat, pancreas, scrotal sac, epididymides were covered with tan nodules (pin point to 3 mm in diameter), including abdominal side of diaphragm. | - Mesothelioma (site of primary neoplasm: TESTIS, LEFT). |
| ANIMAL NO: 472 | |
| TESTIS (LEFT) | |
| - 01: Two pale areas, 4 x 5 mm each. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Pale mass, 30 x 17 x 14 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 473 | |
| TESTIS (LEFT) | |
| - 01: White, linear discoloration, 4 x 2 mm; slightly flaccid. | - Edema, grade 1. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Slightly enlarged, 50 x 11 x 6 mm. | - Extramedullary Hematopoesis, grade 3. |
| TESTES | |
| - 01: Slightly flaccid. | - No corresponding finding. |
| MAMMARY GLAND | |
| - 01: Lactating. | - Secretion, grade 2. |
| KIDNEYS | |
| - 01: Both- dark, irregular pale areas throughout. | - Nephropathy, bilateral, grade 2. |
| LYMPH NODES | |
| - 01: Mandibular Lymph Node, appears to be cystic. | - Cyst, bilateral. |
| - 02: Cervical Lymph Node, right, enlarged, 7 x 5 x 3 mm and red. | - Plasma Cell Hyperplasia, bilateral, grade 3. |
| EYES | |
| - 01: Right, bulging out of socket and red. | - Cornea Ulcer, bilateral, grade 4. |
| GASSERIAN GANGLION (RIGHT) | |
| - 01: Enlarged (twice the size of the left). | - Squamous Cell Carcinoma (site of primary neoplasm:PALATE (ORAL MUCOSA)). |
| PITUITARY GLAND | |
| - 01: Mass, 2 x 2 x 4 (unit), dark raised area. | - Pars Distalis Adenoma. |
| PALATE (ORAL MUCOSA) | |
| - 01: Right, lesion, 9 x 4 mm, concave, and reddish. | - Squamous Cell Carcinoma (malignant neoplasm). |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 4, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 474 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 15 x 10 mm. | - Interstitial Cell Adenoma. |
| ANIMAL NO: 475 | |
| LIVER | |
| - 01: Pale. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Slightly mottled, 50 x 14 x 7 mm (enlarged). | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 477 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 28 x 14 x 13 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Small, 15 x 8 x 7 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 480 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 10 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| LYMPH NODES | |
| - 01: Mandibular, prominent. | - Plasma Cell Hyperplasia, bilateral, grade 2. |
| ANIMAL NO: 482 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 5 x 5 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 20 x 12 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| EYES | |
| - 01: Left, opacity. | - Phthisis Bulbi, unilateral. |
| ANIMAL NO: 483 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 30 x 17 x 14 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Right side of head, skin, ulcerated mass, 18 x 15 x 11 mm. | - SEE UNDER: SALIVARY GLANDS. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 4, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| SPLEEN | |
| - 01: Ventral, pale mass, 6 x 5 x 4 mm. | - Stromal Hyperplasia, grade 3. |
| TESTES | |
| - 01: Right, pale area 2 x 2 mm. | - Interstitial Cell Adenoma, bilateral. |
| LYMPH NODES | |
| - 01: Right, mandibular, enlarged, 5 x 5 mm. | - No corresponding finding. |
| SALIVARY GLANDS | |
| Finding 01 in SKIN/SUBCUTIS | - Sublingual Adenocarcinoma, unilateral. |
| ANIMAL NO: 484 | |
| LIVER | |
| - 01: Pale, granular surface. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 45 x 9 x 6 mm. | - Extramedullary Hematopoesis, grade 3. |
| TESTES | |
| - 01: Right, pale mass, 20 x 10 x 7 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 485 | |
| TESTIS (LEFT) | |
| - 01: pale mass, 25 x 14 x 15 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 14 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 486 | |
| LIVER | |
| - 01: Left, lobe, pale area, 5 x 4 mm. | - Bile Duct Hyperplasia, grade 2. |
| TESTES | |
| - 01: Right, pale area, 7 x 5 mm. | - Interstitial Cell Adenoma, unilateral. |
| ANIMAL NO: 487 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 18 x 10 x 7 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, small, 14 x 7 x 3 mm. | - Tubular Atrophy, unilateral, grade 4. |
| LYMPH NODES | |
| - 01: Mediastinal LN, prominent. | - No corresponding finding. |
| ANIMAL NO: 488 | |
| TESTIS (LEFT) | |
| - 01: Pale, 25 x 12 x 11 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Right, subcutaneous tissue, red nodule, 7 x 4 x 3 mm. | - SEE UNDER: MAMMARY GLAND. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 4, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| TESTES | |
| - 01: Right, amall, 16 x 9 x 7 mm. | - Tubular Atrophy, focal, bilateral, grade 4. |
| MAMMARY GLAND | |
| Finding 01 in SKIN/SUBCUTIS | - Galactocole Hemorrhage. |
| LYMPH NODES | |
| - 01: Mandibular LN, prominent. | - Plasma Cell Hyperplasia, bilateral, grade 2. |
| ANIMAL NO: 489 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| LUNG | |
| - 01: Congested. | - Congestion, grade 2. |
| TESTES | |
| - 01: Right, small, 17 x 9 x 7 mm. | - Tubular Atrophy, unilateral, grade 2. |
| ANIMAL NO: 490 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 15 x 10 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Slightly pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Slightly enlarged, 43 x 10 x 6 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, pale mass, 20 x 15 x 9 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 491 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 28 x 15 x 14 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 12 x 10 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 493 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 15 x 15 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 22 x 14 x 12 mm. | - Interstitial Cell Adenoma, bilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 520 | |
| LUNG, LEFT | |
| - 01: Several (1-2)mm, red foci throughout. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTIS (LEFT) | |
| - 01: Yellow, white, and black discoloration. | - Interstitial Cell Adenoma. |
| - 02: Some fluid. | - Interstitial Cell Adenoma. |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Left, mass, 30 x 20 x 10 mm, firm, tan. Crusted over (skin side); part of mass appeared to be necrotic. | - Adenoma, bilateral. |
| LIVER | |
| - 01: Mottled. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 75 x 20 x 13 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LUNG | |
| - 01: Caudal lobe (dorsal cranial area) has (3mm dia) tan area. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Dark. | - Nephropathy, bilateral, grade 2. |
| BODY CAVITIES | |
| - 01: Thoracic cavity contained some red fluid; More fluid. | - No corresponding finding. |
| - 02: Adbominal cavity contained some red fluid. | - No corresponding finding. |
| PITUITARY GLAND | |
| - 01: Black area, 1 x 2 x 1 mm. | - Pars Distalis Hyperplasia Focal, Hyperplasia, focal, grade 3. |
| ANIMAL NO: 549 | |
| TESTIS (LEFT) | |
| - 01: White and yellow discoloration, focal. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Irregular pale areas throughout. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Small. | - Lymphoid Depletion, grade 2. |
| LUNG | |
| - 01: Nodules, 1-3 mm dia. | - Alveolar Bronchiolar Carcinoma (malignant neoplasm). |
| - 02: Mass (smooth flat side) nodules, 1-3 mm dia. | - Cystic Keratinizing Epithelioma. |
