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Tumor imaging of small animal by phase contrast X-ray CT technique

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Currently, conventional X-ray absorption CT is used to image various animal models of tumor for accessing the pathological conditions and drug efficiency for tumors. Since the tumor lesions composed of soft tissue has significantly weak absorption in X-ray, tumor imaging with high-spatial- and high-contrast-resolution is difficult without contrast agents. Phase-contrast X-ray technique has approximately 1000-times higher sensitivity than conventional absorption X-ray technique for low atomic number elements as carbon, oxygen, and nitrogen. Then, phase-contrast X-ray CT (PCT) can visualize internal structures of brain, testes and kidney of small animal. Here, spontaneous brain and testicular tumors of aged rat were imaged by PCT using crystal X-ray interferometer without contrast agent. In brain tumor, PCT sectional images well defined the intra-tumor density changes as viable cell growth areas, necrotic and hemorrhage, and edema of cerebrum surrounding tumor. In testicular tumor, PCT sectional images depicted the density different in glandular changes of tumor, and surrounding seminiferous tubular atrophy. Both PCT images resembled to corresponding pathological pictures. In addition, PCT has ability for obtaining three dimensional (3D) data, so 3D tumor growth and intra-vascular migration were clearly accessed. Thus, PCT might be potentially helpful tool for fine depicting the pathological conditions in various animal models of tumor.

Biography

Thet Thet Lwin is an Assistant Professor at School of Allied Health Sciences, Kitasato University, Japan. She has obtained her PhD on nuclear medicine diagnosis of hypertrophic cardiomyopathy from Tsukuba University, Japan. Currently she is conducting research on establishment of aging-related changes by phase-contrast X-ray CT imaging. She has more than 10 published papers in peer reviewed international journals.

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