

# Biopolymeric Hydrogels as Transdermal Delivery Systems

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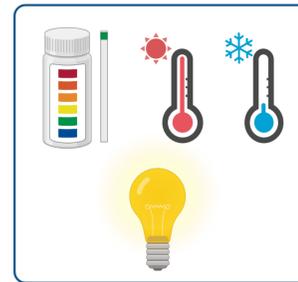
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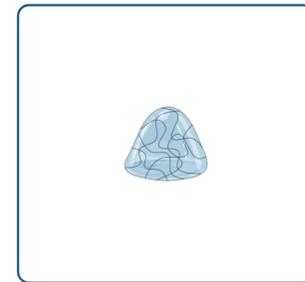
## INTRODUCTION

Biopolymer hydrogels have gained considerable recognition in recent years as versatile transdermal delivery systems. These hydrophilic three-dimensional networks, composed of natural polymers such as chitosan, alginate and hyaluronic acid, offer an innovative approach to enhance transdermal absorption of therapeutic agents. The aim of the project was to investigate the role of biopolymer hydrogels in transdermal drug delivery, discussing their formulation strategies, properties and various applications. One of the main advantages of biopolymer hydrogels is their ability to maintain a moist environment on the skin surface, which promotes effective drug penetration while minimising skin irritation. Their variable physicochemical properties allow for controlled drug release, providing prolonged therapeutic effects and reduced dosing frequency. Furthermore, these hydrogels can be tailored to encapsulate a wide range of drugs, including hydrophobic and hydrophilic compounds, proteins and peptides. Furthermore, the study focuses on the challenges of biopolymer hydrogel-based transdermal delivery, such as optimising drug release kinetics and ensuring long-term stability. However, their potential to revolutionise transdermal drug delivery, particularly for chronic diseases, makes biopolymer hydrogels an attractive area of research in pharmaceutical and biomedical sciences.

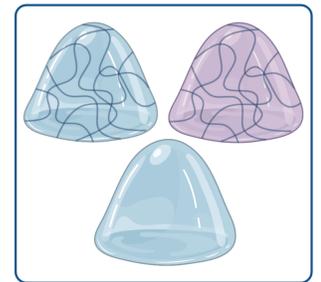
## RESULTS



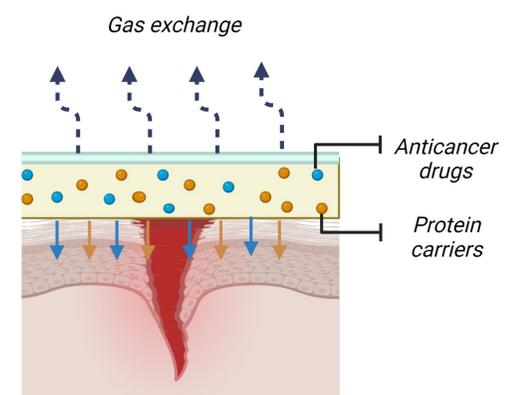
Variable parameters



Smart hydrogel



Change of properties



## MATERIALS AND METHODS

The hydrogel materials were obtained by photopolymerization in a UV radiation field. The chosen method makes it possible to obtain a dressing material of any shape and size individually tailored to the needs of a particular patient. The hydrogel materials include a polymer base based on PVP and protein carriers. The obtained materials will be subjected to detailed physicochemical analysis, including sorption capacity analysis, incubation studies in simulated body fluids, and spectroscopic analysis to determine the chemical structure of the obtained material.



## SUMMARY

With customizable drug doses and release rates, cytostatically modified hydrogels allow for a more personalized approach to cancer treatment, tailored to the individual patient's needs. The innovation involves a special hydrogel dressing whose form and shape allow it to be precisely placed in the area affected by cancer. What's more, the possibility of modifying the polymer matrix by adding different therapeutic substances makes it possible to extend the range of applications to other skin conditions, such as e.g., atopic dermatitis, burns or sores.

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