| - 03: Lung pluck, adhesion to spine. | - No corresponding finding. |
| TESTES | |
| - 01: Small, flaccid. | - No corresponding finding. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| KIDNEYS | |
| - 01: Granular surfaces. | - Alveolar Bronchiolar Carcinoma (site of primary neoplasm:LUNG). |
| - 02: Left, mass, 3 mm dia., raised, white. | - Alveolar Bronchiolar Carcinoma (site of primary neoplasm:LUNG). |
| - 03: Right, renal pelvis, dialated. | - Alveolar Bronchiolar Carcinoma (site of primary neoplasm:LUNG). |
| - 04: Right, mass, 15 x 13 x 5 mm, firm, white. | - Alveolar Bronchiolar Carcinoma (site of primary neoplasm:LUNG). |
| LYMPH NODES | |
| - 01: Mesenteric LN, enlaged and red. | - Sinus Dilation, bilateral, grade 2. |
| BODY CAVITIES | |
| - 01: Thoracic cavity, blood inside, large clot below heart. | - No corresponding finding. |
| - 02: Thoracic cavity, lined with nodules, 1-3 mm dia. | - Alveolar Bronchiolar Carcinoma (site of primary neoplasm:LUNG). |
| BONE | |
| - 01: Rib, nodules 1-3 mm dia. | - Alveolar Bronchiolar Carcinoma (site of primary neoplasm:LUNG). |
| - 02: Sternum, 1-3 mm dia. | - Alveolar Bronchiolar Carcinoma (site of primary neoplasm:LUNG). |
| SEMINAL VESICLES | |
| - 01: Small, with irregular shaped edges. | - No corresponding finding. |
| PITUITARY GLAND | |
| - 01: 2 x 3 mm red area. | - Pars Distalis Cyst, Cyst. |
| INTESTINE-LARGE, COLON | |
| - 01: Nodule, tan, 3 x 4 x 2 (units). | - Muscularis Focal Thickening. |
| HEART | |
| - 01: Nodules, 1-3 mm dia. | - Alveolar Bronchiolar Carcinoma (site of primary neoplasm:LUNG). |
| SKELETAL MUSCLE, DIAPHRAGM | |
| - 01: Nodules, 1-3 mm dia. | - Alveolar Bronchiolar Carcinoma (site of primary neoplasm:LUNG). |
| ANIMAL NO: 551 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 28 x 15 x 13 mm. | - Interstitial Cell Adenoma. |
| SPLEEN | |
| - 01: Enlarged, 50 x 15 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, pale mass, 23 x 18 x 15 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 552 | |
| TESTIS (LEFT) | |
| - 01: Flaccid. | - No corresponding finding. |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Right, mass, 18 x 14 x 6 mm, firm surface, soft inside, green exudate. | - Carcinoma, unilateral. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| LIVER | |
| - 01: Mottled. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 55 x 17 x 12 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LUNG | |
| - 01: Red, with black focal areas throughout. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| MAMMARY GLAND | |
| - 01: Lactating. | - Secretion, grade 2. |
| KIDNEYS | |
| - 01: Granular, pitted surface. | - Nephropathy, bilateral, grade 4. |
| PITUITARY GLAND | |
| - 01: Mass, 6 x 5 x 3 mm, black. | - Pars Distalis Adenoma. |
| ANIMAL NO: 553 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 15 x 10 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, small. | - Tubular Atrophy, unilateral, grade 3. |
| ANIMAL NO: 554 | |
| TESTIS (LEFT) | |
| - 01: Small, flaccid. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 45 x 10 x 7 mm. | - Extramedullary Hematopoesis, grade 3. |
| TESTES | |
| - 01: Multiple pale nodules, 2-3mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIDES). |
| - 02: Pale area 20 x 15 x 11 mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIDES). |
| MESENTERY | |
| - 01: Multiple pale nodules, 2-3mm, throughout. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIDES). |
| LYMPH NODES | |
| - 01: Thymic region, dark nodules, 2-4mm. | - Pigment, bilateral, grade 3. |
| BODY CAVITIES | |
| - 01: Abdominal wall, pale nodules, 2-3mm. | - Mesothelioma (site of primary neoplasm: EPIDIDYMIDES). |
| EPIDIDYMIDES | |
| - 01: Right, multiple pale nodules, 2-3mm. | - Mesothelioma, unilateral (malignant neoplasm). |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 555 | |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Left, green area 5 x 4 mm. | - Inflammation Chronic Active, bilateral, grade 2. |
| Finding 01 in MAMMARY GLAND | - Cyst, bilateral. |
| LIVER | |
| - 01: Nodule adjacent diaphagm 17 x 10 x 5 mm. | - Hepatodiaphragmatic Nodule. |
| MAMMARY GLAND | |
| - 01: Lactating. | - SEE UNDER: PREPUTIAL GLANDS (INGUINAL GLANDS). |
| PITUITARY GLAND | |
| - 01: Mass, dark, 8 x 5 x 4 mm. | - Pars Distalis Adenoma. |
| ANIMAL NO: 556 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 9 x 8 x 6 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale and enlarged. | - Bile Duct Hyperplasia, grade 2. |
| TESTES | |
| - 01: Right, pale area, 6 x 5 x 4 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Pale and enlarged. | - Nephropathy, bilateral, grade 3. |
| ADRENAL GLANDS | |
| - 01: Enlarged, red foci, 4 x 4 x 3 mm. | - Cortex Focal Hyperplasia, Focal, Hypertrophy, bilateral, grade 2. |
| LYMPH NODES | |
| - 01: Mandibular, enlarged, 3 x 2 x 3 mm. | - No corresponding finding. |
| - 02: Thymic area, pale, 3 x 4 mm. | - No corresponding finding. |
| ANIMAL NO: 557 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 14 x 11 mm. | - Interstitial Cell Adenoma. |
| SPLEEN | |
| - 01: Enlarged, 45 x 12 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, pale mass, 30 x 15 x 12 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 558 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 23 x 12 x 10 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Ventral, ulceration 20 x 15 mm. | - Squamous Cell Carcinoma. |
| PREPUTIAL GLANDS (INGUINAL GLANDS) | |
| - 01: Mass, 30 x 30 x 15 mm. | - No corresponding finding. |
| SPLEEN | |
| - 01: Enlarged, 45 x 14 x 10 mm. | - Extramedullary Hematopoesis, grade 2. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| TESTES | |
| - 01: Small, flaccid, 15 x 7 x 3 mm. | - Tubular Atrophy, unilateral, grade 4. |
| KIDNEYS | |
| - 01: Granular. | - Nephropathy, bilateral, grade 2. |
| LYMPH NODES | |
| - 01: Mediastinal, dark. | - Pigment, bilateral, grade 2. |
| ANIMAL NO: 559 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 11 x 6 mm. | - Interstitial Cell Adenoma. |
| SPLEEN | |
| - 01: Enlarged, 55 x 11 x 7 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTES | |
| - 01: Right, pale mass, 12 x 12 x 6 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 560 | |
| TESTIS (LEFT) | |
| - 01: Small 15 x 12 x 4 mm. | - Interstitial Cell Adenoma. |
| - 02: Pale area, 2 x 3 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, 18 x 14 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 561 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 10 x 8 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 10 x 10 x 7 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 562 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 14 x 12 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 28 x 18 x 14 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 563 | |
| GENERAL OBSERVATIONS | |
| - 01: Whole body (skin, fat, and internal organs) have a yellow tint. | - No corresponding finding. |
| LIVER | |
| - 01: Abnormal color (orange), granular-pitted surface. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| SPLEEN | |
| - 01: Enlarged, 95 x 28 x 15 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Black. | - Nephropathy, bilateral, grade 2. |
| PITUITARY GLAND | |
| - 01: Focal area, red, approximately 3 mm dia. | - Pars Distalis Adenoma. |
