InVivos
BRINGING LIFE TO YOUR RESEARCH

A case of spontaneous testicular teratoma observed in genetically modified AG129 mice

Nijaguna Bethur, Nurhafizah Rahim. Dept. Vet Services, InVivos Pte Ltd, Singapore

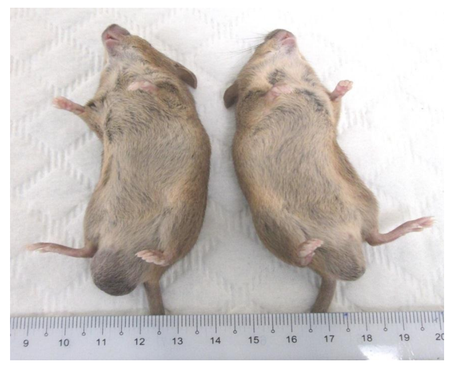
Abstract: Teratoma is observed in many animal species including mice arising from pluripotential primordial germ cells. High incidence of spontaneous testicular teratoma is reported in inbred strains of mice especially in 129SVE. There are not many literatures reporting on the incidence of testicular teratoma in the genetically modified mice of 129SVE background. In our facility, 2 male AG129 mice 5-6weeks of age were reported with a hard mass in the scrotum, which did not affect their normal activity and body condition. The mice were euthanized and the mass was collected in 10% neutral buffered formalin for histopathology analysis. The report from histology studies confirmed the mass to be spontaneous testicular teratoma arising of pluripotential primordial germinal cells. So this case study suggests that the genetically modified mice of 129SVE background are also susceptible of developing teratoma and it serves as useful information for researchers working on them.

Introduction

Testicular teratomas, which originate from germ cells, are tumors in which cell types representing all three germ layers are found. They are observed in many animal species such as man, horses, guinea pigs, fowl and mice. Testicular teratomas are rare in mice except in the inbred strain 129 composed of embryonic and adult tissues which are not normally found in testes. Two percent of the males of some sublines of 129 strain develop spontaneous teratomas congenitally. The teratocarcinogenetic process is initiated before 15 days and not later than 17 days of gestation. The incidence of spontaneous testicular teratomas in strain 129 is strongly influenced by environmental and genetic factors. There are not many literatures reporting on the incidence of testicular teratoma in the genetically modified mice of 129SVE background. So our effort was to investigate the lesion found in male scrotum of AG129 mice of similar incidence. AG129 mice is a knock out mice of IFN- αβγ and popular model used to study dengue infection.

Methodology

A hard mass in the scrotum was reported in 2 male AG129 mice of 5-6weeks of age. The mice displayed normal activity with good body condition. There was no injury or secretion observed at the enlarged scrotal area. AG129 mice are maintained in standard isolator conditions. The mice were euthanized in CO2 chamber and the necropsy examination revealed the mass to be oval in shape (~1.5mm diameter), hard in consistency and no secretion was observed in the scrotal cavity. No abnormality was observed in other organs. The mass was collected in 10% neutral buffered formalin and sent for histopathology analysis to AMPL.



Results & Discussion

Histopathology analysis from AMPL revealed that both the testicular masses consisted of neoplasm characterized histologically as teratoma. Detection of tissue derived from at least two of the three germinal layers (endoderm, mesoderm, ectoderm) is suggestive of teratoma arising from pluripotential primordial germ cells. Histology description as described below:

1.The endoderm with numerous variably sized cysts up to 1.5 mm in diameter which were either lined by a single layer of cuboidal epithelium with multifocal subjacent tubules or pseudostratified columnar epithelium with multifocal cilia and goblet cells (respiratory epithelium) or intestinal epithelium with goblet cells (Fig 1)

2.The ectoderm was mainly composed of neuroectoderm components, which included a small cluster of a few neural tubes, neurons, a few neuronal rosettes, small and hyperchromatic primitive neuroblastic cells embedded in neuropil (Fig 2)

3.The mesoderm comprised collagen fibers, adipose tissue, bundles of smooth muscles, blood vessels, multifocal plates of cartilage and bone spicules, trabeculae with bone marrow (Fig 3&4).

Fig 1. Cystic structures lined by keratinized or non-keratinized squamous epithelium and contain lamellated keratin and keratin debris

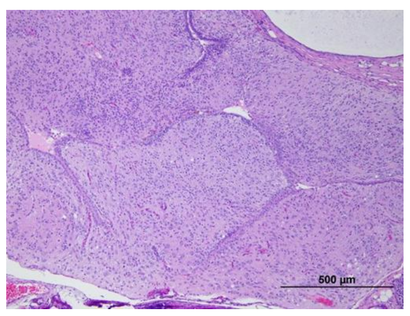


Fig 2. Neuroectoderm components

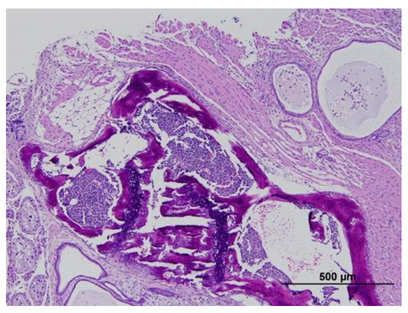


Fig 3. Bone and marrow

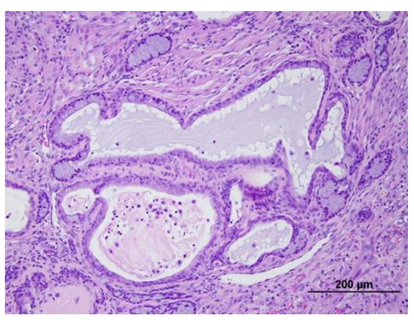


Fig 4. Cuboidal epithelium with cilia and goblet cells

Conclusion

Investigation of hard scrotal mass in AG129 mice lead to the diagnosis of Teratoma which emphasized that even genetcially modified mice developed in 129SVE background were susceptible for occurrence of spontaneous testicular teratorma. This case serves as an useful information for researchers using 129SVE background for developing new disease models and consider doing genetic manipulation work.

Acknowledgement: Dr. Ong Chee Bing (AMPL) and Dr.Sylvie Alonso (NUS)

References: 1. Meir et al., 1970. *Cancer Res*. Occurrence, Pathological Features, and Propagation of GonadalTeratomas in Inbred Mice and in Rabbits.
2. Marin et al., 2013. *Int. J. Dev. Biol*. 57: 201-210. Testicular teratomas: an intersection of pluripotency, differentiation and cancer biology
3. Stevens LC, Little CC. *Proc Natl Acad Sci U S A*. 1954 Nov;40(11):1080-7. Spontaneous Testicular Teratomas in an Inbred Strain of Mice.