



Diagnostic Exercise

From The Davis-Thompson Foundation*

Case #: 72 Month: September Year: 2016

Answer Sheet

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Microscopic Description: The thyroid gland architecture is disrupted and replaced by haphazardly arranged thyroid follicular cells rarely forming discrete follicles. At 100x magnification (Figure 3), one can see that follicular cells lining these follicles are enlarged and have apically located nuclei and a subcellular membrane-bound vesicle filled with pale eosinophilic colloid-like material. In this particular case, the gland is diffusely affected and only a few colloid-filled follicles are recognizable.

Morphologic Diagnosis: Thyroid Gland Dysplasia, Wistar Rat

Typical Gross finding: Enlarged thyroid gland

Etiologic Diagnosis: Congenital Dysplasia, Thyroid Gland, Wistar Rat

Cause: Genetic trait

Discussion: The Hannover Wistar GALAS rats have a thyroid dysplasia that commonly results in growth retardation. The thyroid gland is often enlarged at the gross level, and the individual follicular cells are enlarged with subcellular colloid containing vesicles. The condition is associated with a genetically determined defect in the ability of the thyroid follicular cell to produce and/or secrete thyroglobulin into the lumen of follicles. Twenty-two percent (22%) of affected littermates are dwarfs due to a concurrent interference with growth hormone production by the pituitary gland. It is believed that the defect in thyroid hormone production by the thyroid gland affects the maturation and ability of the pituitary gland to produce growth hormone (Weber, *et al* 2009). These clinically affected dwarfed animals also have elevated serum TSH and decreased serum T4. Fifty-two percent (52%) of littermates are clinically normal (no dwarfism) and have normal serum TSH or T4, but have variable degrees of microscopic changes in the thyroid gland. The case presented here is one of those subclinically affected animals. There were other rats in this chronic study with small areas of affected/dysplastic thyroid gland and no gross finding of any thyroid gland enlargement.

Thyroid dysplasia of the Wistar rat was first identified in 1997 in a WistarHan:Br1(BALAS) rat colony in Berlin, and represents a congenital heritable disease. Affected animals are not suitable

for reproductive toxicity studies because of the possibility of giving birth to dwarfs. With culling and selective breeding, this dysplasia is rarely identified in colonies of Wistar rats anymore.

References and Recommended literature:

Weber, K., Ernst, R., Fankhause,r, H., Hardisty, J.F., Heider, W., Stevens, K. (2009) Thyroid Dysplasia in Wistar Hannover GALAS Rats. *J. Toxicol Pathol* 22:247-254.

Shimoi, A., Kuwayama, C., Miyauchi, M., Kakinuma, C., Kamiya, M., Harada T., Ogiara T., Kurokawa M., and Mizuguchi, K. (2001). Vacuolar change in the thyroid follicular cells in Br1Han:WIS@Jcl (GALAS) Rats. *J. Toxicol Pathol.* 14:253-257.

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