| ANIMAL NO: 564 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 25 x 11 x 11 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 20 x 12 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 566 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 10 x 9 mm. | - Interstitial Cell Adenoma. |
| MAMMARY GLAND | |
| - 01: Subcutis neck, pale nodule, 2 x 2 x 1 mm. | - Galactocoele. |
| - 02: Subcutis abdomen, red nodule, 2 x 1 x 1 mm. | - Granuloma. |
| ANIMAL NO: 567 | |
| TESTIS (LEFT) | |
| - 01: Black discoloration, focal. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Diaphragmatic hernia, 15 x 10 x 6 mm. | - Hepatodiaphragmatic Nodule. |
| EYES | |
| - 01: Right, bulging, red, crusted over. | - Cornea Ulcer, ulcer, unilateral, grade 3. |
| HARDERIAN GLANDS | |
| - 01: Right, enlarged, 10 x 10 x 13 mm, red. | - Inflammation, focal, unilateral, grade 4. |
| GASSERIAN GANGLION (RIGHT) | |
| - 01: Enlarged, 12 x 5 x 3 mm. | - Meningioma Malignant. |
| ANIMAL NO: 568 | |
| TESTIS (LEFT) | |
| - 01: Discolored, yellow, firm areas. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Liver is mottled, has granular and pitted surface, abnormal color (pale). | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: 105 x 30 x 16 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| LUNG | |
| - 01: Caudal lung lobe has two, 2 mm tan foci. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Right kidney has a tumor present. 3 mm in diameter, both kidneys black. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LYMPH NODES | |
| - 01: Mandibular lymph nodes enlarged. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Mesenteric lymph nodes enlarged. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 03: Renal lymph nodes enlarged. (attached to mesentery). | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 569 | |
| TESTIS (LEFT) | |
| - 01: Yellow,black, and white discoloration; bilateral. | - Interstitial Cell Adenoma. |
| - 02: Flaccid. | - No corresponding finding. |
| SKIN/SUBCUTIS | |
| - 01: Left axillary region, mass, 85 x 80 x 32 mm, firm, lobulated, white and tan, necrotic area in center of mass. | - Fibroadenoma. |
| LIVER | |
| - 01: Diaphragmatic hernia, 12 x 15 x 5 mm. | - Hepatodiaphragmatic Nodule. |
| SPLEEN | |
| - 01: Enlarged, 50 x 15 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| ANIMAL NO: 571 | |
| TESTIS (LEFT) | |
| - 01: pale area, 6 x 4 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale mass, 22 x 12 x 12 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 572 | |
| LUNG, LEFT | |
| - 01: Pale area, 2 x 2 mm. | - Alveolar Epithelium Hyperplasia, grade 3. |
| LIVER | |
| - 01: Slightly pale. | - Bile Duct Hyperplasia, grade 1. |
| SPLEEN | |
| - 01: Slightly mottled. | - Extramedullary Hematopoesis, grade 2. |
| ANIMAL NO: 573 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 10 x 10 mm. | - Interstitial Cell Adenoma. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| TESTES | |
| - 01: Right, pale area, 7 x 5 mm. | - Interstitial Cell Adenoma, bilateral. |
| MAMMARY GLAND | |
| - 01: Thorax subcutis, red nodules, 2 x 3 x 4 mm. | - Galactocole Hemorrhage. |
| ANIMAL NO: 574 | |
| LIVER | |
| - 01: Pale, mottled + friable. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 9 x 2.7 x 1.5 cm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LUNG | |
| - 01: Mottled with pale areas. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LYMPH NODES | |
| - 01: Mesenteric lymph node, enlarged. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SEMINAL VESICLES | |
| - 01: Small. | - No corresponding finding. |
| ANIMAL NO: 575 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 15 x 10 x 9 mm. | - Interstitial Cell Adenoma. |
| STERNUM | |
| - 01: Red nodule, adjacent, 4 x 3 mm. | - Blood Vessel Arteritis, grade 3. |
| - 02: Red nodule, adjacent, 2 x 2 mm. | - Blood Vessel Arteritis, grade 3. |
| LIVER | |
| - 01: Pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Mottled. | - Extramedullary Hematopoesis, grade 3. |
| TESTES | |
| - 01: Right, pale areas (2) 2 x 4 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Mottled. | - Nephropathy, bilateral, grade 3. |
| ADRENAL GLANDS | |
| - 01: Dark spots, 1 mm. | - Cortex Adenoma, Adenoma, unilateral. |
| MESENTERY | |
| - 01: Multiple red, firm, nodules, 2-5mm diameter. | - Blood Vessel Arteritis, grade 3. |
| LYMPH NODES | |
| - 01: Mediastinal, prominent. | - Plasma Cell Hyperplasia, bilateral, grade 2. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 576 | |
| TESTES | |
| - 01: Right, pale mass, 25 x 15 x 11 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 578 | |
| LIVER | |
| - 01: Mottled, has granular appearance with pitted surface and abnormal color. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Very enlarged, 90 x 13 x 14 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| KIDNEYS | |
| - 01: Both kidneys are black. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| LYMPH NODES | |
| - 01: Renal lymph nodes, enlarged. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 02: Mesenteric lymph nodes, enlarged. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 03: Mandibular lymph nodes, enlarged. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| - 04: Thymic lymph nodes, enlarged. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 579 | |
| TESTIS (LEFT) | |
| - 01: Small, pale areas, 2-4mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Pale mass, 22 x 14 x 10 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 580 | |
| TESTES | |
| - 01: Right, pale area, 9 x 7 mm. | - Interstitial Cell Adenoma, unilateral. |
| ANIMAL NO: 581 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 15 x 11 mm. | - Interstitial Cell Adenoma. |
| SPLEEN | |
| - 01: Surface irregular. | - Extramedullary Hematopoesis, grade 2. |
| KIDNEYS | |
| - 01: Slightly mottled. | - Nephropathy, bilateral, grade 3. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
PATHOL. NO.: 90188 GAW
DATE : 29-AUG-13
PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 582 | |
| SPLEEN | |
| - 01: Dark. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| ANIMAL NO: 583 | |
| LUNG, LEFT | |
| - 01: Pale area, 4 x 3 mm. | - Alveolar Bronchiolar Adenoma. |
| LUNG | |
| - 01: Right, pale area, 6 x 5 mm. | - Interstitial Fibrosis, grade 3. |
| ANIMAL NO: 584 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 30 x 15 x 12 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Slightly enlarged. | - Mixed Cell Focus. |
| SPLEEN | |
| - 01: Slightly enlarged 40 x 11 x 7 mm. | - Congestion, grade 2. |
| TESTES | |
| - 01: Pale mass, 25 x 15 x 11 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Slightly mottled. | - Nephropathy, bilateral, grade 3. |
| ANIMAL NO: 585 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 30 x 15 x 14 mm. | - Interstitial Cell Adenoma. |
| SKIN/SUBCUTIS | |
| - 01: Ventral chest, skin nodule, 7 x 5 x 4 mm. | - Keratoacanthoma. |
| TESTES | |
| - 01: Small, flaccid, 18 x 9 x 7 mm. | - Tubular Atrophy, unilateral, grade 5. |
| ANIMAL NO: 586 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 30 x 15 x 15 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Right, anterior lobe, pale mass, 15 x 15 x 9 mm. | - Hepatocellular Adenoma. |
| LUNG | |
| - 01: Right, caudal lobe, pale area, 5 x 4 mm. | - Alveolar Epithelium Hyperplasia, grade 3. |
| KIDNEYS | |
| - 01: Granular, pitted and pale. | - Nephropathy, bilateral, grade 3. |
| PALATE (ORAL MUCOSA) | |
| - 01: Pale, raised area 5 x 7 mm. | - Squamous Cell Carcinoma. |

