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PRELIMINARY REPORT

EXPERIMENTAL CHRONIC POLYARTHRITIS IN MICE

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Since Klinge (1934) first reported development of experimental polyarthritis, there have been many studies on the development of this condition as a model of human rheumatoid arthritis. Pearson (1956) observed development of polyarthritis in rats after injection of only Freund's adjuvant. Recently, Cosden et al. (1971) reported production of chronic monoarthritis by injection of ovalbumin into an articular space of rabbits immunized with ovalbumin.

This paper reports preliminary studies on the development of an experimental polyarthritis in inbred C3H/He mice by a new and highly reproducible method.

The C3H/He mice from our own inbred mice colony were injected intraperitoneally with 10^7 living thymus cells (suspended in Eagle's minimum essential medium (Eagle, 1959)) of inbred BALB/c mice maintained in our own mice colony. The treatment was repeated one week later. Within two weeks after the second injection, more than 90% of the animals (46/50) began to develop acute swelling of multiple joints, such as the wrists, forepaws, knees, ankles and hind paws (Fig. 1). This polyarthritis was persistent and still active after six months. In the chronic stage (8 weeks after the second injection) the most striking histopathological change was hypertrophy of the synovial tissue with infiltration of cells, especially mononuclear cells (Fig. 2).

About six months after injection of thymus cells, many joints, such as the wrists, elbows, shoulders, ankles, knees and hips showed swelling, stiffness and limited motion. X-ray photos showed destruction of articular cartilages and bone, and narrowing of joint spaces (Fig. 3).

Arthritis was not induced by either a lysate of thymus cells or living cells in a diffusion chamber embedded in the peritoneal cavity.

When the roles of the two strains of mice were reverse, i.e., thymus cells of C3H/He mice were injected into BALB/c mice, no clinical or pathological arthritis was observed. Moreover, no arthritis could be induced using other combinations of strains of mice maintained in our own colony (e.g., A/He, AKR, CBA, C57BL/6J, DBA/2 and DD), or xenogeneic combinations, namely, inbred mice and inbred rats (Tanabe et al. 1976).

