



CMHD Pathology Report



CMHD Pathology Core

Toronto Centre for
Phenogenomics
25 Orde St. 3rd fl.
Toronto, Ont. M5T 3H7
Tel.(416) 586-8375
Fax (416) 586-5993

contact: Dr. Susan
Newbigging
email:
newbigging@lunenfeld.ca

Principle Investigator: Dr. Jacqui White

Institute: Wellcome Trust Sanger Institute
Address: Attn: Linda Read Wellcome Trust
Genome Campus Hinxton Cambridge CB10
1SA, UK

ReportID: Report Date: July 24, 2013
Pathologist: Dr. H. Adissu

Mouse Genetics Project

Wellcome Trust Sanger
Institute
Wellcome Trust Genome
Campus
Hinxton, Cambridge
CB10 1SA
UK

email:
MGPenquiries@sanger.ac.uk
[Mouse Portal](#)
[Europhenome](#)

CMHD LabID: N13-486

Relevant History:

Phenotype:

abnormal retina morphology
increased susceptibility to bacterial infection
decreased susceptibility to bacterial infection
decreased survivor rate
abnormal iris morphology
abnormal retinal development
abnormal retinal layer morphology
cataracts
opacity of vitreous body
persistence of hyaloid vascular system

AnimalID: M00809733 (Male)

Histopathology Findings:

thymus (MA:0000142)

Histopath Description:

The thymus contains multiple cysts (25-300 um in diameter) that attenuate the cortex and to some extent the medulla. The cyst are lined by flat or squamous cells and contain sloughed cells and lightly eosinophilic granular fluid.

Morphological Diagnosis:

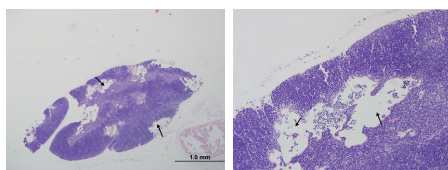
Distribution: multifocal; **Severity:** severe; **MPATH Diagnosis:** cyst MPATH:62

Definitive Diagnosis:

Thymic cyst, multilocular

Histopathology Comments:

Unilocular (single) small cysts are commonly seen in the mouse thymus. However, the severity and the multiplicity of the cysts is unusual.



Thymus, cysts, 4x, HE
Thymus, cysts, 20x, HE

Lymph node (MA:0000139)

Histopath Description:

The mesenteric lymph nodes is small and depleted.

Morphological Diagnosis:

Distribution: Diffuse; **Severity:** moderate; **MPATH Diagnosis:** hypoplasia MPATH:133

Definitive Diagnosis:

Lymphoid hypoplasia

liver (MA:0000358)**Histopath Description:**

diffuse lipidosis

Morphological Diagnosis:**Distribution:** diffuse; **Severity:** severe; **MPATH Diagnosis:** steatosis MPATH:622**Definitive Diagnosis:**

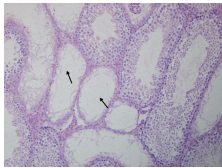
Hepatic lipidosis

testis (MA:0000411)**Histopath Description:**

There is multifocal vacuolar degeneration and atrophy of the seminiferous tubules affecting 10% of the testicular parenchyma.

Morphological Diagnosis:**Distribution:** multifocal; **Severity:** moderate;**Definitive Diagnosis:**

Testicular degeneration and atrophy



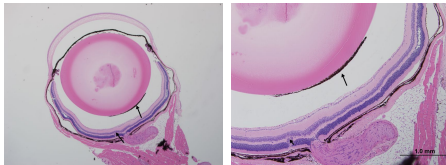
Testis,
degeneration and
atrophy, 10x, HE

eye (MA:0000261)**Histopath Description:**

There is focal retinal dysplasia in one eye. There is a dense pigmented band adhered to the posterior lens capsule in one eye.