TEST ITEM : AMPHIBOLE ASBESTOS PATHOL. NO.: 90188 GAW
TEST SYSTEM : RAT, , 18 MO, INHALATION DATE : 29-AUG-13
SPONSOR : THE HAMNER PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 587 | |
| LUNG, LEFT | |
| - 01: Pale area, 3 x 7 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTIS (LEFT) | |
| - 01: Pale area, 10 x 11 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Slightly pale. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| SPLEEN | |
| - 01: Enlarged, 60 x 15 x 9 mm. | - Mononuclear Cell Leukemia (site of primary neoplasm:SYSTEMIC NEOPLASMS). |
| TESTES | |
| - 01: Right, pale area, 4 x 11 mm. | - Interstitial Cell Adenoma, bilateral. |
| MAMMARY GLAND | |
| - 01: Subcutaneous fat, red nodules 5 x 4 x 2 mm. | - Galactocole Hemorrhage. |
| - 02: Subcutaneous fat, red nodules, 3 x 3 x 2 mm. | - Galactocole Hemorrhage. |
| KIDNEYS | |
| - 01: Surface, granular. | - Nephropathy, bilateral, grade 3. |
| ANIMAL NO: 588 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 20 x 15 x 15 mm. | - Interstitial Cell Adenoma. |
| TESTES | |
| - 01: Right, pale area, 15 x 11 mm. | - Interstitial Cell Adenoma, bilateral. |
| ANIMAL NO: 589 | |
| LUNG | |
| - 01: Right , caudal lobe, pale area, 4 x 5 mm. | - Alveolar Epithelium Hyperplasia, grade 3. |
| ANIMAL NO: 591 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 2 x 3 mm. | - Interstitial Cell Adenoma. |
| KIDNEYS | |
| - 01: Slightly granular. | - Nephropathy, bilateral, grade 4. |
| ANIMAL NO: 592 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 12 x 10 x 7 mm. | - Interstitial Cell Adenoma. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
PATHOL. NO.: 90188 GAW
DATE : 29-AUG-13
PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| LYMPH NODES | |
| - 01: Mandibular LN, prominent. | - Plasma Cell Hyperplasia, bilateral, grade 3. |
| ANIMAL NO: 593 | |
| TESTIS (LEFT) | |
| - 01: Pale area, 5 x 4 mm. | - Interstitial Cell Adenoma. |
| LUNG | |
| - 01: Right caudal lobe, pale area, 4 x 4 mm. | - Alveolar Bronchiolar Adenoma. |
| MAMMARY GLAND | |
| - 01: Right, lateral thorax, pale, soft mass, 45 x 47 x 22 mm. Cut surface reveals milky liquid and soft pale tissue. | - Fibroadenoma, single. |
| KIDNEYS | |
| - 01: Pale and pitted surface. | - Nephropathy, bilateral, grade 4. |
| ANIMAL NO: 594 | |
| TESTIS (LEFT) | |
| - 01: Small, 15 x 8 x 7 mm. | - Tubular Atrophy, grade 5. |
| LIVER | |
| - 01: Edges rounded, pale. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 40 x 10 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, pale mass, 20 x 20 x 18 mm. | - Interstitial Cell Adenoma, unilateral. |
| ANIMAL NO: 595 | |
| KIDNEYS | |
| - 01: Brown, granular surface. | - Nephropathy, bilateral, grade 4. |
| ANIMAL NO: 596 | |
| TESTIS (LEFT) | |
| - 01: Pale mass, 22 x 14 x 11 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Irregular surface. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Enlarged, 45 x 10 x 7 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, small, 15 x 10 x 7 mm. | - Interstitial Cell Adenoma, bilateral. |
| KIDNEYS | |
| - 01: Pitted, slight. | - Nephropathy, bilateral, grade 4. |

