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Biomarkers as targets in positron emission tomography for non-invasive and whole body diagnostic imaging and quantification of oncological diseases

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The development of a personalized approach in healthcare is motivated by the call for improved efficiency, safety, and quality of treatment. Early diagnosis plays an important role and is one of the major factors that reduces the mortality and cancer management costs. The remarkable achievements in genomics, proteomics, and biotechnology have contributed drastically to the emergence of individualized diagnosis and therapy on molecular level. High-resolution molecular imaging is one of the fastest growing imaging procedures worldwide and is considered as a major breakthrough that strongly contributes to the realization of personalized medicine. Nuclear medicine includes such technology as positron emission tomography (PET) that utilizes positron emitting radionuclides and ligands towards various biomarkers for the generation of a signal that results in a whole-body scan in a single examination. PET provides fast and noninvasive real-time evaluation of physiology and pathology, and together with external and internal radiotherapy merge into theranostics of personalized medicine. Theranostics in its broader meaning embraces diagnostic methods conducted for the prediction of the efficacy of specific therapeutic interventions on an individual basis as well as for monitoring the response to the treatment. The clinical value of molecular imaging diagnostics is greatly elevated by its improved accuracy and safety as compared to biopsy with regard to discrimination of the heterogeneity of a primary tumor and between a primary tumor and metastases. The selection of the molecular biomarkers and development of the respective positron emitting imaging agents is the core of PET diagnostic method. Imaging agents targeted to biomarkers specifically expressed in particular diseases are of strong interest. Clinical imaging and quantification of neuroendocrine tumors and breast cancer lesions as well as the impact on the therapeutic patient management will be presented in this talk.

Biography

Irina Velikyan is an Associate Professor in Biomedical Radiation Sciences, Uppsala University, and a Senior Scientist at PET Centre, Uppsala University Hospital, Sweden. She graduated from Yerevan State University (MSc, 1988). She received her PhD from Uppsala University (2005). The focus of her scientific activity is development and clinical implementation of positron emission tomography radiopharmaceuticals for molecular diagnostic imaging and quantification as well as bridging molecular imaging and therapy for personalized patient treatment.

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