



# Immuno Expression of Osteocalcin in Hypertrophic Chondrocytes of the Growth Plate

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## Clinical Image

Growth plate is a characteristic cartilage tissue placed between epiphysis and diaphysis that regulates the longitudinal bone growth. Chondrocytes of the growth plate are arranged in three layers: resting (RZ), proliferative (PZ) and hypertrophic zones (HZ) (Figure 1A and 1B) [1]. In the late phase of endochondral ossification, hypertrophic chondrocytes degenerate and undergo apoptosis. Capillaries and bone marrow-derived cells reach the hypertrophic zone and new bone is formed on the surface of the cartilage calcified matrix, subsequently eroded by bone marrow-derived chondroclasts/osteoclasts forming the medullary cavity.

Osteocalcin is a typical protein of mineralized extracellular matrix, mainly expressed by osteoblasts and it is a late marker of bone formation [2] it determines active osteoblasts appearance around hydroxyapatite/collagen components [3]. In figures, growth plate of rat 3 weeks old (Figures 1A;A1) and 5 weeks old (Figure 1B;B1). It is showed that also hypertrophic chondrocytes produce osteocalcin for the ongoing of bone formation. Furthermore, osteocalcin immuno expression in hypertrophic chondrocytes increases during the molecular processes, in fact osteocalcin immuno staining is higher at 5 weeks (Figure 1B;B2, red arrows) when compared to 3 weeks (Figure 1A;A2, yellow arrows).

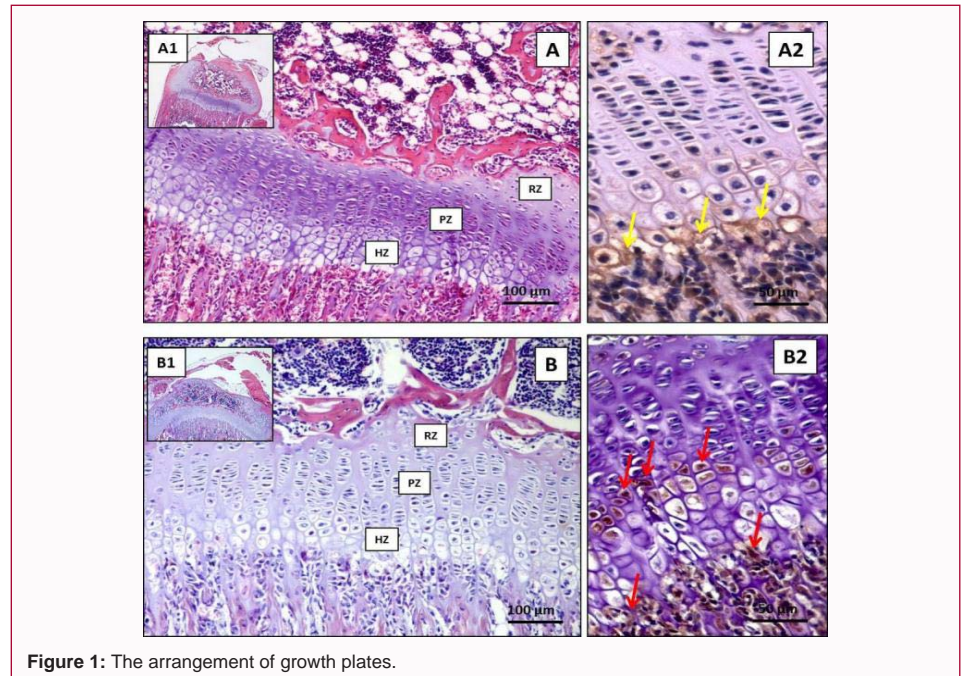


Figure 1: The arrangement of growth plates.

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