TEST ITEM : AMPHIBOLE ASBESTOS
TEST SYSTEM : RAT, , 18 MO, INHALATION
SPONSOR : THE HAMNER
PATHOL. NO.: 90188 GAW
DATE : 29-AUG-13
PathData®System V6.2d2

CORRELATION TABLE: NECROPSY - MICROSCOPY
DOSE GROUP 5, MALE

| NECROPSY OBSERVATION | CORRESPONDING MICROSCOPIC FINDING |
|---|---|
| ANIMAL NO: 597 | |
| TESTIS (LEFT) | |
| - 01: Left testis, pale mass 30 x 16 x 15 mm. | - Interstitial Cell Adenoma. |
| LIVER | |
| - 01: Pale, edges rounded. | - Bile Duct Hyperplasia, grade 2. |
| SPLEEN | |
| - 01: Slightly enlarged, 40 x 8 x 8 mm. | - Extramedullary Hematopoesis, grade 2. |
| TESTES | |
| - 01: Right, small, 20 x 10 x 9 mm. | - Interstitial Cell Adenoma, bilateral. |

# EXPLANATION OF CODES AND SYMBOLS

**EXPLANATION OF CODES AND SYMBOLS**

**CODES AND SYMBOLS USED AT TABLE LEVEL:**

AOFT = Animal Organ Finding Table

**CODES AND SYMBOLS USED AT ANIMAL LEVEL:**

M = Male Animal
K0 = Terminal Sacrifice Group
K1 . . . K9 = Interim Sacrifice Group 1 . . . 9
R1 . . . R9 = Recovery / Post-Treatment Group 1 . . . 9
+ = Intercurrent Death / Sacrificed Moribund

**CODES AND SYMBOLS USED AT ORGAN LEVEL:**

A = Organ autolytic, evaluation not possible
G = Gross finding evaluated histologically
0 = Tissue not present for histologic examination
‘ = Histologic examination not required
+ = Organ examined, findings present
- = Organ examined, no pathologic findings noted (AOFT only)
( = Only one of paired organs examined/present
! = No corresponding microscopic finding required
NAD = No abnormalities detected

**CODES AND SYMBOLS USED AT FINDING LEVEL:**

GRADE 1 = Minimal / very few / very small
GRADE 2 = Slight / mild / few / small
GRADE 3 = Moderate / moderate number / moderate size
GRADE 4 = Marked / many / large / moderately severe
GRADE 5 = Massive / extensive number / extensive size / severe
P = Finding present, severity not scored
B0 = Benign neoplasm
N0 = Malignant neoplasm
M = Metastasis
( = Finding unilateral in paired organs

**CORRELATION TABLE: NECROPSY-MICROSCOPY:**

Evaluation not required = No corresponding microscopic finding required

# ATTACHMENT

# EPA FIBER PROJECT: SUBCHRONIC INHALATION EXPOSURE OF RATS TO AMPHIBOLE ASBESTOS:

# FINAL BRONCHOALVEOLAR LAVAGE CYTOLOGY REPORT 18 MONTHS POST-EXPOSURE

# EPA FIBER PROJECT: SUBCHRONIC INHALATION EXPOSURE OF RATS TO AMPHIBOLE ASBESTOS: BRONCHOALVEOLAR LAVAGE CYTOLOGY

THE HAMNER INSTITUTES FOR HEALTH SCIENCES PROTOCOL NUMBER: 10026

EPL PROJECT NO.: 304-466

FINAL BRONCHOALVEOLAR LAVAGE CYTOLOGY REPORT
**(18 MONTHS POST-EXPOSURE)**

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August 29, 2013

EPA FIBER PROJECT: SUBCHRONIC INHALATION EXPOSURE
OF RATS TO AMPHIBOLE ASBESTOS:
BRONCHOALVEOLAR LAVAGE CYTOLOGY

THE HAMNER INSTITUTES FOR
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FINAL BRONCHOALVEOLAR LAVAGE CYTOLOGY REPORT
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OF RATS TO AMPHIBOLE ASBESTOS:
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THE HAMNER INSTITUTES FOR
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EPL PROJECT NO.: 304-466

FINAL BRONCHOALVEOLAR LAVAGE CYTOLOGY REPORT
**(18 MONTHS POST-EXPOSURE)**

## INTRODUCTION

This subchronic study was conducted to determine the biological potency of inhaled Libby amphibole (LA) fibers over the near-life span of the rat compared to the potency of inhaled amosite, a known fibrogenic amphibole asbestos fiber, and to develop fiber burden data to use in a dosimetry model of amphibole fiber deposition, clearance, and retention in the respiratory tract (head, trachea, lung lobes) and GI tract. As part of this study, Experimental Pathology Laboratories, Inc. (EPL®) was requested to perform the quantitative bronchoalveolar lavage (BAL) cytological evaluation of prepared cytological slides provided by The Hamner Institutes for Health Sciences.

The original experimental design pertinent to the BAL cytology analysis is summarized in Table 1. The results for the BAL cytology analysis for samples collected at 1 day, 1 month, and 3 months post-exposure have been separately reported (Willson and Wall, 2013). At the final (~18 months post-exposure) necropsy, BAL was conducted on 8 of the surviving animals from the scheduled group of 50 per dose. The present report only includes samples collected at 18 months post-exposure.

**Table 1. Experimental Design**

| Group Number[1] | Test Material | Concentration (mg/m$^3$) | No. of rats to be necropsied at each time point[2] | | | | Total in Each Exp. Group |
|---|---|---|---|---|---|---|---|
| | | | Post-Exposure Period | | | | |
| | | | 1 day | 1 month | 3 months | 18 months | |
| 1 | Air Control | 0.0 | 11 | 11 | 11 | 53 | 86 |
| 2 | Amosite | 3.3 | 14 | 14 | 14 | 56 | 98 |
| 3 | LA | 1.0 | 14 | 14 | 14 | 56 | 98 |
| 4 | LA | 3.3 | 14 | 14 | 14 | 56 | 98 |
| 5 | LA | 10.0 | 14 | 14 | 14 | 56 | 98 |
| | Total in Each Post-Exp Period | | 67 | 67 | 67 | 277 | |
| | Total Animals in Study | | **478** | | | | |

[1]To facilitate the BAL cytology analysis, the exposure level (treatment) groups were numbered as follows: 1 – Air control, 2 – amosite 3.3 mg/m$^3$, 3 – LA 1.0, 4 – LA 3.3 mg/m$^3$, and 5 – LA 10 mg/m$^3$.

[2]At each scheduled necropsy conducted at 1 day, 1 month, and 3 months post-exposure, the same 8 animals designated for histopathology were also designated to have the right lung lavaged for BAL cytology.

## BRONCHOALVEOLAR LAVAGE ISOLATION AND CYTOLOGY PROCEDURES

Rat lungs were lavaged by means of a cannula inserted into the trachea. Three mL of room temperature phosphate buffered saline were introduced and drawn out of the lungs twice (total of 6 mL) and stored on ice (L1 sample). Lungs were then lavaged three more times (total of 9 mL) and stored on ice (L2 sample). The L1 and L2 samples were centrifuged at 200 x g for 10 minutes. Cell pellets from L1 and L2 samples were combined in 1 mL of F12 medium (Gibco F12 GlutaMax) and counted using a Coulter Counter Model ZM (Beckman Coulter, Brea, CA). Zap-oglobin was used to lyse red cells in the counting vial. Duplicate counts were recorded to obtain a mean count per sample.

