

# Bachelor's/ Master's/ Semester Thesis

## Capture of nucleotide-based therapeutics

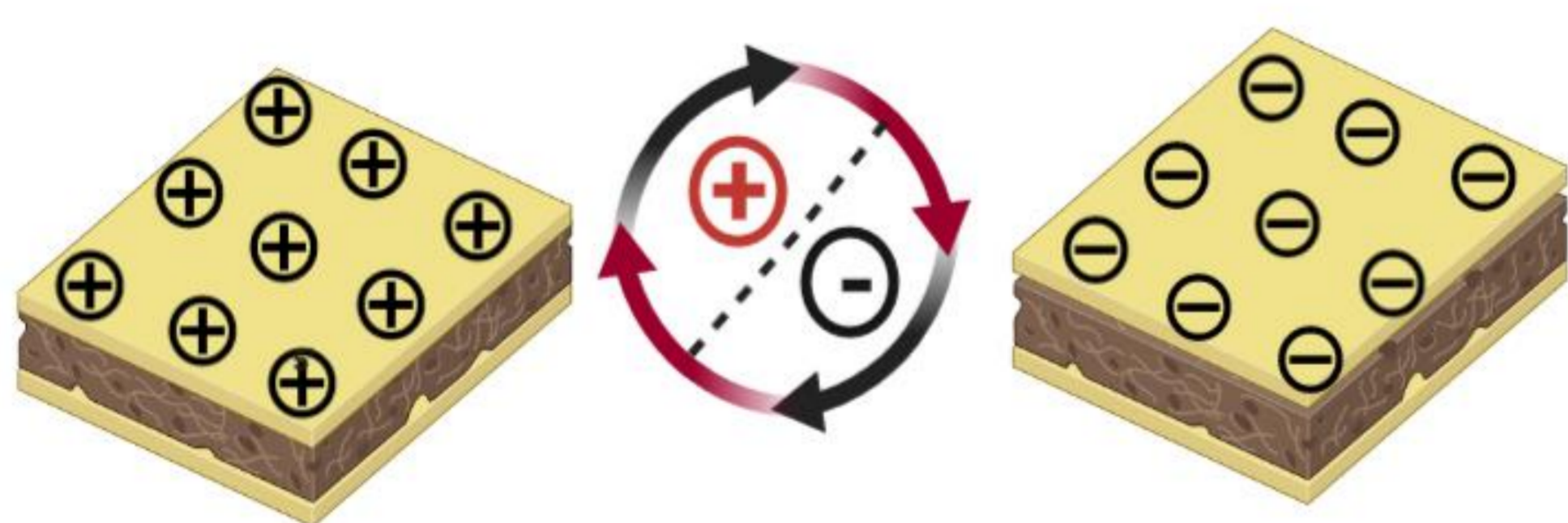
Keywords: Membranes, Adsorption/desorption, Nucleotide therapeutics, Membrane Chromatography

