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Supra and Sub Molecular Investigation of Pathologic Tissues by X-Ray Scanning Microscopy

Monday, 4 October 2021 15:30 (15 minutes)

X-ray Small and Wide Scattering scanning microscopies have been adopted to inspect morphological and structural properties of collagen-based tissues at the atomic and nano scale¹. Examples will be discussed on specific pathologies:

- osteoarthritis of the hip, also named osteoarthrosis of the hip or coxarthrosis, which is a chronic degenerative disorder of the hip joint, causing growing articular pain that can bring the patient to lifestyle limitations until surgical intervention is needed²
- keratoconus, a pathology affecting cornea, which causes progressive thinning of the stroma and consequently abnormal curvature, inducing irregular astigmatism and myopia, corneal fibrosis, and distortion of vision, due to the modification in the organization of the corneal collagen³
- abdominal aortic aneurysm, that occurs in the major artery from the hearth that supplies blood to the abdomen, and popliteal aneurysm, that takes place in the legs, behind the knees, characterized by alteration of collagen structure into vessel's wall of the aneurysm tissues, heterogeneous grade of inflammation related to infiltrating cells and extracellular matrix changes, in particular disruption of elastic fibers, fibrosis and calcifications⁴
- diabetes mellitus, a metabolic disorder characterized by high blood sugar levels over a prolonged period due to defects in insulin action or secretion, which causes collagen to have a fixed orientation, stiffen the tissue and is likely to disrupt the normal cell interactions⁵.

References

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