Slides were prepared by adjusting the cell concentrations to 50,000/225 µL and centrifuging the 225 µL with 25 µL fetal bovine serum in a Shandon Cytospin (Thermo Fisher Scientific, Waltham, MA) for three minutes at 500 RPM. Slides were air dried followed by fixation and staining with Siemens Diff-Quik Stain Set (Fisher Scientific, Kalamazoo, MI) and provided to EPL for determination of the cell differential percentages. Three hundred (300) leukocytic cells per slide were enumerated and differentiated (Gao et al., 2006; Palmans et al., 2000) via a manual tagging method using digital photographic images of cells in photographic fields (40X total magnification). The fields for photography

were selected using a random pattern that prevented duplicate photography of the same fields.

The method of enumeration was performed via the application of manual tagging procedures available in the image analysis software, ImagePro Plus, v.5.0.2.9 (Media Cybernetics, Inc., Silver Spring, Maryland). Briefly, the cells enumerated included: macrophages, lymphocytes, neutrophils, and eosinophils. For each cell type a unique color code was assigned as the class color identifier. Using the appropriate class color each type of cell in each photograph was counted. As each cell was counted it was tagged with a unique number that had the color code for its class. The evaluation of photographic fields and counting was continued until a count of 300 cells was accumulated. Samples with less than 300 leukocytic cells were considered inadequate for evaluation. The absolute differential cell count for each photographic field was manually recorded.

Using an EXCEL spreadsheet, the absolute counts for each cell type observed in all photographic fields counted were totaled for each animal. The differential cell count data for animal 376 were recorded, but percentages were not calculated and the animal was excluded from the statistical analyses due to an inadequate sample.

For those animals for which 300 cells were counted, the total count of each cell type for each animal was divided by 300 and the result multiplied by 100 to obtain the cell differential percentage for each cell type enumerated. The cell counts recorded for individual photomicrographic images were included in the filed study raw data. The total cell counts for each cell type for each animal, and the calculated cell differential percentages for each animal were tabulated for inclusion in this report and for application to calculate the absolute (total) differential BAL cell counts used for the statistical analysis. The tabulated data for the differential counts of cells in BAL cytology preps were audited by the EPL Quality Assurance unit and the audited tabulated data were provided electronically to the Study Director for statistical analysis of the absolute (total) BAL differential cell counts that was completed by The Hamner Institutes for Health Sciences. The results of the statistical analysis were returned to EPL. Tabular and graphic information that document the statistical analysis was filed as raw data.

## RESULTS AND DISCUSSION

The results for the differential cell count of up to 300 cells in BAL cytology samples from each animal are presented in Appendix A. The total cell counts that were calculated using percentages in Appendix A are presented in Appendix B. Means and standard deviations of total cell counts per major cell types (lymphocytes, neutrophils, and macrophages) are shown in Table 2. In general, amosite or LA fiber-exposed groups had lower mean lymphocytes and higher mean neutrophils compared to the air control group means, but there were no statistically significant differences in the total number of cells for each type of cell included in the differential count at the18 month's post-exposure time point. The absence of differences in BAL cell types in animals that were dosed with Libby amphibole or Amosite when compared to animals in the Air Control at 18 months post-exposure suggests complete resolution of inflammatory cell responses that might have been associated with the earlier sampling time points (1 day, 1 month, and 3 months post-exposure).

**Table 2. Summary of Total Cell Counts for Lymphocytes, Neutrophils, and Macrophages**

| Exposure Group and Concentration | Lymphocytes | Neutrophils | Macrophages ($x10^2$) |
|---|---|---|---|
| Air Control | 11991 ± 16607* | 14379 ± 13644 | 14939 ± 3555 |
| Amosite 3.3 mg/$m^3$ | 10784 ± 15129 | 30647 ± 14935 | 15510 ± 3438 |
| LA 1.0 mg/$m^3$ | 6931 ± 7526** | 15528 ± 6803** | 13958 ± 2570** |
| LA 3.3 mg/$m^3$ | 1568 ± 3024 | 43716 ± 73747 | 14531 ± 3112 |
| LA 10 mg/$m^3$ | 3116 ± 4123 | 41460 ± 40470 | 13705 ± 1943 |

*Mean ± standard deviation, n=8
**n=7

## CONCLUSIONS

The BAL cell differential cytology and total cell counts for individual cell types disclosed that Libby amphibole (LA) exposure of rats to 10.0, 3.3. or 1.0 mg/$m^3$ for 90 days resulted in no changes in the proportion of cell types in BAL samples when compared to rats that were Air Control or exposed to Amosite 3.3 mg/$m^3$ for 90 days when evaluated at the 18

months post-exposure time point. In contrast to the 18 months post-exposure time point, neutrophils were increased in rats exposed to LA 10.0 mg/m$^3$ or to Amosite 3.3 mg/m$^3$ at 1 day, 1 month and 3 months post-exposure; neutrophils were increased in the LA 3.3 mg/m$^3$ group at the 1 day and 3 months post-exposure; and macrophages were decreased in the LA 10.0 and LA 3.3 mg/m$^3$ groups at 3 months post-exposure when these groups were compared to the Air Control group. The absence of differences in the cell types in BAL samples at the 18 months post-exposure suggests complete resolution of inflammatory cell responses that were associated with earlier sampling time points (1 day, 1 month, and 3 months post-exposure).

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29 Aug 2013
DATE

HGW/dc

## REFERENCES

Gao H, Hoesel LM, Guo R-F, Rancilio NJ, Sarma JV, Ward PA. 2006. Adenoviral-mediated overexpression of SOCS3 enhances IgG immune complex-induced acute lung injury. J Immunol 177:612-620.

Palmans E, Kips JC, Pauwels RA. 2000. Prolonged allergen exposure induces structural airway changes in sensitized rats. Am J Respir Crit Care Med 161:627-635.

G. Willson, H. Wall. March 6, 2013. Amended Final Report: EPA Fiber Project: Subchronic Inhalation Exposure of Rats to Amphibole Asbestos (1-Day Post-Exposure, 1-Month Post-Exposure, and 3-Months Post-Exposure).

