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## **Activation and microencapsulation of human plasma proteins**

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The research group has developed the method to activate human plasma proteins (albumin) and to micro/nanoencapsulate such proteins. The method of the present study is based on the patent of the Finnish scientist PhD Jouko Savolainen (FI118506B).

The patent describes the creation of active SH groups in the activated proteins after treatment with Na metabisulphite. The sulphate used in the reaction can be precipitated by decreasing pH and by rinse. These procedures can be repeated, and the final preparation can be purified by means of ultrafiltering. The activated protein and the active SH groups facilitate new disulfide bridges (-S-S-) formation in the microcapsule.. Rapeseed oil together with human plasma proteins were successfully used in the present study as a model for encapsulation. The micro/nanocapsules prepared were freeze dried (lyophilized)

Freeze-drying procedure enables decentralized production of pharmaceutical preparations. The present activation and microencapsulation methods can be used for changing liquid to a solid dosage form, and consequently to formulate next-generation medicines and vaccines. The micro/nanocapsules could serve as protective multiple-unit reservoirs for the drug substances or vaccines which enhances the physicochemical/thermal stability and transportation of the final products. This is a well-known bottleneck today for the development of new biological pharmaceuticals and vaccines. Moreover, no harmful additives are needed in the present micro/nanoformulations. The administration of the activated micro/nanocapsules could be (but not limited to) by means of e.g., *via* parenteral (injection), oral or pulmonary route.

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