Cell cycle phase-dependent uptake of FDG and Ga

M.Shozushima, T.Takahashi, R.Tsutsumi*[1],
K. Terasaki*[2], S.Sato*[1] and K.Sakamaki

Department of Dental Radiology, School of Dentistry, Iwate Medical University
*[1]Department of Bacteriology, School of Medicine,Iwate Medical University
*[2]Cyclotron Research Center, Iwate Medical University
19-1 Uchimaru, Morioka, 020-8505

Abstract

The experimental studies demonstrated fluorine-18 fluoro-deoxyglucose (FDG) uptake was higher in faster-growing rather than in slower-growing tumors. These findings show FDG accumulation exhibits cell cycle dependency. However, the precise mechanism remains to be elucidated. In this study, the relationship between FDG uptake and the cell cycle phase in HeLa S3 cells, as well as how they compare to the conventional tracer ^{67}Ga citrate (Ga) with SPECT was assessed. Ga uptake was higher in the G2/M phase. In addition, FDG uptake in HeLa S3 cells was significantly higher in the early S phase and G2/M phase compared to the G1 phase. It has been concluded cell cycle dependensy is reflected in the uptake of FDG and Ga, seen during PET or SPECT imaging of tumor tissue. These results reveal tumor proliferative activity, and can assist in evaluating a therapeutic response.