# The hemoglobin-haptoglobin receptor function and development of novel drugs targeting molecules to the macrophage


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## The group's research interests

The group's overall field of research is the receptor CD163, expressed specifically on the surface of macrophages. The physiological role of CD163 is to clear the complex of hemoglobin and haptoglobin from circulation. One focus is on characterizing the ligand binding of CD163, including identification of novel ligands. Another focus is on the development of techniques for specifically targeting small molecule drugs to macrophages, using monoclonal antibodies to make novel antibody-drug conjugates or targeted liposomes, both binding CD163. The macrophage plays a pivotal role in inflammation as the main producer of a range of pro-inflammatory cytokines, such as TNF and IL-1. By targeting glucocorticoids to the macrophages we can specifically inhibit the production of these pro-inflammatory cytokines, and we have shown that the efficacy of glucocorticoids is increased by a factor 50 through this specific targeting. The drug has been tested in inflammatory models in pigs, mice and rats. We are currently establishing other inflammatory models in order to characterize the role of the macrophage in other diseases and validate the specific targeting approach. In addition, a special subtype of the macrophage, the tumor associated macrophage, promotes the growth of tumors, and we are also working on targeting these cells. The work in the laboratory ranges from early receptor identification, recombinant expression and purification of proteins, over characterization of receptor binding, to in vitro and in vivo testing of drug candidates. The research is part of a larger group lead by professor Søren Moestrup.

### Contact present Former students

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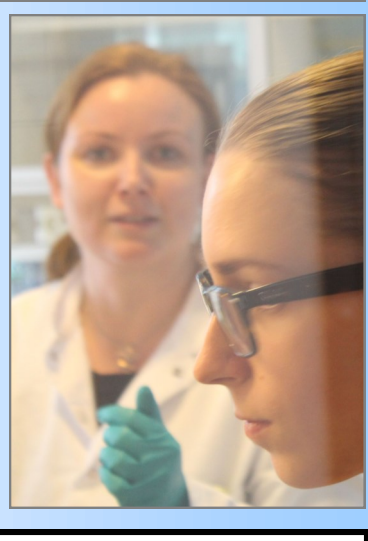

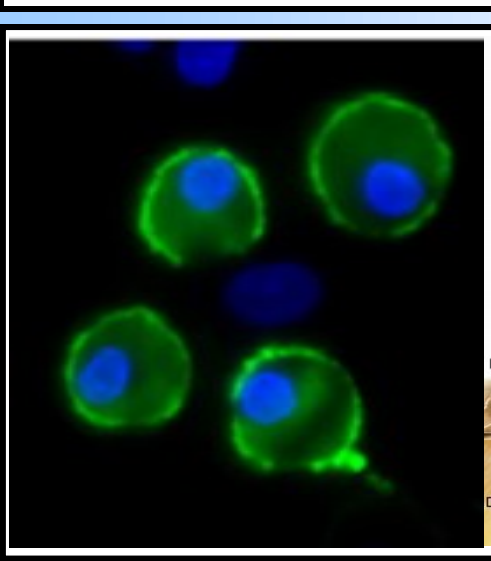

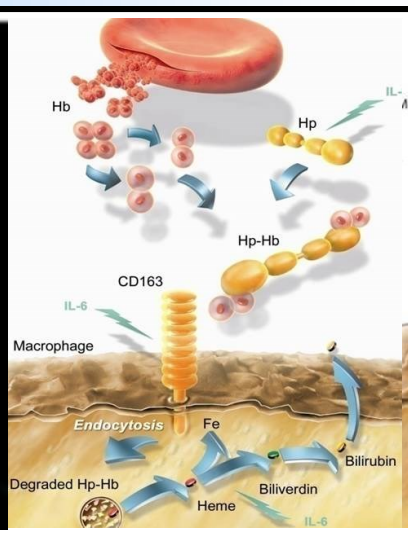


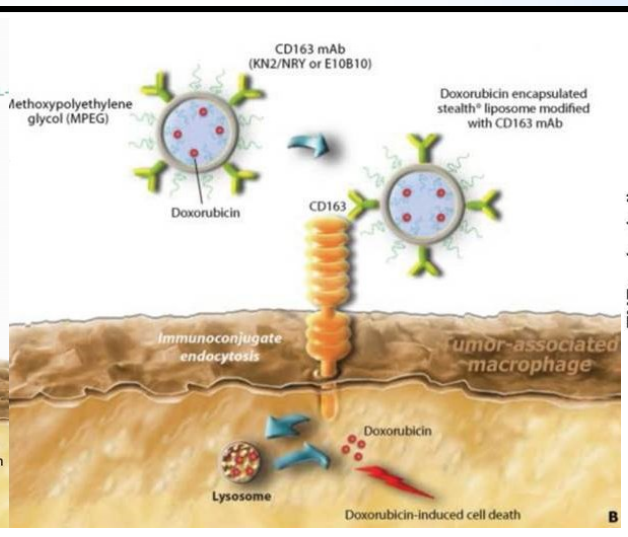


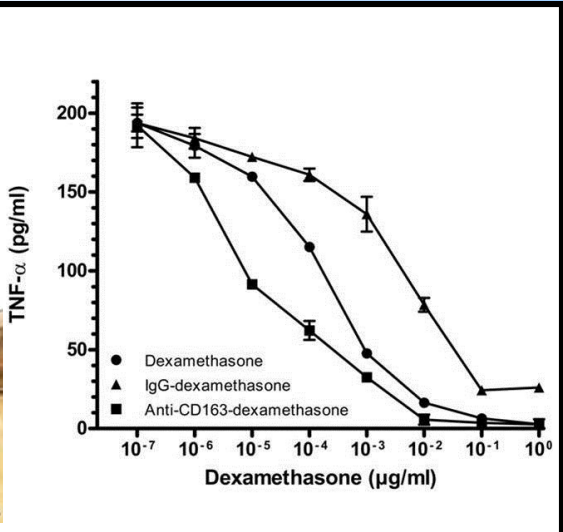


## Project examples

**1. Identification and characterization of receptor ligand interaction. The project will either be centered on a detailed characterization of the interaction between CD163 and known ligands or on the identification of novel ligands for CD163 and its related molecules. Further, novel projects centered on identification of other receptor-ligands pairs can and will be established. Finally, other receptors that can potentially be targets for antibody drug conjugates can be characterized and validated in vitro.**

**2. Development and characterization of novel antibody drug candidates and liposomes. Novel approaches for design of conjugates and liposomes will be tested, and the product tested in vitro and in vivo. Further development of novel approaches for making more efficient monoclonal antibodies for use in antibody drug conjugates can be investigated**

**3. Testing of the effect specific targeting of glucocorticoids to macrophages in inflammatory animal models. Testing the effect of antibody drug conjugates or liposomes targeting glucocorticoids to macrophages in rodent models of rheumatoid arthritis, multiple sclerosis, asthma etc. The project will pivot around establishment of disease models and testing of drug candidates in the models, further different drug designs can be evaluated.**