

## Innovative Approach to Producing Cell-Free Serotype 2 and 3 Marek's Disease Virus Vaccines

Supervisory team:

Main supervisor: Prof Shahriar Behboudi (University of Bristol) Second supervisor: Dr Ian Cadby (University of Bristol)

Host institution: University of Bristol

## **Project description:**

Every year, more than 22 billion vaccine doses are used to fight a deadly and infectious disease called Marek's disease in chickens. These vaccines come in different types, like CVI988-Rispens, SB1, and herpesvirus of turkey. Genes from other viruses can also be inserted into herpesvirus of turkey to generate efficacious poultry vaccines which protect chickens from other commercially important infectious diseases such as avian influenza virus which have public health implications. The problem is that these vaccines are like part of the cells, so they need to be kept around minus 200 degrees Celsius in liquid nitrogen. Storage and transportation of these vaccine is very expensive, and any temperature fluctuations can make these vaccines ineffective. Moreover, cooling and liquefying the nitrogen requires energy which harmful for environment. But if we could make a different kind of vaccine that doesn't need to be kept in such cold temperatures, it would be make the vaccine much cheaper for farmers especially for those in low- and middle-income countries.

Our group have been awarded funding from research council to work on a new way to make these vaccines. We used some special stem cells from chicken feathers to grow CVI988-Rispens vaccine in a cell-free form that doesn't need to be kept in liquid nitrogen. Now we want to try to do the same thing for two other types of vaccines (namely SB1, and herpesvirus of turkey).

In this project, the student will use these special stem cells to make those two vaccines in a cell-free form without needing to be kept in liquid nitrogen. The student will do some tests to see if these cells can help the vaccines grow without being part of the cells. The student will also make these cells live forever so we can keep using them to make vaccines. We will do these things:

- Grow these special stem cells and see if they can help the vaccines grow without being part of the cells, cell-free vaccine.
- Transform these cells and make them to become more cost effective to grow and make vaccines.
- Test the resulting vaccines to see if they work well when they are kept in ambient temperatures.

Our aim as the SWBio DTP is to support students from a range of backgrounds and circumstances. Where needed, we will work with you to take into consideration reasonable project adaptations (for example to support caring responsibilities, disabilities, other significant personal circumstances) as well as flexible working and part-time study requests, to enable greater access to a PhD. All our supervisors support us with this aim, so please feel comfortable in discussing further with the listed PhD project supervisor to see what is feasible.