Morphological Diagnosis:**Distribution:** focal; **Severity:** mild;**Definitive Diagnosis:**

Central posterior capsule pigmentation; Retinal dysplasia (focal)



Eye, posterior
capsule, pigmented
capsule, 10x, HE

Eye, posterior
capsule, pigmented
capsule, 10x, HE

brain (MA:0000168)**Histopath Description:**

There is mild dilation of the lateral ventricles

Morphological Diagnosis:**Distribution:** bilateral; **Severity:** mild;**Definitive Diagnosis:**

Dilation of the brain ventricles

Histopathology Comments:

Mild dilation of the lateral ventricles is a background condition in mice of C57BL/6N background (Brayton et al., 2004).

Organ/Tissue Analyzed:

Histopathology examination included the following organs and tissues: brain, trigeminal ganglion, eyes, salivary glands, trachea, lungs, heart, thymus, thyroid gland, parathyroid gland, exocrine and endocrine pancreas, oesophagus, stomach, small intestine, large intestine, liver, gall bladder, spleen, kidneys, adrenal gland, lymph nodes, spinal cord, bone marrow, sternum, femur and tibia with associated skeletal muscles, brown fat, pinna, skin, testis, epididymis, seminal vesicle, and prostate.

AnimalID: M00809732**Histopathology Findings:****thymus (MA:0000142)****Histopath Description:**

The thymus contains multiple cysts (25-300 um in diameter) that attenuate the cortex and to some extent the medulla. The cyst are lined by flat or squamous cells and contain sloughed cells and lightly eosinophilic granular fluid.

Morphological Diagnosis:

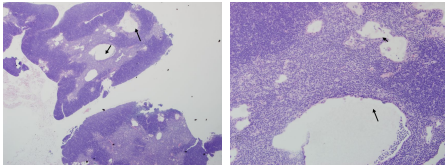
Distribution: multifocal; **Severity:** severe; **MPATH Diagnosis:** cyst MPATH:62

Definitive Diagnosis:

Thymic cyst, multilocular

Histopathology Comments:

Unilocular (single) small cysts are commonly seen in the mouse thymus. However, the severity and the multiplicity of the cysts is unusual.



Thymus, cysts, 4x, HE Thymus, cysts, 20x, HE

liver (MA:0000358)**Histopath Description:**

diffuse lipidosis

Morphological Diagnosis:

Distribution: diffuse; **Severity:** severe; **MPATH Diagnosis:** steatosis MPATH:622

Definitive Diagnosis:

Hepatic lipidosis

eye (MA:0000261)**Histopath Description:**

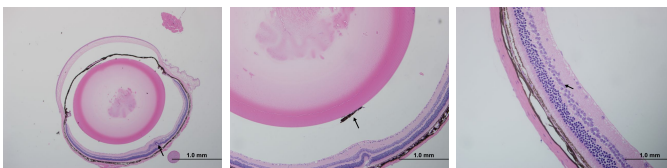
There is extensive retinal folding and disorganization. The inner nuclear layer of the retina is thinner than normal. There is a dense pigmented band adhered to the posterior lens capsule in one eye.

Morphological Diagnosis:

Distribution: focally extensive; **Severity:** mild;

Definitive Diagnosis:

Central posterior capsule pigmentation; Atrophy of inner nuclear layer; retinal dysplasia



Eye, retinal dysplasia, 4x, HE Eye, lens, central posterior capsule pigmentation, 10x, HE Eye, retina, atrophy of inner nuclear layer, 40x, HE

stomach (MA:0000353)**Histopath Description:**

moderate neutrophilic gastritis; there is also mild epithelial proteinosis

Morphological Diagnosis:

Distribution: multifocal; **Severity:** moderate;

Definitive Diagnosis:

Moderate neutrophilic gastritis with epithelial proteinosis

AnimalID: M00816346**Histopathology Findings:**

thymus (MA:0000142)**Histopath Description:**

The thymus contains multiple cysts (25-300 um in diameter) that attenuate the cortex and to some extent the medulla. The cyst are lined by flat or squamous cells and contain sloughed cells and lightly eosinophilic granular fluid.

