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Expression of hydrophobins for protective coating of polymeric nanoparticles for drug delivery

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The use of nanotechnology in medicine and more specifically in drug delivery extends rapidly. Nanoparticles, that are becoming important instruments in the area of medical treatment, have the potential to enhance the therapeutic efficacy of medicine. However, particle properties have to be carefully engineered in order to regulate drug release and prolong the residence time in the body. Currently, chemical stabilizers (e.g. poloxamers) with limited biocompatibility are used to facilitate preparation and ensure formulation stability. Alternative strategies for surface-modification are urgently searched after. A synergistic approach with multiple benefits would be to coat the nanocarriers with self-adhesive proteins. Hydrophobins are unique fungal amphiphilic proteins with a broad range of biocompatibility with different materials. They are also considered to be suitable for surface modification and biomolecule immobilization purposes also because they are immunologically inert [1]. Thus, therapeutic agents such as enzymes can be encapsulat-

ed by the nanocarriers coated with hydrophobins, thereby protecting these agents against enzymatic degradation and rejection by the immune system.

Purpose of this work was to compare the ability of *Aspergillus nidulans* DewA (class I) [2], *Trichoderma reesei* HFB4 (class II) and HFB9b (non-class II, intergroup between class I and II) hydrophobins labelled C- and N-terminally with the green fluorescent protein (GFP) to cover poly (lactic-co-glycolic acid) nanoparticles. For this, a production system in *Escherichia coli* was set up for the recombinant expression of the respective fusion proteins. DewA-GFP was selected for the optimization of the expression using parameters such as incubation temperature, cell density, inducer concentration and time of induction to increase the yield and avoid degradation of the target proteins.

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