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Two Cases of Spontaneous Auricular Chondritis in Sprague-Dawley(SD) Rats

Il-Hwan Kim, Yong-Bum Kim, Chang-Su Ha and Boo-Hyon Kang

Spontaneous Auricular Chondritis in Sprague-Dawley Rats
Korea Institute of Toxicology, KRICT, P.O. Box 107, Yuseong, Daejeon, Korea

Abstract: Two cases of spontaneous auricular chondritis were reported in SD rats in a 13-week toxicity study. At necropsy, pinna of each rats had firm, irregular nodules. Based on the anatomical location and histopathological features of the lesion, the disease was diagnosed as auricular chondritis.

Key words: auricular chondritis, pinna, SD rats

Auricular chondritis is known to occur as spontaneous lesions in several strains of rats[1,7], even in rats aged only a few months. It can also be induced by immunization of rats with type II collagen[2,6]. On gross findings, the ears are irregularly thickened, white, nodular, and remarkably deformed and misshapen, resembling "cauliflower" and "wrestler" ears in man[9]. The microscopic features of auricular chondritis are characterized by granulomatous inflammation, chondrolysis, and multinodular proliferative tissue[9]. This paper describes a case of naturally occurring auricular chondritis in domestic SD rats. To our know-ledge, this is believed to be the first such case reported in Korea.

Two cases of auricular chondritis were observed in SD rats of a 13-week toxicity study at Korea Institute of Toxicology, Korea Research Institute of Chemical Technology. Rats obtained from Charles River Breeding Laboratories (Bio Genomics Co., Korea), were maintained in stainless wire cages (220 W×410 L×200 Hmm) with filter tops at 23±3°C, 55±10% humidity and a 12:12 hour light/dark cycle, and given rodent chow (PMI Nutrition International., USA) and water ad libitum.

At necropsy, both pinnae of each rats had white, firm and irregular nodules (Figs. 1, 2). There was no gross significant abnormality observed in other organs.

For histopathological evaluations, the ears were collected and fixed 10% neutral phosphate-buffered formalin, processed routinely, and stained with hematoxylin and eosin.

Microscopically, active granulomatous inflammation involving the auricular cartilage was present (Fig. 3), or the lesions invariably appeared to be granulomatous inflammation consisting of fibrovascular, fibrochondrous, chondrous, or chondroosseous tissues, or a mixture of these (Fig. 4). No histopathological lesions were detected in other organs and cartilaginous tissues of the rats.

Auricular chondritis in rats is known to occur naturally and can also be induced experimentally. The natural disease has been reported in SD1, fawn-hooded (F-H), and F-H x NBR rats[9]. The induced disease has been reported in Wistar rat by type II collagen[2,6]. The lesions in these rats are identical in their gross, histological, and biological features. The precise age of onset of the naturally occurring disease is not known; however, a gross ear change reported to be observed in rats approximately 6 months old and older[1,7].

Nodular masses of fibrochondrous or chondrous tissue in chronic auricular chondritis should be distinguished from fibrochodroma, chondroma, or chondrosarcoma. In auricular chondritis, the irregular nodular masses of fibrovascular, fibrochondrous, chondrous, and/or chondroosseous tissues may partially or entirely replace the central core of the pinna where the normal cartilage plate was once present. The presence of focal mononuclear inflammatory infiltrates in the fibrovascular tissue is also helpful in making a distinction. In addition, there is frequent osseous metaplasia. In neoplasm, the lesions are localized proliferating tissues which only the partially replace the central core of the pinna and are not usually accompanied by granulomatous inflammation[9]. Advanced lesions of auricular chondritis may be difficult to distinguish grossly and histopathologically from chronic lesions found in auricular cartilage disease that develops from a unique and distinctive noninflammatory process-chondrolysis[1,3]. The cause of auricular chondritis is not known but it has been suggested that the condition results from an immune reaction to the

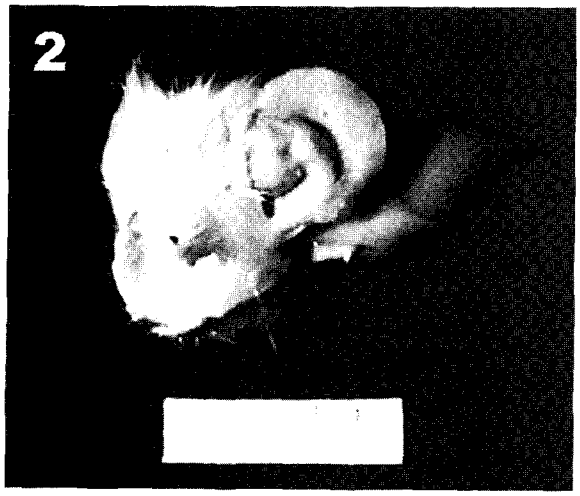

Fig. 1. External ear; 18 week-old male Sprague-Dawley rat. A cross section of the ear. The ear was thickened, nodular, and droopy.

