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Structural changes of the tumor microenvironment and perspectives for diagnosis and targeted immunotherapy.

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The tumor microenvironment is a structurally and functionally complex network. Its effects remain localized for a certain period, suggesting approaches for local therapy. Nanotechnologies allow specific tumor targeting by use of nanoparticles – NP, decorated with appropriate targeting molecules and loaded with drugs. In our studies, we found that the collagen part of a tissue stroma undergoes to quick and early detectable changes following pro-inflammatory and/or carcinogenetic stimuli in experimental models of colon carcinogenesis and chronic colitis (Fig. 1). They appear related to local cytokine background (IL-1α, IL-1ß, TNF-α, IL-4, TGF-ß, etc.) accompanying the pathologic processes. The Constancy of these changes looks promising for possible diagnostic purposes. To study local targeting of tumors, we used a B16F10 mouse melanoma model expressing MSH (melanocyte stimulating hormone) receptor and recombinant human ferritin-based NPs (12 nm) decorated with PEG 5kDa and MSH molecules. NPs specifically engulfed the B16F10 cells in vitro and in vivo (Fig. 2). Recently, we started to develop therapeutic NPs for targeting tumor cells or microenvironmental structures in the view of selective hyperthermia, chemo- and immunotherapy.

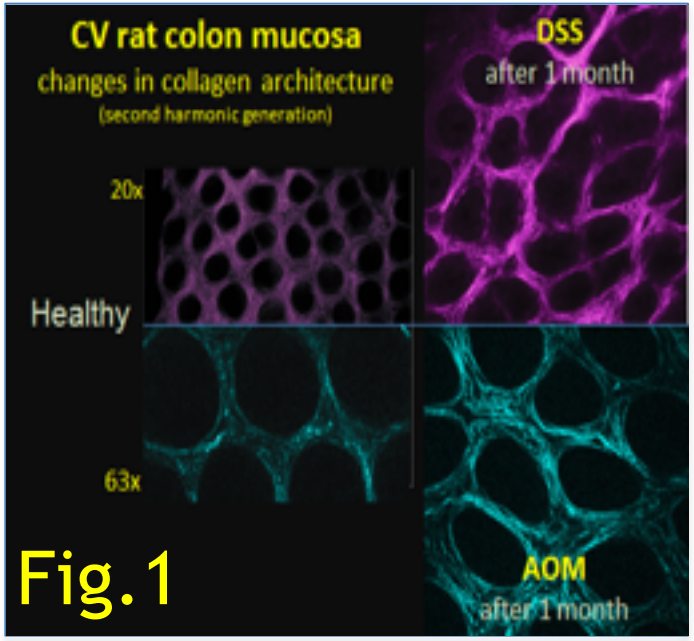

Fig.1

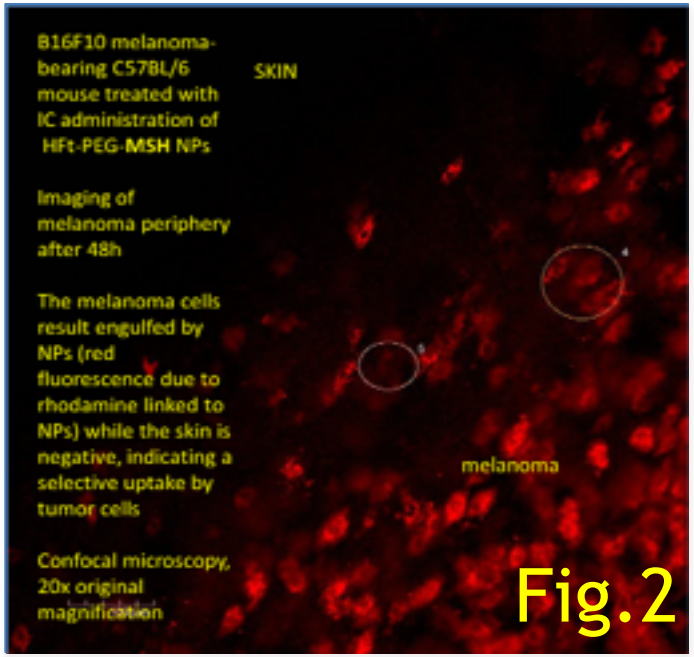

Fig.2