Glycosaminoglycans

Cartilage matrix is a homogeneous material principally composed of **proteoglycans,** macromolecules with a proteinaceous backbone, to which is attached complex carbohydrates *(these carbohydrates are "glycosaminoglycans", usually abbreviated GAGs)*.

The GAGs radiate from the protein core like the bristles of a bottle brush. The principal GAGs of cartilage are **chondroitin sulfate** and **keratan sulfate.** Another matrix component is **hyaluronic acid,** a gelatinous mucopolysaccharide. The hyaluronic acid acts as a sort of cement to bind the proteoglycans together into large aggregates.

Important: Because of the chemical nature and organization of the glycosaminoglycans, the ground substance can readily bind and hold water, which allows the tissue to assume a gelatinous nature that can resist compression and permit some degree of diffusion through the matrix.

Note: Chondrocytes produce all the components of cartilage: the matrix material and the fibers as well.

Hyaline cartilage forms nearly all of the fetal skeleton. In the **adult,** the remnants are:

- **Articular cartilage** — smooth and slippery, it lines movable joints
- **Costal cartilages** — at the sternal ends of the ribs
- **Respiratory cartilages** — movable external nose and septum, larynx, trachea, and bronchial walls