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Nanopartikler som fester seg til slimhinner i munnhulen, kan bidra til at et legemiddel kan oppholde seg over en lengre tid på stedet, og på denne måten gi en mer effektiv behandling. I dette prosjektet har ulike stoffer blitt brukt til å dekke partiklenes overflate for å undersøke hvor klebrige de ville bli. Partiklene som ble laget hadde forskjellig grad av klebrighet og også ulik sikkerhetsprofil for bruk i munnhulen.

Liposomes, lipid-based nanoparticles, have proven useful as carriers of a wide range of drugs to different parts of the body. In this work, these particles were explored as delivery systems to the oral cavity. Herein, liposomes were coated with a range of different substances, called polymers, with the purpose of making them adhesive to mucosal lining of the oral cavity. The use of an adhesive nanoparticulate drug delivery system could provide several advantages. The drug can be applied directly to the diseased area, instead of being spread throughout the body. The stickiness of the carrier may cause a prolonged residence time of the drug in the oral cavity, making the treatment more efficient. Meanwhile, the small size of the particles will provide low patient discomfort.

In order to explore the particles' ability to adhere to the oral cavity, a new method was developed. This method studies the particles' interaction with a protein found in mucus. All the polymer coated liposomes displayed some interaction with this protein, although to a various extent. It was also found that, with the exception of one polymer, the different polymer coated liposomes seem to constitute safe alternatives for application to the oral cavity.

The liposomes coated with chitosan, a polymer derived from the shell of shrimps, showed the most promising interaction with the mucus protein. However, in a different experiment, these particles caused the death of oral cells. Additionally, it was observed that chitosan could help other molecules to cross the cell layer. This property could be beneficial to aid drugs into the bloodstream directly from the oral cavity. However, the ability to cause cell death indicates that these particles should be used with care if applied to the oral mucosa.

In this project, attention was also given to the properties of the liposomes coated with a polymer called p(NIPAAM-co-MAA). It was observed that the polymer layer contracted as a response to heat, which could be an interesting property to further explore for pharmaceutical use.