Characterization of deformation and rupture micro-mechanisms in aortic aneurysm wall

**Context**

Rupture of aneurysm in human aortic wall

Need to study:
- Separate role and interaction of primary structural micro-constituents
- Their evolving properties in response to mechanical loading

~ 35 000 aneurysm deaths/year in UE

**Method**

**In vitro experiments**

Experimental setup to combine mechanics and microstructural imaging:
- Mechanical inflation device
- Multi-photon confocal microscope (3D imaging of fibrous networks inside the tissue)

**Target:**
Obtain a database of 3D images to quantitatively analyze the microstructure under mechanical load bearing

**Micro-scale characterization**

Detailed analysis of the 3D images by providing specific physical quantities and evolution curves

**Targets:**
- Advanced segmentation strategy
- Method to measure displacement boundary conditions in the region
- Method to measure the evolution under increasing load

**Aim:** Investigation at micro-scale to find the determinants of rupture mechanism