Morphological Diagnosis:

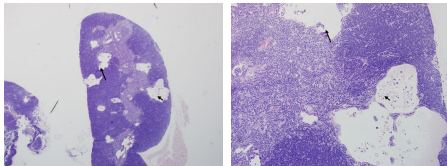
Distribution: multifocal; **Severity:** severe; **MPATH Diagnosis:** cyst MPATH:62

Definitive Diagnosis:

Thymic cyst, multilocular

Histopathology Comments:

Unilocular (single) small cysts are commonly seen in the mouse thymus. However, the severity and the multiplicity of the cysts is unusual.



Thymus, cysts, 4x, HE Thymus, cysts, 20x, HE

lymph node (MA:0000139)**Histopath Description:**

The mesenteric lymph node is markedly enlarged (greater than four fold). The medulla is particularly expanded by chords and sheets of plasmotoid cells. There are prominent germinal centers within the medulla

Morphological Diagnosis:

Distribution: Diffuse; **Severity:** moderate; **MPATH Diagnosis:** hyperplasia MPATH:134

Definitive Diagnosis:

Lymphoid hyperplasia

Histopathology Comments:

The changes in the mesenteric lymph node are suggestive of draining of a regional inflammatory process. However, such a process was not observed in the tissues examined. Early marginal center lymphoma is suspected.

liver (MA:0000358)**Histopath Description:**

diffuse lipidosis

Morphological Diagnosis:

Distribution: diffuse; **Severity:** severe; **MPATH Diagnosis:** steatosis MPATH:622

Definitive Diagnosis:

Hepatic lipidosis

eye (MA:0000261)**Histopath Description:**

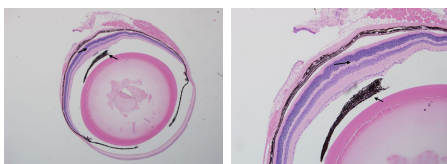
There is focal retinal dysplasia in one eye. There is a dense pigmented band adhered to the posterior lens capsule in one eye.

Morphological Diagnosis:

Distribution: focal; **Severity:** mild;

Definitive Diagnosis:

Central posterior capsule pigmentation; Retinal dysplasia (focal)



Eye, pigmented band in vitreous cavity, 4x, HE Eye, pigmented band in vitreous cavity, 4x, HE

eye (MA:0000261)**Histopath Description:**

The retina is irregular in thickness. There is a dense pigmented band between the retina and the lens.

Morphological Diagnosis:**Distribution:** focal; **Severity:** mild;**Definitive Diagnosis:**

Pigmented band in vitreous cavity; retinal dysplasia

brain (MA:0000168)**Histopath Description:**

There is mild dilation of the lateral ventricles

Morphological Diagnosis:**Distribution:** bilateral; **Severity:** mild;**Definitive Diagnosis:**

Dilation of the brain ventricles

Histopathology Comments:

Mild dilation of the lateral ventricles is a background condition in mice of C57BL/6N background (Brayton et al., 2004).

AnimalID: M00809738**Histopathology Findings:****thymus (MA:0000142)****Histopath Description:**

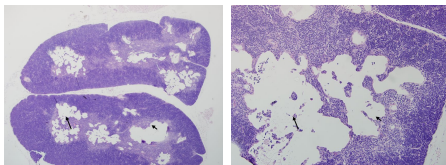
The thymus contains multiple cysts (25-300 um in diameter) that attenuate the cortex and to some extent the medulla. The cysts are lined by flat or squamous cells and contain sloughed cells and lightly eosinophilic granular fluid.

Morphological Diagnosis:**Distribution:** multifocal; **Severity:** severe; **MPATH Diagnosis:** cyst MPATH:62**Definitive Diagnosis:**

Thymic cyst, multilocular

Histopathology Comments:

Unilocular (single) small cysts are commonly seen in the mouse thymus. However, the severity and the multiplicity of the cysts is unusual.

