

## **Lectin histochemistry of goblet cell sugar residues in the small intestine of the chick**

**Principal Supervisor:** Dr Rebecca Forder

Email: [bec.forder@adelaide.edu.au](mailto:bec.forder@adelaide.edu.au)

### **Aim**

To optimize lectin histochemical techniques to assess terminal and sub-terminal sugar profiles in small intestinal goblet cells during early post-hatch development of low bacterial load and conventionally reared chicks.

### **Background**

Mucins, synthesised and secreted by goblet cells, possess potential binding sites for both commensal and pathogenic organisms, and may perform a defensive role during establishment of the intestinal barrier in newly hatched chickens. Increasing interest has been directed toward bacterial interactions within the mucus layer, and the mechanisms by which bacterial colonisation can influence mucus composition during early development. This is important, firstly, as a means to understand their involvement in the pathogenesis of intestinal diseases and secondly, to utilise and optimise their protective properties for enhanced gut function. Currently, information on mucin-bacterial interactions in poultry is limited. In order to observe the effects of bacterial exposure on intestinal goblet cell mucin production during early development, differences in the small intestine of conventionally-reared and low bacterial load broiler chicks were examined during the first 7 days post-hatch.

Using histological staining techniques to distinguish between mucin types, it was found that total goblet cell numbers and morphology of goblet cells showed significant differences in acidic mucin composition at d 3-4 post-hatch, in conventionally reared chicks. Although it was observed that the overall acidic mucin profile was affected in response to colonizing bacteria, it is of interest to identify specific terminal and sub-terminal sugars of mucin glycoproteins, which are important in regards to potential attachment sites for pathogenic bacterial species.

### **Methods**

This proposed project will utilise intestinal tissues previously collected from chickens (0-7d) incubated, hatched and reared in a bacterial-free environment as a means to compare and observe bacterial interactions with the intestinal mucosa to those of chickens exposed to conventional rearing conditions.

Previously embedded jejunal and ileal samples will be serially sectioned and incubated with a series of selected enzyme-conjugated lectins. These will then be viewed using light microscopy and quantified using image analysis software.

### **Other information**

There may be a Poultry CRC scholarship attached to this project.