Abstract (General public)

The concept of targetability, where a molecule is used to target only specific cells, has been around since Paul Ehrlich used the term “magic bullet” some 120 years ago. Yet, to-date there are very few examples of targetability besides immunotherapy – where antibodies are used. One of the main problems is that targeting and delivering, for example drugs to certain cell types, are two different phenomena that are often unmixable. Nanotechnology is able to overcome some of such obstacles by having targeting molecules (ligands to receptors) on their outer layer, while carrying cargoes within for delivery, including molecules with low solubility. Yet, despite that nanoparticles have been around for many years, they have not been able to fulfil their promising potential. Part of the problem is that there are multiple steps and phenomena between synthesis of nanocarriers and delivery of functional molecules, and such have not been addressed step by step. Our work is to study these overlooked steps so we can improve on the design of nanoparticles for therapeutic use.