### Project Description

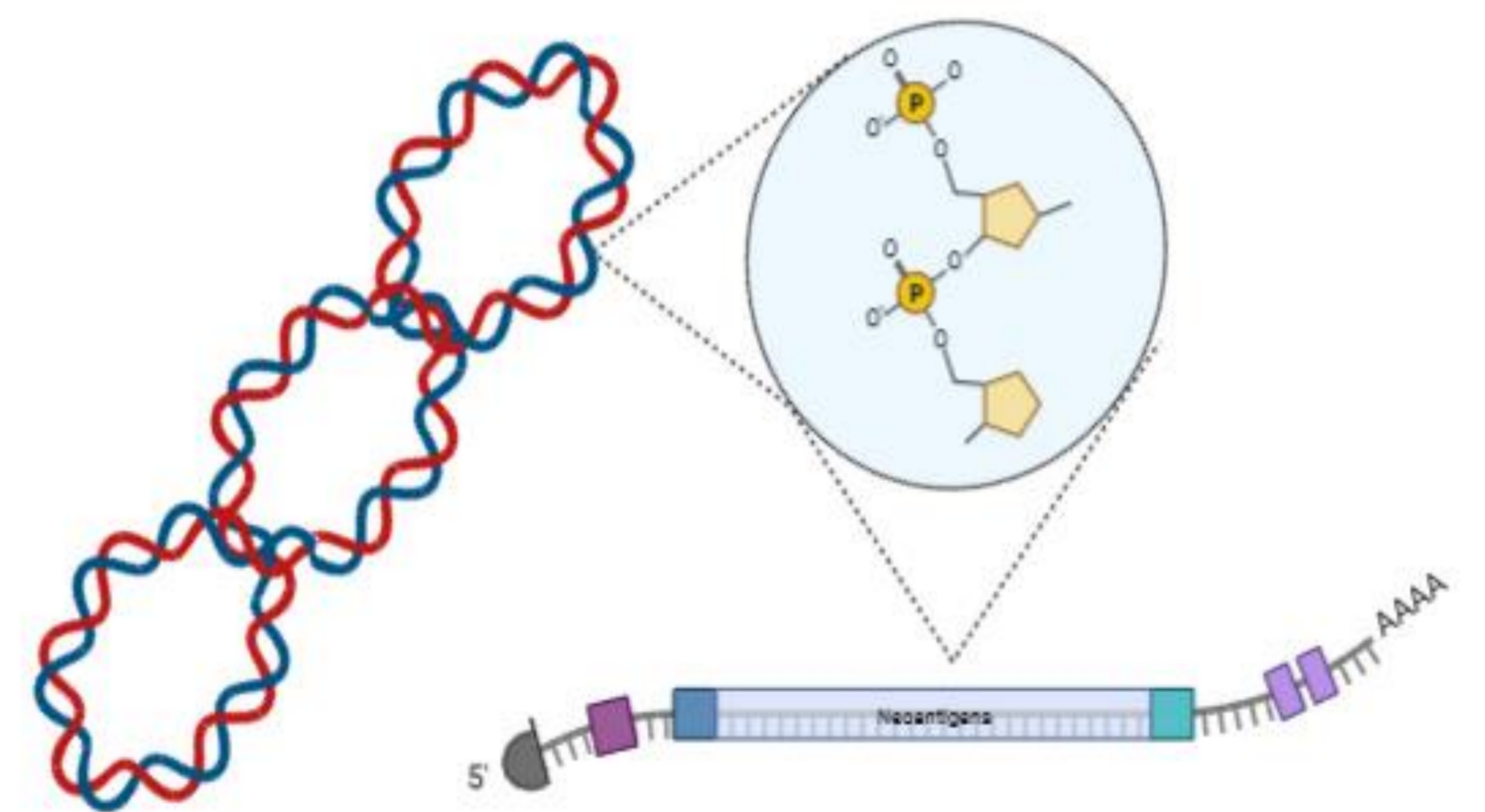
Nucleotide-based therapeutics such as pDNA and mRNA vaccines are of growing importance for the modern biopharmaceutical industry. However, conventional purification methods are only suited to a limited extent for the production of nucleotide therapeutics. Reasons for that are the molecular size, low fermentational yield, and the presence of the product in multiple isoforms.

Using novel smart materials, such as metallized membranes, the efficiency and yield of separation processes can be drastically increased. By modulation of their surface charge and consequently their binding behavior, these novel membranes allow for more efficient and sustainable separation processes. In this thesis, the interfacial interactions between metallized membranes and polynucleotides will be investigated. Factors influencing the binding behavior will be systematically studied and the gained knowledge transferred onto a chromatographic setup.

#### Conductive membranes



#### Charged/Polarized nucleotides



#### Tasks

1. Bioreactor fermentation and upstream development for nucleotide production
2. Purification of polynucleotides
3. Characterizing the membrane surface prior and after adsorption
4. Quantifying the amount of poly-nucleotides adsorbed to the surface under different conditions and in biological mixtures

#### Profile

- Structured and independent work
  - Creativity and craftyness
  - Bioprocess-, Chemical-, mechanical-, medical-, engineering, or similar
- Ideal, but not required:*
- Lab experience

**Start: flexible**