

# Introduction to Biomaterials

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LEC (3)

# General Criteria for materials selection

- Mechanical and chemical properties
- No undesirable biological effects
  - carcinogenic, toxic, allergenic or immunogenic
- Possible to process, fabricate and sterilize with a good reproducibility
- Acceptable cost/benefit ratio

# Material Properties

- Compresssive strength
- Tensile strength
- Bending strength
- E-Modulus
- Coefficient of thermal expansion
- Coefficient of thermal conductivity
- Surface tension
- Hardness and density
- Hydrophobic/philic
- Water sorption/solubility
- Surface friction
- Creep
- Bonding properties

# Cell/tissue reaction to implant

- Soft tissue
- Hard tissue
- Blood cells

# The biological milieu

- Atomic scale
- Molecular scale
- Cellular level
- Tissue
- Organ
- System
- Organism

# pH in humans

- Gastric content 1.0
- Urine 4.5-6.0
- Intracellular 6.8
- Interstitial 7.0
- Blood 7.17-7.35