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Distinct Trafficking of Solid Lipid Nanoparticles within Cells

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Solid lipid nanoparticles (SLN) represent rapidly growing class of colloidal transport system, particularly interesting for pharmaceutical applications [1]. Various physical methods can be used for characterization of nanoparticles (NPs), but evidently, their imaging and monitoring, especially in biological system, are of primary importance. Fluorescence microscopy may provide valuable information regarding interactions between nanoparticulate carriers and target cells as well as their intracellular fate. For this purpose, good fluorescent labels are needed. Since numerous different dyes with affinity to particular target object in the cell are available, for colloidal carriers only few are frequently used (e. g. derivatives of cyanine, fluorescein, rhodamine and coumarin), which are not design for particular nanosized system and often make comprehension difficult [2].

The advantages of the *in vitro* imaging of SLN by using novel fluorescent dye (SPP-189) was investigated in comparison with frequently used dye 6-coumarin (C). SPP-189 is derivative of coumarin with long lipophilic chain [3] which enables its stronger integration into lipid matrix of SLN than 6-coumarin, what was proved by release study. SPP-189 shows overall brightness in the pictures of long lasting monitoring of SLN-SPP-189 internalization and intracellular localization comparing to the dye 6-coumarin (Figure 1).

Accordingly, we present an extremely sensitive tool to monitor the location of fluorescently labelled NPs by SPP-189 within respective organelles that should find a wide application in drug study.

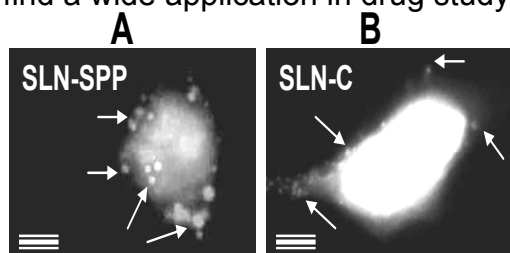


Fig. 1. Imaging of internalized SLN (marked with arrows) located next to the nuclei (rounded structure). A - SLN-SPP are seen distinctly as (blue) dots, while B - SLN-C are hardly recognized due to the broadly distributed fluorescence from 6-coumarin (green). Bar is 10 µm.

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