

CHARACTERIZATION OF ISOGENIC TUMOR CELL LINES BY SPECTRAL ANALYSIS OF CELLULAR AUTOFLUORESCENCE

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In this study we investigated the utility of spectral imaging for specific detection of tumor cells as well as discrimination between tumor cells with various malignancies in a cell model of glioblastoma. For development of highly standardized, isogenic cell models we used site-specific recombination techniques for the establishment of Tet-inducible gene expression in glioblastoma cell line U251-MG. Selected genes (TP53 and PTEN) involved in tumor progression were stably expressed in the cancerous cells. In this way we produced cell lines with different grades of malignancy.

Cellular autofluorescence was induced by two-photon excitation at different wavelength (750nm, 800nm, 850nm and 880nm). Spectrally resolved images (Figure 1) of the cells were generated using an image spectrograph combined with a motorized microscope stage. Data analysis of measured emission spectra of single cells was performed by artificial neuronal network or cluster analysis, respectively. Spectral profiles showed considerable differences between the analyzed cell models expressing different tumor-specific genes. Thus, we were able to discriminate between cells over expressing TP53 or PTEN genes, respectively.

Our results indicate that autofluorescence emission profiles of tumor cells and tissues are useful tools that can be applied in characterization of tumors.

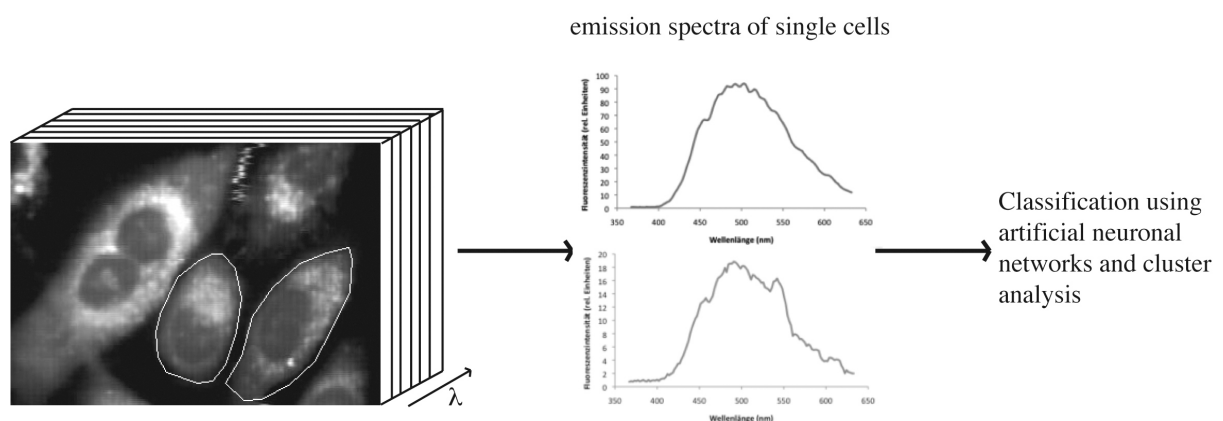


Figure 1: Single cell analysis of spectrally resolved images of U251-MG glioblastoma cells.

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