MICRO-CT IMAGING FOR THE LONGITUDINAL FOLLOW-UP OF PRECLINICAL STUDIES ON PATHOLOGICAL CALCIFICATIONS

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In vivo imaging techniques have progressively become essential tools for preclinical and clinical research. Among these techniques, the X-ray micro-tomography (micro-CT) allows quick acquisition of structural images, depending on the X-ray absorption by the tissues, in order to obtain with high resolutions spatial representations of scanned objects. Our micro-CT platform (Quantum FX® PerkinElmer) is part of the in vivo imaging network of Paris Descartes University (Life Imaging Platform, LIP) and enables image acquisition in various rodent models. Recent technical advances provide fast image acquisition allowing a long-term (longitudinal) follow up of pathologies in animal models, which is a real added value in many experimental projects. This technique is mainly used for the exploration of mineralized tissues and was initially optimized for bone studies (growth follow-up, bone phenotyping, bone remodeling and regeneration, exploration of angiogenesis within calcified tissues after injection of contrast agents). It is also a precious technique for dental research as teeth are mainly composed of calcified tissue. In addition, high resolution micro-CT is a valuable tool to detect ectopic calcifications in the context of the exploration of murine models of either genetic disorders or chronic diseases. For example, we have developed a method of image analysis to visualize renal calcifications, to observe their microstructure and their location within the kidney and to quantify their volume and density. Another interesting biomedical application is the detection of pathological calcifications that may occur in blood vessels or in the heart in models of cardiovascular diseases.