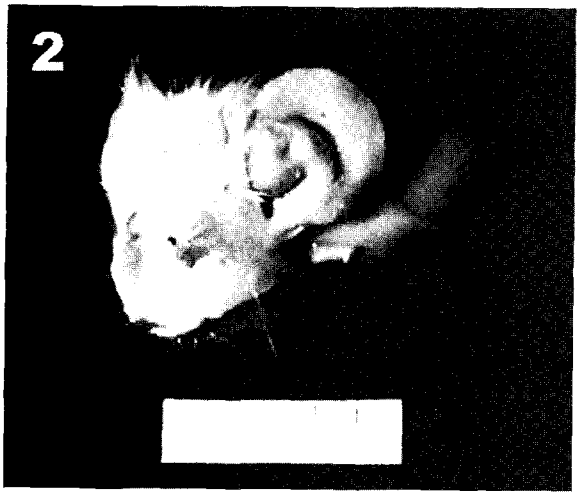

Fig. 2. External ear; 18 week-old male Sprague-Dawley rat. The ear was thickened and nodular. A remarkably misshapen ear was noticed.

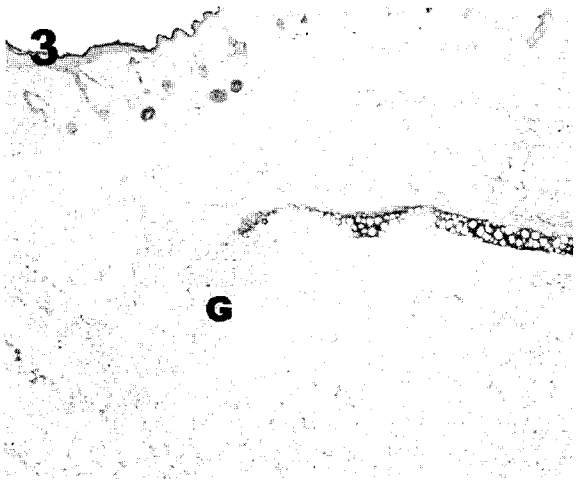

Fig. 3. Microscopic picture of Fig. 1. Early stage of auricular chondritis. Notice the lesion of granulomatous inflammation(G) in the cartilage plate. HE. ×40.

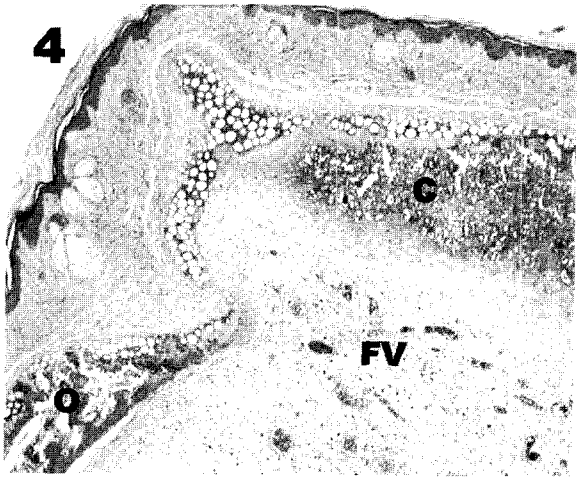

Fig. 4. Microscopic picture of Fig. 2. Advanced stage of auricular chondritis, Note the sequential formation of various regenerative tissues - fibrovacular(FV), chondrous(C) and osseous tissue(O). HE. ×40.

type II collagen present in cartilage[7].

We incidentally observed auricular chondritis in control animals in a 13-week toxicity study. The natural incidence of gross ear deformity in outbred SD rats which were obtained from Charles River Breeding Laboratories, Wilmington, Massachusetts, was reported to be 98 of 2733 (3.6%) males and 82 of 2148 (3.8%) females[1].

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