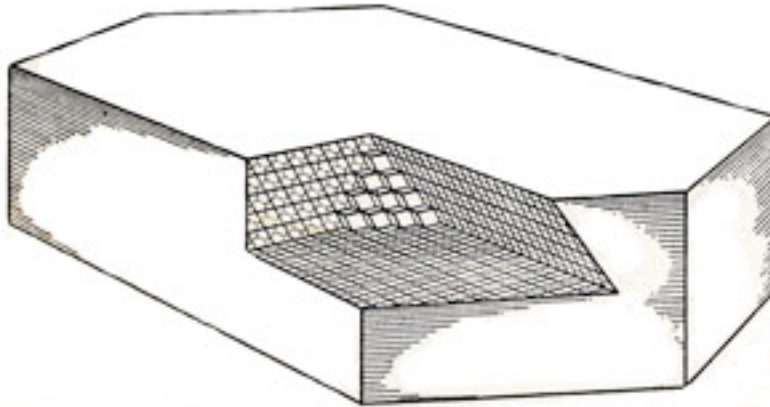


INORGANIC MATRIX OF BONE

Note the function of bone in storing calcium and phosphate. There are cells (osteoclasts) specialized for removal of bone substance as well as cells (osteoblasts) specialized for deposition. Minerals generally are removed first from least-used bones (“use it or lose it”).

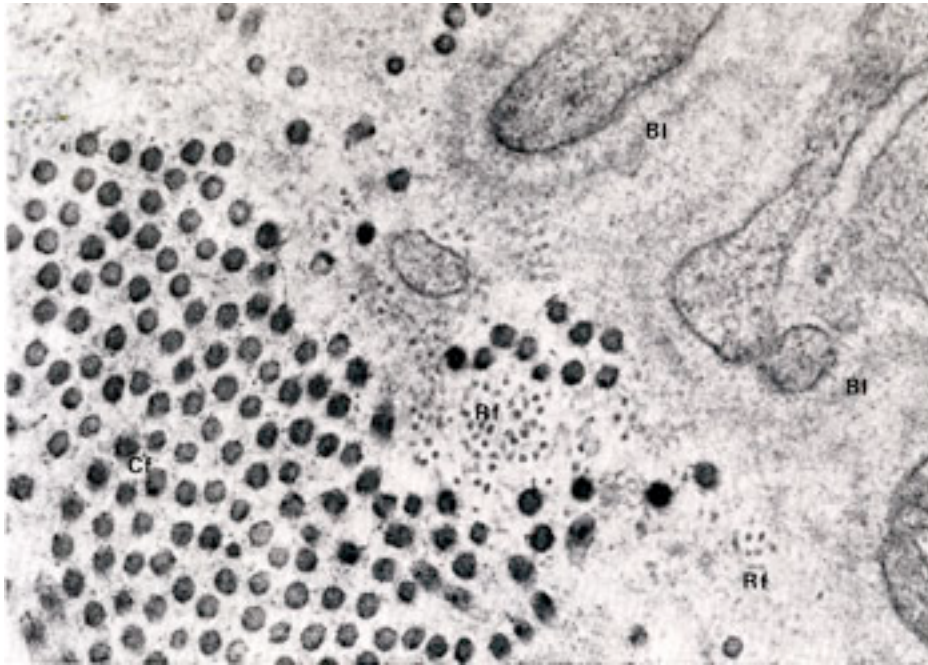
The main mineral constituent of bone is calcium phosphate, laid down initially in amorphous form (new bone) and subsequently organized into crystals of hydroxyapatite (mature bone). Calcium carbonate is the mineral usually found in the hard tissues of invertebrates, but calcium phosphate and apatite do occur in groups other than vertebrates.



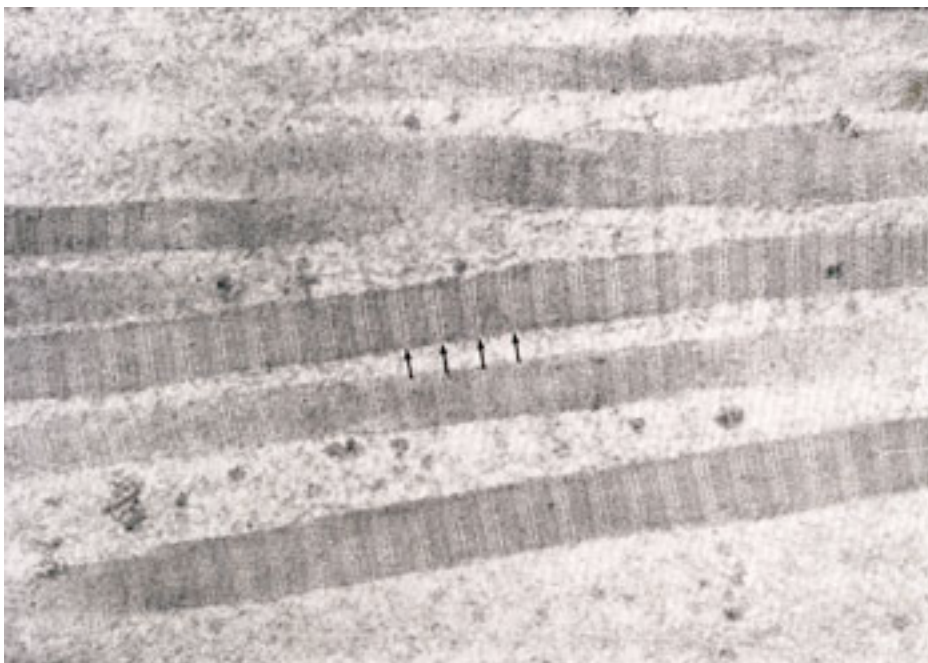
Although we usually think of bone as primarily skeletal or protective in function, it also serves as a mineral store of calcium and phosphate. Mineral regulation in the vertebrate organism involves both the deposition of calcium and phosphate in bony tissue and the decalcification of bone with the mobilization of calcium and phosphate back into the circulatory system for distribution and use.

COLLAGENOUS FIBERS

Collagenous fibers are composed of the fibrous protein collagen. Collagenous fibers are widely distributed in all types of connective tissue, making collagen the most abundant protein in mammals (constituting about a quarter of the total). Collagen fibers form the main fibrous element of skin, bone, ligaments, cartilage and teeth. Collagenous fibers possess little elasticity, but offer great resistance to pulling forces. Collagenous fibers consist of bundles of collagenous fibrils bound together. This basic structural motif can be modified to meet the specialized needs of particular tissues.



Cross-sections of several collagenous fibers (Cf). The smaller fibers seen nearby are reticular fibers (Rf). The basal portions of a couple of epithelial cells (Bl) are shown in the upper right corner of the micrograph.



Several collagenous fibers in longitudinal section. Note the bundles of collagenous fibrils (noted by the arrows) crossing each other.