















## Structure of a Synovial Joint

- Joint capsule - fibrous capsule around the joint.
- Synovial membrane - membrane lining the joint capsule and surrounding the synovial cavity. This tissue secretes the lubricating synovial fluid.
- Synovial cavity (joint cavity) - cavity containing synovial fluid + bone ends
- Articular cartilage (hyaline cartilage) - cartilage covering articular surfaces of the bone ends.

## Joint degeneration

- Cartilage does not have a good capillary blood supply.
- Cartilage has a poor ability to repair and regenerate itself.
- With age, overuse and/or disease, such as arthritis, the articular cartilage degenerates and bone ends make more direct contact, causing inflammation and pain.

## Intervertebral Disc Structure

- Nucleus pulposus - incompressible watery gel contained within an elastic sac.
- Annulus fibrosis - fibrocartilage lamellae arranged in layers around the nucleus. Fiber orientation varies from layer to layer.
- End plates - hyaline cartilage end plates protect each end of the disc.
- Motion segment - 2 vertebrae either side + intervertebral disc.

## Bone and Muscle Loss in Space

- In space, astronauts will experience a deterioration in their musculoskeletal system:
  - 1 to 2 % loss of bone mass each month.
  - Up to 20% loss of skeletal muscle mass within 2 weeks if the astronaut does not exercise:
    - ◆ Visiting astronauts (< 2 weeks) exercise 30 minutes/day
    - ◆ Space station astronauts exercise 2 hours/day.