Abstract

Fibroblast activation protein (FAP) is a membrane serine protease that is mainly expressed in epithelial tumor cells. The specific occurrence in the tumor microenvironment and its absence in most healthy tissues makes this protein an important target for the development of diagnostic probes or targeted endoradiotherapy.

The goal of this work is the preparation of a new series of potential probes for SPECT imaging of tumours using low molecular weight FAP inhibitors. The structure and synthetic strategy for four new probes were proposed. At the same time two already published probes serving as references for biodistribution experiments were prepared. Two probes were based on the compound IOCB22-AP446, the most potent FAP inhibitor published so far, which was developed in the laboratory of prof. Konvalinka at the IOCB, Prague. The other four prepared probes used the inhibitor UAMC1110, which is utilized as a targeting molecule in a number of compounds in the clinical testing phase. The degree of FAP inhibition *in vitro* was determined for all prepared compounds. Furthermore, the ability of the probes to visualise tumour tissue *in vivo* was tested on two animal models of human tumours. Comparison of the results with published data led to the validation of one of the models for use in further experiments.

Key words: Fibroblast activation protein (FAP), Single-photon emission computed tomography (SPECT), tumour imaging, radiopharmaceuticals