

# Characterization of putative diagnostic *Giardia intestinalis* and *Spironucleus salmonicida*

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*Spironucleus salmonicida* and *Giardia intestinalis* are parasitic, protozoan pathogens, belonging to the order diplomonadida. *S. salmonicida* causes systemic spironucleosis in fishes and *G. intestinalis* causes giardiasis in humans. *G. intestinalis* is the main contributor of diarrheal diseases with approximately 250 million symptomatic human infections every year. Recently it has been included in the WHO's neglected disease initiative.

*Giardia* has a simple life cycle with infectious cysts, formed in the differentiation-process encystation and disease-causing trophozoites. Only the trophozoites stage has been identified so far in *Spironucleus*. The *Giardia* genome has several genes which are crucial for the encystation (cyst wall formation) process. When these encystation-associated genes are searched for in the *S. salmonicida* genome database then several similar genes were found. These also comprise all known cyst wall proteins in *Giardia*. This suggests that *Giardia* and *Spironucleus* may have the same life cycle pattern and that *Spironucleus* can form cysts. This comparative analysis of encystation genes will not only be valuable for investigating evolution of encystation in diplomonads, but will also be applied for the search of life cycle stages and new therapies for these parasites. The antibody against *S. salmonicida*'s cyst wall protein might also be very useful in diagnostics of infected fish.

Moreover, previous comparative genomics analysis among three *Giardia* isolates identified 74 isolate-specific genes. Out of which two genes were selected on the basis of bioinformatics analysis for characterization studies. These isolate-specific proteins were over-expressed and antibodies generated for localization. Characterization of these protein products showed distinctive results. Therefore, those isolate-specific antibodies could be used as an economical, newer and faster diagnostic tool for isolate-specific Giardial infection in humans and mammals.

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