CARDIOVASCULAR TISSUES: FROM THE CHARACTERISATION TO THE MODELLING

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ABSTRACT

Cardiovascular diseases represent one of the most important cause of death worldwide and they induce very peculiar morphological and structural changes in the vasculature structure [1]. In this context, the assessment of the mechanical characteristics of pathological tissues is crucial to understand any possible changes due to the diseases [2] or to cluster different type of patients. Different tests can be used to assess the impact of the pathology onto the mechanical behaviour of the vessel.

According to the interested mechanical property, different techniques can be adopted ranging from uniaxial and biaxial tensile and compression tests, to indentation, atomic force microscopy, pressure myography or elastography.

Experimental results can be used in many different ways: differences in mechanical properties could indicate the effect of the progression of the disease onto the mechanical characteristics of the vessel [3], experimental stress-strain curves can be used for the calibration of constitutive models with different grade of complexity or to perform reliable numerical simulations.

In this Minisymposium we welcome contributions focused on gold standard or novel experimental strategies for the characterizations of cardiovascular tissues as well as their application in the computational field.

Furthermore, since every pathology induce a different, not physiological, mechanical behaviour, the clinical treatment that usually consists of the substitution of the biological tissue with a bio prosthesis may impact differently onto the remaining part of the tissue. In this case, studies focusing onto the impact of discrepancies of the mechanical properties of novel biomaterials with the pathological tissue for novel implants can be very important.

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