

## FWO Research Consortium

*Nanomaterials for drug delivery and in vivo imaging*

LECTURE INVITATION

# DEVELOPMENT OF A LIPOSOMAL pDNA VACCINE AGAINST SARS-COV2 WHEN MANUFACTURING MATTERS.

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The lecture will take place on Monday November 13<sup>th</sup> 2023 at 10 am in room 1.4 Friedrich Sertürner, Campus Heymans Faculty of Pharmaceutical Sciences, Ottergemsesteenweg 460, 9000 Ghent, Belgium.

*Registration not required.*

**Contact**

Dr. Ine Lentacker

## Development of a liposomal pDNA vaccine against SARS-COV2: When manufacturing matters.

A plasmid DNA (pDNA) encoding SARS-COV-2 full-length Spike (S) protein, pDNA-S was developed at Chula Vaccine Research Center, Chulalongkorn University, Bangkok, Thailand. An effective DOTAP based liposomal delivery system was prepared by thin film method, which showed immunogenicity *in vivo*. The thin film protocol was translated to a microfluidics device (NanoAssemblr Ignite, Precision Nanosystems). DOTAP4 liposomes were prepared by microfluidics, dynamic light scattering, zeta-potential measurement, transmission electron microscopy (TEM) and gel permeation assay were used for characterization of blank liposomes and pDNA-S lipoplexes. DOTAP4 blank liposomes prepared by thin film rehydration and microfluidics were comparable in terms of size and zeta-potential. Gel permeation assay as well as zeta-potential results of various N/P ratios are equivalent for the two methods. However, differences were observed in mice immunogenicity after intramuscular injection. To understand the cause, SAXS and WAXS analysis were performed on blank liposomes. A difference in hydration of the membrane of the two samples was observed, thus a difference in complexation of the cationic liposome with the nucleic acid. Thin film hydration manufactured liposomes had a bigger space between lipid headgroups allowing a better complexation with the DNA, resulting in better immunogenicity. With this study, we underline the importance of structural analysis during the development of a formulation and in case of tech transfer.