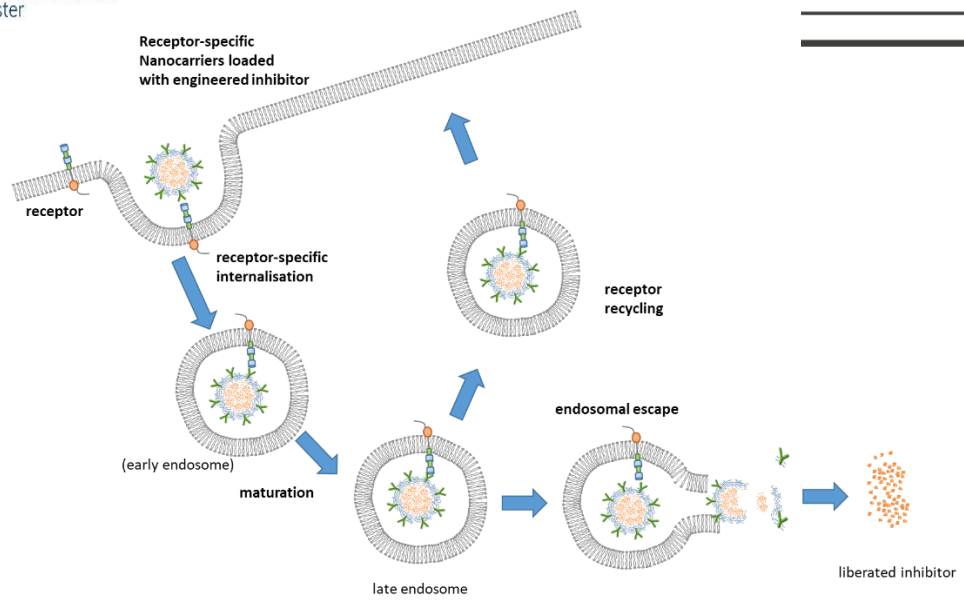
Master-Thesis Biology (Ms. Sc.) at the Dept of Medicine A, UKM

-Nanocarriers for siRNA and drug transport



The use of drugs like **small inhibitory molecules** has revolutionized cancer therapy, since they provide the opportunity to target a cancer-specific factor. However, the effect of these molecules usually relies on **their unspecific uptake into cells**, thereby also entering cancer cells in order to fulfill their task.

In the past years, our group in Münster developed a method to stably transport and introduce **oncogene-specific inhibitors** (Faust et al.) **and siRNAs** (Bäumer et al.) **to tumor cells**, directed by their specific delivery via cell surface-receptors, which is novel. Here, we conjugated the anti-EGFR, anti-CD33 anti-IGF1R and anti CD20 monoclonal antibody, respectively, (mAb) to the cationic peptide protamine by means of bispecific crosslinkers. Protamine binds specifically engineered inihibitors or siRNAs. The resulting IgG-protamine conjugate molecule spontaneously forms into a **nanocarrier structure** decorated with the antibodies, was able to internalize the respective receptors and **release the cargo load** for the tumor cell intervention (Figure) specifically in those cells.

Here, we plan to broaden the novel therapy approach to treat different tumor entities. Techniques you are going to work with include:

- Tumor cell culture
- Molecular biology
- Therapeutic antibody production and purification
- Protein biochemistry
- Functional cell assays
- Flow cytometry
- Nanocarrier technology
- Advanced microscopy
- *In vivo* mousework

Previous experiences with the techniques above are appreciated, but not mandatory.

Publications:

Faust et al. Tumor-Cell-Specific Targeting of Ibrutinib: Introducing Electrostatic Antibody-Inhibitor Conjugates (AiCs). Angew Chem Int Ed Engl. 2022 Jan 3;61(1):e202109769 Epub 2021 Nov 25. PMID: 34725904. *Imp. F. 15,6*

Bäumer N et al, Electrostatic anti-CD33-antibody-protamine nanocarriers as platform for a targeted treatment of acute myeloid leukemia. J Hematol Oncol. 2022 Dec 1;15(1):171. doi: 10.1186/s13045-022-01390-5. PMID: 36457063; PMCID: PMC9716776. *Imp. F. 23,16*

Bäumer N, et al. Targeted siRNA nanocarrier: a platform technology for cancer treatment. Oncogene. 2022 Feb 26. doi: 10.1038/s41388-022-02241-w. PMID: 35220407. *Imp. Fact 9,89*

If you are interested, please send your application (DE/Eng) including a short CV to baumers@uni-muenster.de

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