shivering commenced again as though the inhibitory system had been exhausted.

Inhibition of shivering was not limited to the segment where the stimulation was applied. No matter what region of body surface was stimulated, shivering stopped over the entire musculature of the animal. This can be observed visually or felt by the experimenter when a forelimb is held while the hind limb is stimulated.

The evidence indicates that inhibition of shivering takes place in a region of the nervous system located above the level of the spinal cord: (i) The simultaneous inhibition of the entire musculature suggests that the activity of a central region is being inhibited. (ii) Cutting the dorsal funiculi of the spinal cord at L2 resulted in an inhibition lasting for about 1 minute over the entire body. Thereafter shivering reoccurred. Severing the tracts acted as a stimulus which inhibited the central shivering mechanism. (iii) In several experiments, the dorsal region of the cord was cut at L2 so that shivering still occurred in regions of the body below the level of the section. Upon stimulation of the skin of a hind limb, however, inhibition of shivering did not take place either above or below the level of the section. Our interpretation of this result is that the centripetal passage of inhibitory impulses was blocked by dorsal section of the cord.

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Mitosis in Adult Cartilage

Nowikoff (*1*) concluded from a study of cell division in amphibian cartilage that mitosis is the method of cell division during development but is entirely superseded by amitosis in the adult. Elliott (*2*) could not demonstrate mitosis in the articular cartilage of the extremities in the adult dog and rabbit; however, he described what he believed to be amitotic figures, which were presented in the form of a few questionable drawings. Clark and Clark (*3*) studied the formation of new cartilage in a transparent chamber that was installed in the ear of a rabbit and found that fully differentiated chondrocytes did not divide when they were observed for several months. Most of the recent editions of American histology textbooks either state or intimate that division of fully differentiated chondrocytes, although quite rare, may occur. However, undoubtedly because of the controversial experimental evidence, nearly all fail to state whether cell division, if it does occur, is mitotic or amitotic.

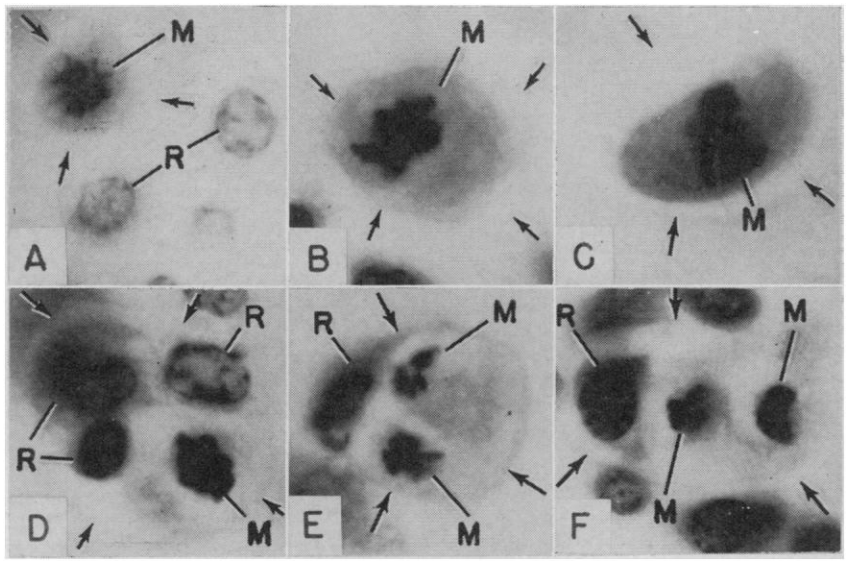

Fig. 1. Chondrocytes of adult symphysial cartilage in mice following injections of estrogen, relaxin, and colchicine. Hyaline cartilage: *A*, *D*, and *F* (× 1000); fibrocartilage: *B* and *C* (× 1500), *E* (× 1000). *M*, mitotic cell; *R*, "resting" cell; arrows, lacunar wall.

In numerous studies on the pubic symphysis in mice, I have never observed a mitotic or amitotic figure in the interpubic chondrocytes of intact and untreated adult males and virgin females. However, the first changes which occur in the relaxation of the pubic symphysis, induced experimentally or occurring during pregnancy, are an increase in the number of chondrocytes within the individual lacunae of both the hyaline and fibrocartilage and a concomitant swelling of the matrix. Apparently no change occurs in other articular cartilages of the body at this time (*4*). The significance of mitosis in the proliferation of the fully differentiated interpubic chondrocytes has been unclear, because only a few mitotic figures have ever been observed in serially sectioned symphyses (*4*, *5*).

In an attempt to elucidate the significance of mitosis, mice were treated as follows: five primiparous mice were sacrificed daily from the 12th day of pregnancy to term (19th to 20th day). Gonadectomized adult males and females received three daily injections of 1 μg of estradiol benzoate in sesame oil, followed by an injection of 100 G.P. units of relaxin (*6*) in benzopurpurine. Two of each sex were sacrificed at 2-hour intervals from 6 to 48 hours following the injection of relaxin. Each pregnant and gonadectomized mouse received an injection of 50 μg of colchicine in saline 6 hours before necropsy to halt mitotic activity occurring during this interval at metaphase. Mitotic figures were increased 10 times in the symphysial cartilage (9 to 10 average per section) when compared with identically treated mice that had not received colchicine (1 to 2 average per section). The mitotic activity was not localized in any particular area; however, as many as three mitotic figures were found in a number of individual lacunae of both the hyaline and fibrocartilage (Fig. 1). These findings cast great doubt on the occurrence of amitosis in cartilage, for nothing was found which I could even vaguely consider to be amitotic divisions.

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Effect of Kinetin on Protein Content and Survival of Detached Xanthium Leaves

When a leaf is detached from a plant, its protein content undergoes a prompt and rapid decline (*1*), the chlorophyll