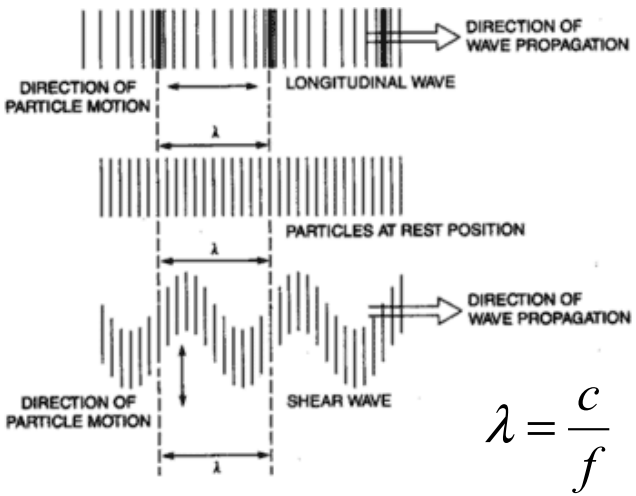
Focused Ultrasound Principles

- Ultrasound generates 2 types of waves when interacting with tissue
  - **Longitudinal** (fluids, soft tissue and bone), and shear waves (bone only)
  - Pressure is positive during compression and negative during rarefaction of the wave
- As waves traverse a lossy medium, attenuation (**absorption**, scattering and mode conversion) reduces the energy delivery
- Waves are focused geometrically, mechanically, or electronically to aim all the energy emitted from the transducer into a small target
- Acoustic intensity (power focused over a small area) determines the amount of thermal energy deposited at the focus



$$\lambda = \frac{c}{f}$$