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Ultraviolets for betterdiagnosis

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Background

The invention of the UV lamp by Dr Wood triggered the observation of fluorescence induced by UV from tissues and biological samples at the beginning of the last century with notably, the classification of the observable color from dissected tissues under UV excitation[1]. In the following years, it was widely used for tumors observation[2]. We would like to demonstrate that one century after, this method may be rejuvenated.

Materials and methods

DISCO Beamline[3] is a bending magnet beamline at synchrotron SOLEIL covering the unusual 1-21 eV energy range. One of its branches is dedicated to UV microscopic imaging of biological samples[4].

Results

Use of deep ultraviolet (DUV, below 350 nm) fluorescence opens up new possibilities in biology because, it does not need external specific probes or labeling, but instead takes profit of the intrinsic fluorescence that arise from many biomolecules under deep ultraviolet excitation. Indeed, observation of label free biomolecules[5] or active drugs[6] ensures that the label will not modify the biolocalisation or any of its properties. UV monophotonic excitation does present real spectral excitation, leading the way to excitation imaging and a better selectivity of the chromophores. DUV excitation may also be used to track exogenous drugs or toxic compounds that present different spectral behaviour. Moreover, due to diffraction limit the lateral resolution is always increased when looking in the UV range allowing nanometric spatial resolution[4]. Examples of UV for diagnosis, in drug pharmacokinetic, in liver grafts quality and microcalcifications formations will be presented.