# APPENDIX A

## INDIVIDUAL ANIMAL BAL CELLS DIFFERENTIAL COUNTS AND PERCENTAGES – 18 MONTHS POST-EXPOSURE

Appendix A: Individual Animal BAL Cells Differential Counts And Percentages –18 Months Post-Exposure

| Necropsy Interval (Months post-exposure) | Exposure Level Concentration (mg/m3) | GP* | ID | EOS | EOP | LYM | LYP | NEU | NEP | MAC | MAP | BAS | BAP | Total Cells Counted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | Air Control | 1 | 156 | 0 | 0.00 | 9 | 3.00 | 4 | 1.33 | 287 | 95.67 | 0 | 0.00 | 300 |
| 18 | Air Control | 1 | 158 | 0 | 0.00 | 0 | 0.00 | 3 | 1.00 | 297 | 99.00 | 0 | 0.00 | 300 |
| 18 | Air Control | 1 | 159 | 0 | 0.00 | 5 | 1.67 | 6 | 2.00 | 289 | 96.33 | 0 | 0.00 | 300 |
| 18 | Air Control | 1 | 160 | 0 | 0.00 | 2 | 0.67 | 3 | 1.00 | 295 | 98.33 | 0 | 0.00 | 300 |
| 18 | Air Control | 1 | 161 | 0 | 0.00 | 0 | 0.00 | 3 | 1.00 | 297 | 99.00 | 0 | 0.00 | 300 |
| 18 | Air Control | 1 | 162 | 0 | 0.00 | 2 | 0.67 | 0 | 0.00 | 298 | 99.33 | 0 | 0.00 | 300 |
| 18 | Air Control | 1 | 163 | 0 | 0.00 | 0 | 0.00 | 2 | 0.67 | 298 | 99.33 | 0 | 0.00 | 300 |
| 18 | Air Control | 1 | 164 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 300 | 100.00 | 0 | 0.00 | 300 |
| 18 | Amosite 3.3 | 2 | 268 | 0 | 0.00 | 4 | 1.33 | 7 | 2.33 | 289 | 96.33 | 0 | 0.00 | 300 |
| 18 | Amosite 3.3 | 2 | 269 | 0 | 0.00 | 0 | 0.00 | 4 | 1.33 | 296 | 98.67 | 0 | 0.00 | 300 |
| 18 | Amosite 3.3 | 2 | 270 | 0 | 0.00 | 2 | 0.67 | 6 | 2.00 | 292 | 97.33 | 0 | 0.00 | 300 |
| 18 | Amosite 3.3 | 2 | 274 | 0 | 0.00 | 8 | 2.67 | 7 | 2.33 | 284 | 94.67 | 1 | 0.33 | 300 |
| 18 | Amosite 3.3 | 2 | 275 | 0 | 0.00 | 2 | 0.67 | 1 | 0.33 | 297 | 99.00 | 0 | 0.00 | 300 |
| 18 | Amosite 3.3 | 2 | 276 | 0 | 0.00 | 1 | 0.33 | 8 | 2.67 | 291 | 97.00 | 0 | 0.00 | 300 |
| 18 | Amosite 3.3 | 2 | 277 | 0 | 0.00 | 0 | 0.00 | 5 | 1.67 | 295 | 98.33 | 0 | 0.00 | 300 |
| 18 | Amosite 3.3 | 2 | 278 | 0 | 0.00 | 0 | 0.00 | 8 | 2.67 | 292 | 97.33 | 0 | 0.00 | 300 |
| 18 | LA 1.0 | 3 | 370 | 0 | 0.00 | 5 | 1.67 | 4 | 1.33 | 291 | 97.00 | 0 | 0.00 | 300 |
| 18 | LA 1.0 | 3 | 372 | 0 | 0.00 | 0 | 0.00 | 4 | 1.33 | 295 | 98.33 | 1 | 0.33 | 300 |
| 18 | LA 1.0 | 3 | 375 | 0 | 0.00 | 1 | 0.33 | 1 | 0.33 | 298 | 99.33 | 0 | 0.00 | 300 |
| 18 | LA 1.0 | 3 | 376 | 0 |  | 14 |  | 10 |  | 134 |  | 0 |  | 158** |
| 18 | LA 1.0 | 3 | 377 | 0 | 0.00 | 1 | 0.33 | 5 | 1.67 | 294 | 98.00 | 0 | 0.00 | 300 |
| 18 | LA 1.0 | 3 | 378 | 0 | 0.00 | 0 | 0.00 | 2 | 0.67 | 298 | 99.33 | 0 | 0.00 | 300 |

*Abbreviations: GP – group, ID – animal identification, EOS – eosinophil count, EOP – eosinophil percentage, LYM – lymphocyte count, LYP – lymphocyte percentage, NEU – neutrophil count, NEP – neutrophil percentage, MAC – macrophage count, MAP – macrophage percentage, BAS – basophil count, BAP – basophil percentage

**Inadequate sample for evaluation.

Appendix A: Individual Animal BAL Cells Differential Counts And Percentages –18 Months Post-Exposure (Continuation)

| Necropsy Interval (Months post-exposure) | Exposure Level Concentration (mg/m3) | GP | ID | EOS | EOP | LYM | LYP | NEU | NEP | MAC | MAP | BAS | BAP | Total Cells Counted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | LA 1.0 | 3 | 380 | 0 | 0.00 | 2 | 0.67 | 2 | 0.67 | 296 | 98.67 | 0 | 0.00 | 300 |
| 18 | LA 1.0 | 3 | 395 | 0 | 0.00 | 2 | 0.67 | 6 | 2.00 | 292 | 97.33 | 0 | 0.00 | 300 |
| 18 | LA 3.3 | 4 | 467 | 0 | 0.00 | 0 | 0.00 | 6 | 2.00 | 294 | 98.00 | 0 | 0.00 | 300 |
| 18 | LA 3.3 | 4 | 468 | 0 | 0.00 | 1 | 0.33 | 0 | 0.00 | 299 | 99.67 | 0 | 0.00 | 300 |
| 18 | LA 3.3 | 4 | 472 | 0 | 0.00 | 0 | 0.00 | 6 | 2.00 | 294 | 98.00 | 0 | 0.00 | 300 |
| 18 | LA 3.3 | 4 | 474 | 0 | 0.00 | 0 | 0.00 | 47 | 15.67 | 253 | 84.33 | 0 | 0.00 | 300 |
| 18 | LA 3.3 | 4 | 475 | 0 | 0.00 | 2 | 0.67 | 4 | 1.33 | 294 | 98.00 | 0 | 0.00 | 300 |
| 18 | LA 3.3 | 4 | 476 | 0 | 0.00 | 0 | 0.00 | 5 | 1.67 | 295 | 98.33 | 0 | 0.00 | 300 |
| 18 | LA 3.3 | 4 | 477 | 0 | 0.00 | 0 | 0.00 | 3 | 1.00 | 297 | 99.00 | 0 | 0.00 | 300 |
| 18 | LA 3.3 | 4 | 496 | 0 | 0.00 | 0 | 0.00 | 2 | 0.67 | 298 | 99.33 | 0 | 0.00 | 300 |
| 18 | LA 10.0 | 5 | 571 | 0 | 0.00 | 0 | 0.00 | 16 | 5.33 | 284 | 94.67 | 0 | 0.00 | 300 |
| 18 | LA 10.0 | 5 | 572 | 0 | 0.00 | 1 | 0.33 | 5 | 1.67 | 294 | 98.00 | 0 | 0.00 | 300 |
| 18 | LA 10.0 | 5 | 573 | 0 | 0.00 | 1 | 0.33 | 2 | 0.67 | 297 | 99.00 | 0 | 0.00 | 300 |
| 18 | LA 10.0 | 5 | 575 | 0 | 0.00 | 0 | 0.00 | 5 | 1.67 | 295 | 98.33 | 0 | 0.00 | 300 |
| 18 | LA 10.0 | 5 | 576 | 0 | 0.00 | 0 | 0.00 | 2 | 0.67 | 298 | 99.33 | 0 | 0.00 | 300 |
| 18 | LA 10.0 | 5 | 577 | 0 | 0.00 | 2 | 0.67 | 21 | 7.00 | 277 | 92.33 | 0 | 0.00 | 300 |
| 18 | LA 10.0 | 5 | 579 | 0 | 0.00 | 0 | 0.00 | 8 | 2.67 | 292 | 97.33 | 0 | 0.00 | 300 |
| 18 | LA 10.0 | 5 | 580 | 0 | 0.00 | 1 | 0.33 | 5 | 1.67 | 294 | 98.00 | 0 | 0.00 | 300 |

