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Micro-CT journey - from bones to personalized medicine

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X-ray microtomography (micro-CT) is a well establised nondestructive 3D method for small sample internal structure imaging. For over 20 years, micro-CT is known as a golden standard in bone microarchitecture analysis, as an alternative to histological sectioning method for preclinical research [1, 2]. Micro-CT surpasses histological analysis because it provides 3D information with several micron sampling.

In recent years, micro-CT has been succesfully used in micro-angiography research. For this purpose it needs addition of contrast agents either by staining the sample for ex-vivo scanning or using perfusion in small animal in-vivo micro-CT [3, 4]. Staining methods enhance imaging contrast globally by diffusion process in examined tissue, particullary in areas with high affinity to a specific contrasting solutions. Recent research proofs the potential of this metod in imaging of 3D cell cultures called spheroids [5]. The injected contrast agent works more locally. It can enhance image contrast of blood vessels, heart, kidneys and urinary bladder.

From the other hand micro-CT is an indispensable tool in material science including drug design for a personalized medicine. This work shows how micro-CT can help in design and quality control of individualy 3D printed tablets [6, 7].

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Primary authors: LESZCZYŃSKI, Bartosz (M. Smoluchowski Institute of Physics, Jagiellonian University); Dr WRÓBEL, Andrzej (M. Smoluchowski Institute of Physics, Jagiellonian University); Prof. VANDE VELDE, Greetje (Department of Imaging and Pathology, KU Leuven, University of Leuven); Dr JAMRÓZ, Witold (Department of Pharmaceutical Technology and Biopharmaceutics, Jagiellonian University Medical College); Prof. STĘPIEŃ, Ewa (M. Smoluchowski Institute of Physics, Jagiellonian University)

Presenter: LESZCZYŃSKI, Bartosz (M. Smoluchowski Institute of Physics, Jagiellonian University)

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