

# Can the fish parasite *Spironucleus salmonicida* hide from the immune system?

Ásgeir Ástvaldsson

*Giardia intestinalis* is a diplomonad that is a well-known parasite and a common cause of diarrhea around the world. Its impact on humans have made it a very popular research model and other closely related species have not been researched nearly as much. A close relative of *G. intestinalis* is *Spironucleus salmonicida*, a fish parasite that has been causing problems in fish farms in many countries, especially Norway, causing high economical losses for the farmers. It was only recently recognized as a separate species and low amount of scientific information is available for it. Newly performed analyses and publications on the *S. salmonicida* genome, including sequencing of the whole genome, has cleared the path to extensively study this parasite. The infection process and how it spreads from fish to fish is unknown, though there have been some speculations about it.

*G. intestinalis* possesses a mechanism called antigenic variation, where it basically can change its surface for protection against the immune system. If the parasite enters the body, the immune system recognizes the parasite from proteins on the surface of it, called variable surface proteins (VSPs). It has around 270 proteins of this sort, but only one protein is covering the parasite at each time. When the immune system recognizes the parasite in the body, *Giardia* can use the antigenic variation mechanism to change which of the VSP proteins are covering the body and that way hide from the immune system again.

What I wanted to investigate is whether *S. salmonicida* also have these proteins and if they could be a part of the infection process of the parasite. I made constructs of the proteins and a small part of the influenza virus hemagglutinin (HA). I put these constructs back into *S. salmonicida* cells using a plasmid, and used an antibody that binds to this small part of the influenza virus HA to check where these proteins ended up in the cell. I observed that only 4 of my 12 proteins ended up on or near the surface, and only one of these 4 showed similarities to the VSP genes of *G. intestinalis*. Most of the proteins ended up in the middle of the cell, in the endoplasmic reticulum. These proteins all have an unknown function and further research is needed to try to determine their role in the parasite.