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Autofluorescence and endogenous fluorophores: Biomolecules as intrinsic biomarkers of cell and tissue in biomedical research and diagnosis

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Several biomolecules naturally present in cells and tissues give rise to autofluorescence (AF) signal under suitable excitation light. The AF emission properties (amplitude and spectral shape) depend on kind, amount, physico-chemical state, intra tissue distribution and microenvironment of endogenous fluorophores, in strict relationship with metabolic engagement and/or structural organization of the biological substrate. Endogenous fluorophores can thus play a role as intrinsic biomarkers, their AF emission being exploitable as parameter for real time, in situ monitoring and diagnosis of physiological or altered morphofunctional properties of cell and tissue, in the absence of perturbation induced by exogenous marker administration. The liver is a suitable model to investigate and validate the AF diagnostic potential, due to the presence of several endogenous fluorophores involved in different metabolic, biosynthetic, catabolic and detoxificating functions. In addition to NAD(P)H and flavins (coenzymes in redox pathways: energetic metabolism, oxidative defense, reductive biosynthesis, signal transduction), vitamin A, fatty acids, proteins i.e., collagen-, lipopigments, porphyrins, bilirubin and other bile components can act as biomarkers of liver functionality, disorders and disease progression. Under near-UV excitation, all fluorophores can contribute to a global AF emission signal, carrying comprehensive information on tissue morphofunctional properties that can be solved by proper curve fitting analysis. The AF signal collected *in vivo*, via fiber optic probe, is even able to evidence transient phenomena or changes in energetic metabolism engagement, otherwise hardly detectable or demonstrable through different, time consuming biochemical and histochemical assays.

Biography

Anna Cleta Croce completed her PhD in Histochemistry and Cytochemistry at the University of Pavia in 1982, and is engaged in research activity photobiology with a permanent position at IGM-CNR since 1987. She has published more than 85 papers in international journals and book chapters, and serving as referee for reputed photobiological and photochemical journals.

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