*Abbreviations: GP – group, ID – animal identification, EOS – eosinophil count, EOP – eosinophil percentage, LYM – lymphocyte count, LYP – lymphocyte percentage, NEU – neutrophil count, NEP – neutrophil percentage, MAC – macrophage count, MAP – macrophage percentage, BAS – basophil count, BAP – basophil percentage

**Inadequate sample for evaluation.

# APPENDIX B

# 18 MONTHS POST-EXPOSURE TOTAL CELL COUNTS BY CELL TYPES

Appendix B: 18 Months Post-Exposure Total Cell Counts by Cell Types

| Necropsy Interval (Months post-exposure) | Exposure Level Concentration (mg/m3) | ID | Eosinophils | Lymphocytes | Neutrophils | Macrophages | Basophils | Total Cells Counted |
|---|---|---|---|---|---|---|---|---|
| 18 | Air Control | 156 | | 39,627 | 17567.97 | 1263705.03 | | 1,320,900 |
| 18 | Air Control | 158 | | 0 | 15954 | 1579446 | | 1,595,400 |
| 18 | Air Control | 159 | | 36,020 | 43138 | 2077741.77 | | 2,156,900 |
| 18 | Air Control | 160 | | 12,078 | 18027 | 1772594.91 | | 1,802,700 |
| 18 | Air Control | 161 | | 0 | 9434 | 933966 | | 943,400 |
| 18 | Air Control | 162 | | 8,202 | 0 | 1215997.86 | | 1,224,200 |
| 18 | Air Control | 163 | | 0 | 10908.94 | 1617291.06 | | 1,628,200 |
| 18 | Air Control | 164 | | 0 | 0 | 1490100 | | 1,490,100 |
| 18 | Amosite 3.3 | 268 | | 16,786 | 29406.93 | 1215780.93 | | 1,261,974 |
| 18 | Amosite 3.3 | 269 | | 0 | 19521.74 | 1448278.26 | | 1,467,800 |
| 18 | Amosite 3.3 | 270 | | 7,263 | 21680 | 1055057.2 | | 1,084,000 |
| 18 | Amosite 3.3 | 274 | | 45,230 | 39470.2 | 1603709.8 | 5590.2 | 1,694,000 |
| 18 | Amosite 3.3 | 275 | | 10,479 | 5161.2 | 1548360 | | 1,564,000 |
| 18 | Amosite 3.3 | 276 | | 6,518 | 52732.5 | 1915750 | | 1,975,000 |
| 18 | Amosite 3.3 | 277 | | 0 | 35958.44 | 2117241.56 | | 2,153,200 |
| 18 | Amosite 3.3 | 278 | | 0 | 41246.16 | 1503553.84 | | 1,544,800 |
| 18 | LA 1.0 | 370 | | 21,376 | 17024 | 1241600 | | 1,280,000 |
| 18 | LA 1.0 | 372 | | 0 | 20431.46 | 1510545.46 | 5069.46 | 1,536,046 |
| 18 | LA 1.0 | 375 | | 4,144 | 4143.81 | 1247286.81 | | 1,255,574 |
| 18 | LA 1.0 | 376 | | | | | | 1931800* |
| 18 | LA 1.0 | 377 | | 3,896 | 19716.02 | 1156988 | | 1,180,600 |
| 18 | LA 1.0 | 378 | | 0 | 12263.01 | 1818036.99 | | 1,830,300 |
| 18 | LA 1.0 | 380 | | 11,028 | 11027.53 | 1624009.53 | | 1,646,065 |
| 18 | LA 1.0 | 395 | | 8,071 | 24092 | 1172437.18 | | 1,204,600 |

*Inadequate sample for evaluation.

Appendix B: 18 Months Post-Exposure Total Cell Counts by Cell Types (Continuation)

| Necropsy Interval (Months post-exposure) | Exposure Level Concentration (mg/m3) | ID | Eosinophils | Lymphocytes | Neutrophils | Macrophages | Basophils | Total Cells Counted |
|---|---|---|---|---|---|---|---|---|
| 18 | LA 3.3 | 467 | | 0 | 24962 | 1223138 | | 1,248,100 |
| 18 | LA 3.3 | 468 | | 4,694 | 0 | 1417706.08 | | 1,422,400 |
| 18 | LA 3.3 | 472 | | 0 | 26202 | 1283898 | | 1,310,100 |
| 18 | LA 3.3 | 474 | | 0 | 224942.85 | 1210557.15 | | 1,435,500 |
| 18 | LA 3.3 | 475 | | 7,852 | 15587.6 | 1148560 | | 1,172,000 |
| 18 | LA 3.3 | 476 | | 0 | 25509.25 | 1501990.75 | | 1,527,500 |
| 18 | LA 3.3 | 477 | | 0 | 19943 | 1974357 | | 1,994,300 |
| 18 | LA 3.3 | 496 | | 0 | 12578.58 | 1864821.42 | | 1,877,400 |
| 18 | LA 10.0 | 571 | | 0 | 82828.2 | 1471171.8 | | 1,554,000 |
| 18 | LA 10.0 | 572 | | 4,500 | 22773.79 | 1336426 | | 1,363,700 |
| 18 | LA 10.0 | 573 | | 3,540 | 7186.42 | 1061874 | | 1,072,600 |
| 18 | LA 10.0 | 575 | | 0 | 23949.47 | 1410150.53 | | 1,434,100 |
| 18 | LA 10.0 | 576 | | 0 | 7508.02 | 1113091.98 | | 1,120,600 |
| 18 | LA 10.0 | 577 | | 11,704 | 122283 | 1612912.77 | | 1,746,900 |
| 18 | LA 10.0 | 579 | | 0 | 38891.22 | 1417708.78 | | 1,456,600 |
| 18 | LA 10.0 | 580 | | 5,188 | 26255.74 | 1540756 | | 1,572,200 |

*Inadequate sample for evaluation.