PREPARATION AND CHARACTERIZATION OF CHITOSAN-DECORATED LIPOSOMES FOR DRUG DELIVERY

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ABSTRACT

Cancer is one of the leading causes of death worldwide and remains as a major threat to human health. Liposomes having colloidal structures formed by self-assembly of phospholipids were found nearly 50 years ago and have been used as carriers of anti-tumor drugs for the treatment of cancer in chemotherapy due to its excellent biocompatibility. However, the liposome stability and specificity of targeting need to be improved to achieve higher performance with minimum side effects. Chitosan is a biodegradable and biocompatible cationic polysaccharide which can bind to and stabilize the liposomes. The abundant amino and hydroxyl groups of the glucosamine unit of chitosan make it possible to modify the polymer with tumor-targeting ligands such as antibodies, hormones, carbohydrates, peptides, folate, transferrin, etc. The primary chitosan that is used will be characterized by means of Asymmetrical Flow Field Flow fractionation (AF4) and Size Exclusion Chromatography (SEC). Modified chitosan will be prepared and used to decorate liposomes encapsulating drugs. The characterization of these modified structures will not be possible to characterize with column based techniques. Packed columns will destroy these structures and thus characterization will be performed by AF4. The structure and dynamics of chitosan-decorated liposomes will be studied in details to elucidate the mechanisms for the liposome stabilization.

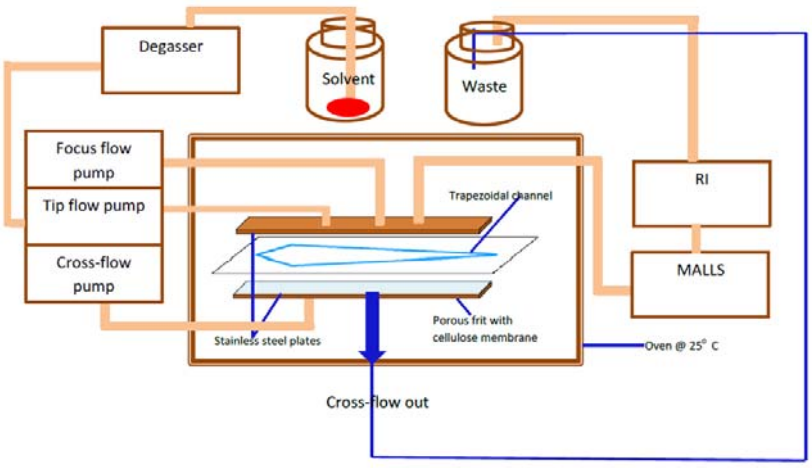

Fig. 1: Schematic presentation of the AF4 instrumentation setup