**Completely replacing all invasive elements in polyclonal antibody production – possibilities and challenges using chickens**

Polyclonal antibodies are central to many applications in modern-day medicine and medical research, making them of great societal importance. Their production typically involves multiple blood draws from rodents, rabbits or larger mammals, following repeated injections with an immunogen – the protein, relevant for e.g. diagnosing disease, which the antibodies are to be directed against.

In a project supported by the Danish 3R-Center we will attempt to demonstrate that polyclonal antibodies can be produced entirely without these animal welfare-compromising invasive procedures.

If chickens are used for antibody production, rather than mammals, no blood samplings are needed: A hen deposits large amounts of antibodies into its eggs; antibodies meant to protect a developing chicken if the egg is fertilized. All the hens in the poultry industry are, moreover, routinely vaccinated against a number of diseases. Crucially, vaccines against respiratory diseases, such as infectious bronchitis virus, are often supplied as an aerosol that the hens and chickens inhale. The vaccine, a weakened form of the virus, makes its way from the respiratory tract to the blood stream where the animal's immune system quickly produces antibodies which yield immunity. We intend to exploit this process by attaching the immunogen to the virus particles of the vaccine. By piggy-backing the immunogen into the blood stream of the hens we hope to vaccinate the hen while at the same time producing antibodies against the immunogen – antibodies that can subsequently be isolated from the hen's eggs – without having ever broken the hen's skin with a needle.

This talk will present the idea for this newly-initiated project, but also discuss the challenges it will pose: How can we, using simple and inexpensive means, direct a hen's immune system toward miniscule amounts of a protein, among many others, presented only for brief moment in an inhaled mist?