

Multiphoton FLIM is Gaining Ground as a Clinical Tool

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Abstract. Multiphoton fluorescence lifetime imaging (FLIM) is gaining ground as a non-invasive and very sensitive research tool, and even as a method in clinical applications. Skin science is the predestined field for the latter, since skin is optically accessible without surgery. A hot topic is using metabolic imaging to investigate melanoma lesions (Fig.1). This method utilizes imaging of the ratio of the amounts of the free and protein-bound forms of the intracellular autofluorescent metabolic co-enzyme nicotinamide adenine dinucleotide (NADH) [1,2,3,4]. Another important topic which is closely bound up with skin cancer risk is safety aspects of sun screens. Multiphoton FLIM enables tracing of nanoparticle after application on the skin. Furthermore, in case of penetration through the stratum corneum again metabolic imaging can be used to investigate toxicity on skin cells [5].

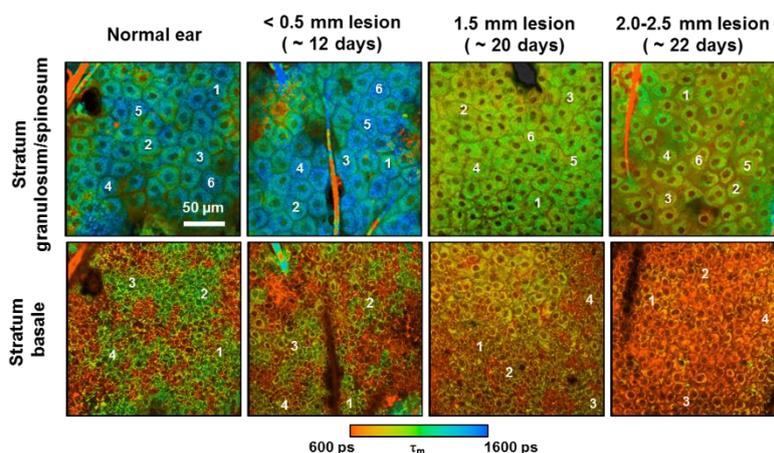


Fig.1: Multiphoton fluorescence lifetime imaging (FLIM) on freshly excised mouse ear skin for different stages of melanoma development. Representative FLIM images of the stratum granulosum/spinosum (upper row) and stratum basale (lower row) layers pseudocoloured from 600 ps (red) to 1600 ps (blue) according to the fluorescence mean lifetime τ_m . White numbers indicate cells selected for further analysis.

References

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