Thymus, cysts,
20x, HEThymus, cysts, 4x,
HE**lymph node (MA:0000139)****Histopath Description:**

The mesenteric lymph node is markedly enlarged (greater than four fold). The medulla is particularly expanded by chords and sheets of plasmotoid cells. There are prominent germinal centers within the medulla

Morphological Diagnosis:**Distribution:** Diffuse; **Severity:** moderate; **MPATH Diagnosis:** hyperplasia MPATH:134**Definitive Diagnosis:**

Lymphoid hyperplasia

Histopathology Comments:

The changes in the mesenteric lymph node are suggestive of draining of a regional inflammatory process. However, such a process was not observed in the tissues examined. Early marginal center lymphoma is suspected.

liver (MA:0000358)**Histopath Description:**

diffuse lipidosis

Morphological Diagnosis:**Distribution:** diffuse; **Severity:** severe; **MPATH Diagnosis:** steatosis MPATH:622**Definitive Diagnosis:**

Hepatic lipidosis

eye (MA:0000261)**Histopath Description:**

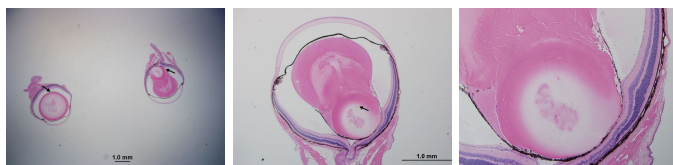
In one eye there is a dense pigmented band partially adhered to the posterior lens capsule in one eye. There is focal retinal dysplasia.

Morphological Diagnosis:

Distribution: focal; **Severity:** mild;

Definitive Diagnosis:

Central posterior capsule pigmentation; Retinal dysplasia (focal)



Eyes, left and right, 1.25x, HE

Eye, lens rupture, central posterior capsule pigmentation, 4x, HE

Eye, lens rupture, central posterior capsule pigmentation, retinal dysplasia, 4x, HE

eye (MA:0000261)**Histopath Description:**

In the other eye, the lens is pear shaped and it is adhered to the retina at the posterior end. The lens capsule lost (broken) at the posterior aspect and the lens is lined by a dense pigmented band. There are few degenerate lens protein globules in the posterior lens where there is breakage of the lens capsule (Morgagnian globules). There is mild retinal dysplasia.

Morphological Diagnosis:

Distribution: focal; **Severity:** mild;

Definitive Diagnosis:

Lens rupture (phacoclasia); central posterior capsule pigmentation; cataract; retinal dysplasia

brain (MA:0000168)**Histopath Description:**

There is marked dilation of the lateral ventricles

Morphological Diagnosis:

Distribution: bilateral; **Severity:** severe; **MPATH Diagnosis:** hydrocephalus MPATH:639

Definitive Diagnosis:

Hydrocephalus, mild

Histopathology Comments:

The lesion is more severe than the usual dilation of the lateral ventricles seen as a background condition in mice of C57BL/6N background (Brayton et al., 2004).

Report Summary and Recommendation:

Ocular and thymic lesions are seen in all mice in this line.

The ocular lesion mainly involves the lens. A pigmented band is present adhered to the posterior capsule or floating within the vitreous cavity. The lesion is suggestive of pigment dispersion syndrome (PDS), a condition associated with the presence of pigmented bands or floaters in humans. Cases of PDS are most often sporadic although genetic studies suggest an autosomal dominant inheritance pattern with linkage to chromosome 7 (andersen et al., 1997). A posttraumatic pathogenesis has also been suggested for this condition (Anand and Harrison, 2005). In one mouse, the lesion is associated with lens rupture (phacoclasia) with adhesion to the retina. Mild to moderate retinal dysplasia is also observed in all mice. The constellation of ocular lesions explains the ocular phenotypes detected in clinical phenotyping.

Multilocular thymic cysts affecting up to 30% of the thymus are observed in all mice. This is unusual lesion and we speculate may have a role in the immune phenotype in this line.

Testicular degeneration and atrophy is observed in one male mouse

Line summary:

Ocular: Central posterior capsule pigmentation (4/4); lens rupture with cataract (1/4); retinal dysplasia (4/4)

Thymus: Thymic cysts (multilocular) (4/4)

Testis: degeneration and atrophy (1/2)

References:

Aashish Anand and Rosalind J Harrison (2005)_Annular pigment band on the posterior capsule following blunt ocular trauma: a case report. BMC Ophthalmology 2005, 5:13. 1 Andersen, J. S. et al. A gene responsible for the pigment dispersion syndrome maps to chromosome 7q35-q36. Arch Ophthalmol 1997;115:384-388.