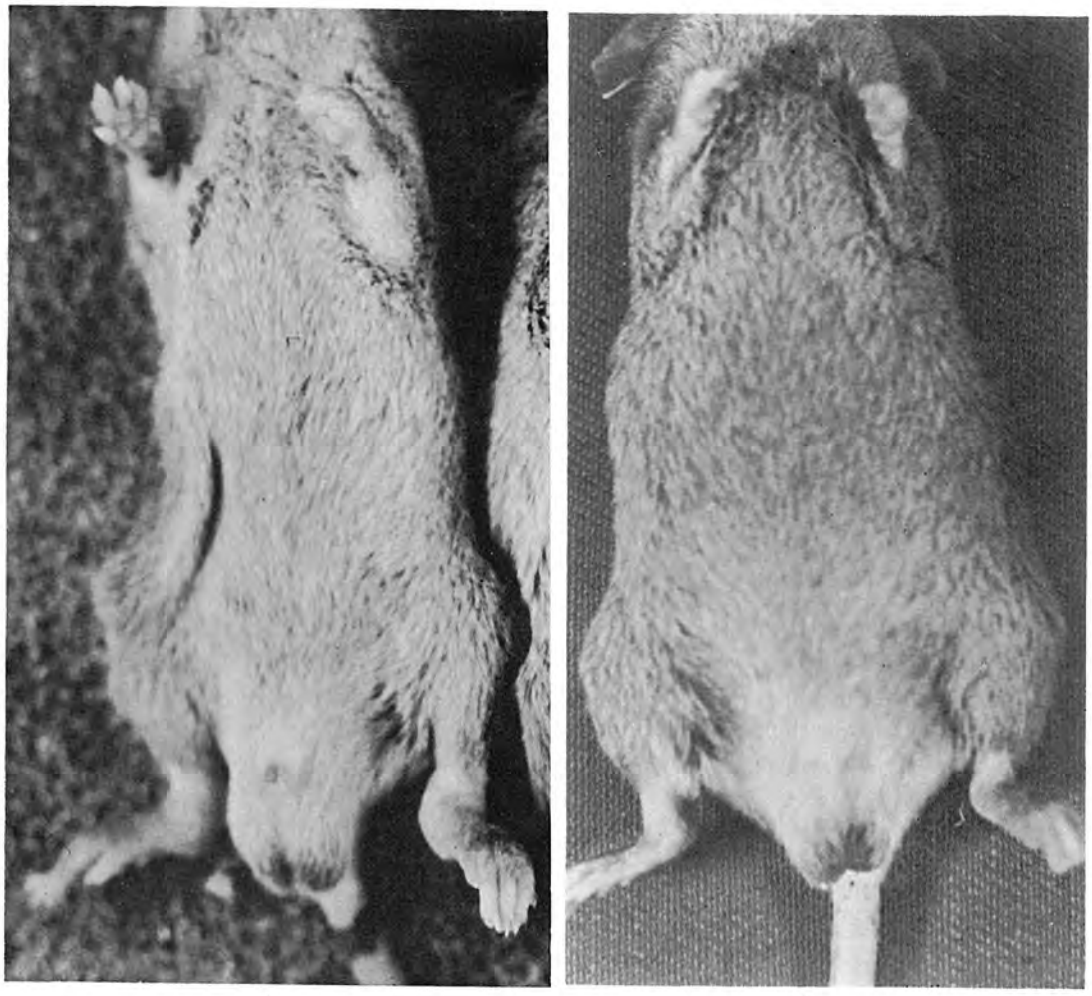

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FIGURE 1. (a) Acute swelling of multiple joints, e.g., wrists, forepaws, knees, ankles and hind paws, 2 weeks after the second injection. (b) Untreated control.

The pathogenetic mechanisms of these changes are still unknown. However, our experimental system should provide a good model for studies on human rheumatoid arthritis.

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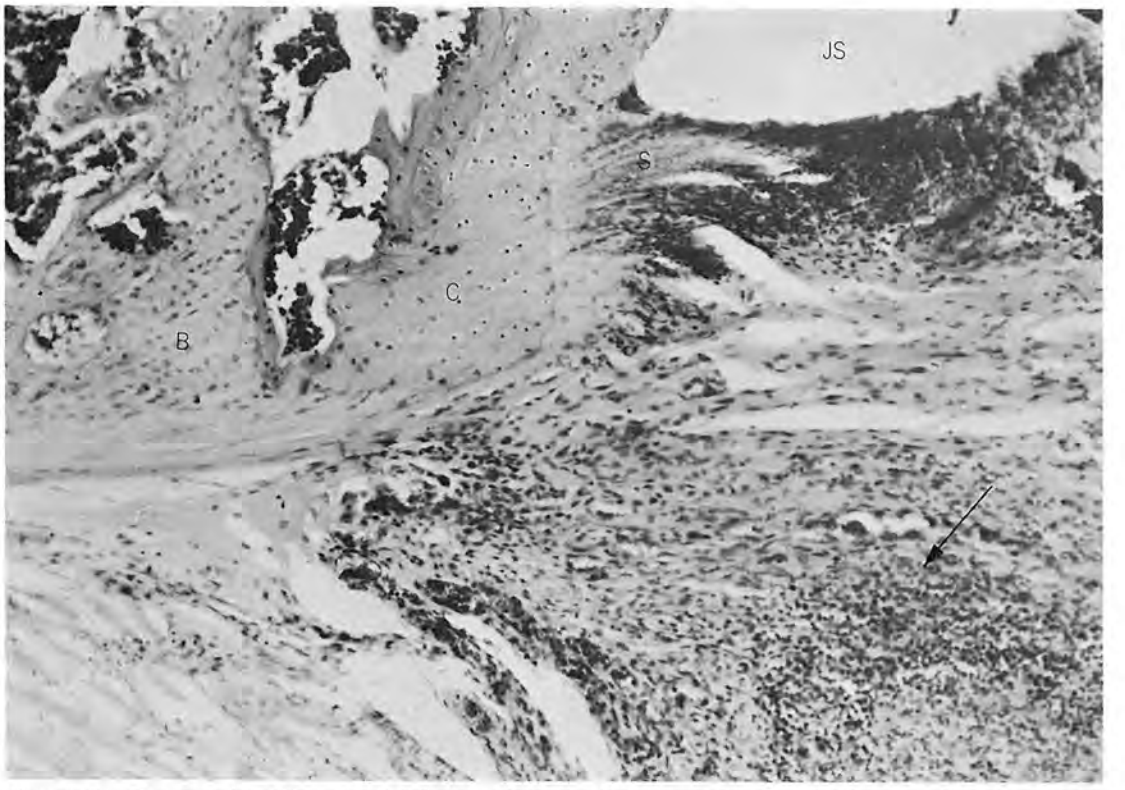

