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Advanced Nanotools for Imaging of Solid Tumors and Circulating and Disseminated Cancer Cells*

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Received July 6, 2018

Semiconductor quantum dots (QDs) are characterized by orders of magnitude higher multiphoton linear absorption cross-sections compared with conventional organic dyes. Combined with the QD photoluminescence quantum yield approaching 100% and their rock-solid photostability, this fact opens great prospects for the two-photon functional tumor imaging with QDs tagged with highly specific recognition molecules. Single-domain antibodies (sdAbs) or „nanobodies“ derived from lamas are the smallest high-affinity recognition molecules, which may be tagged with the QDs thus permitting not only solid tumors multiphoton imaging but also rare disseminated cancer cells and micrometastases in the depth of the tissue to be detected.

DOI: 10.21883/OS.2018.11.46828.209-18

* International Conference „PCNSPA 2018 — Photonic Colloidal Nanostructures: Synthesis, Properties, and Applications“, Saint Petersburg, Russia, June 4–8, 2018.
Полный текст статьи опубликован в английской версии журнала.