ABSTRACT

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Title of the diploma thesis: Photochemical internalization of saporine by phthalocyanine photosensitisers

The application of therapeutic macromolecules is often affected by limited cellular uptake and lysosomal degradation, thus failing to reach their intracellular targets. Their cellular uptake can be increased through photochemical internalization. Photochemical internalization uses photosensitive agents that localize in the membranes of endosomes and induce drug release upon exposure to light.

This diploma thesis is focused on the evaluation of the effect of saporin in the combination with non-symmetrical photosensitizers on HeLa cell line using photochemical internalization. Effect of various concentrations of these compounds on the viability of tumour cells was evaluated. Two approaches to deliver the energy from light were compared as well: before and after the administration of saporin (i.e., “light-before” and “light-after” approach).

From obtained data, it is evident that saporin (administered alone) does not significantly reduce the viability of HeLa cells, even though it was applied in a relatively high concentration.

Our main goal was to create an effective combination of PSs and saporin. However, based on the results, it is evident that the concentrations are not always low. On the other hand, when comparing the effectiveness of individual compounds and their combinations with saporin, there are often clear differences in EC_{50} (mean effective concentration). Nevertheless, this needs to be proven by drug combination studies in the future.

Results of the experiments have shown that higher efficiency, which reduced the viability of HeLa cells by half, was gained using ”light-after” protocol compared to ”light-before”.

Key words: photochemical internalization, photosensitizer, saporin, endosome