FIGURE 2. Hypertrophy of the synovial tissue with infiltration of mononuclear cells 8 weeks after the second injection. (×100) B: bone, C: cartilage, JS: joint space, S: synovia, arrow: infiltration of mononuclear cells.

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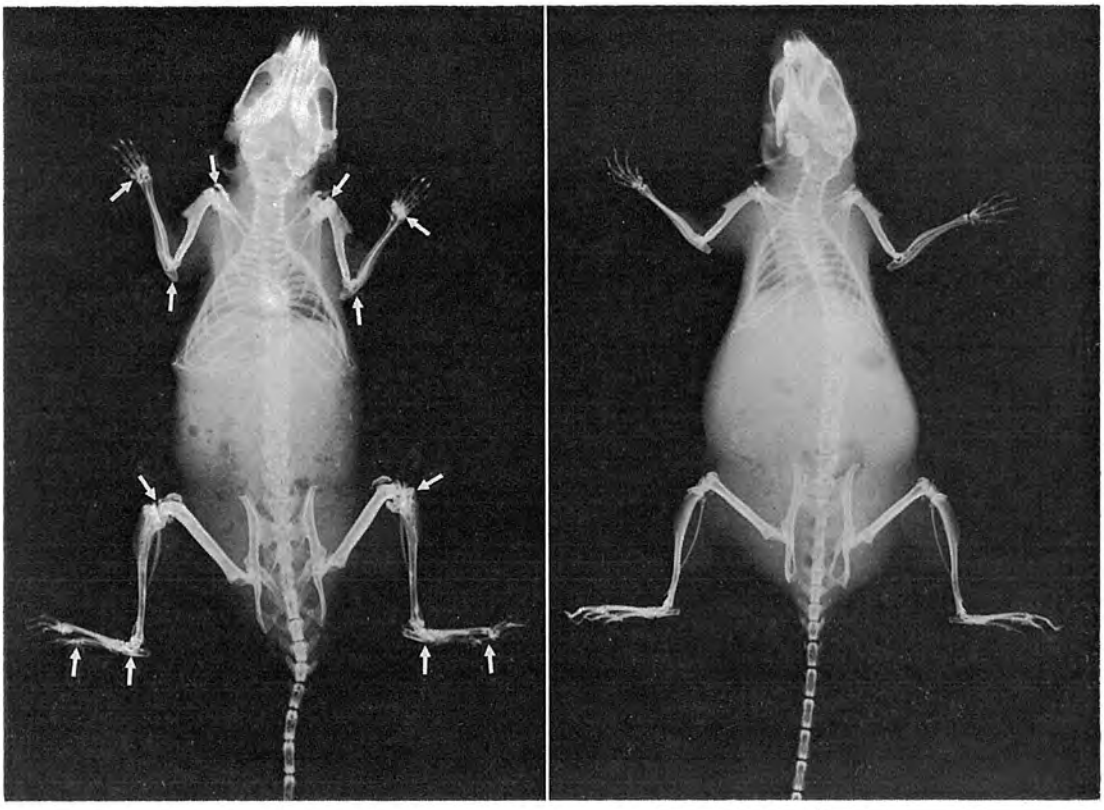

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FIGURE 3. (a) Roentgenogram of a mouse with chronic polyarthritis. Destruction of many joints, especially the knee joints, is seen 6 months after treatment. (b) Untreated control.