ParaFishControl

# *Vaccine against Sphaerospora molnari*
# *Unique model = unique opportunities*

**ParaFishControl Workshop "North European Fish Parasite Management Strategies in Aquaculture Farms"**

**Berlin, 9th October 2019**

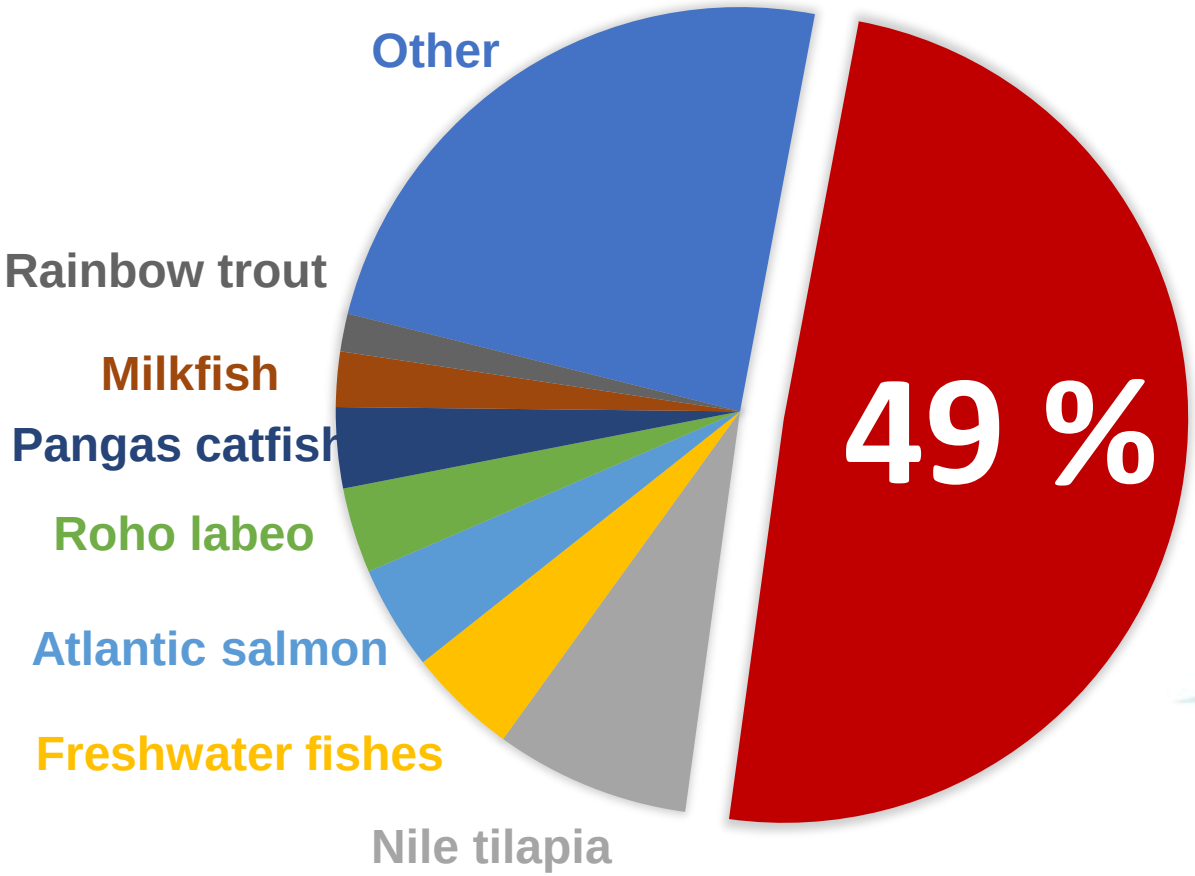
Tom Korytář, Biology Center CAS, Czech Republic



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634429. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

# Challenge and impact

ParaFishControl



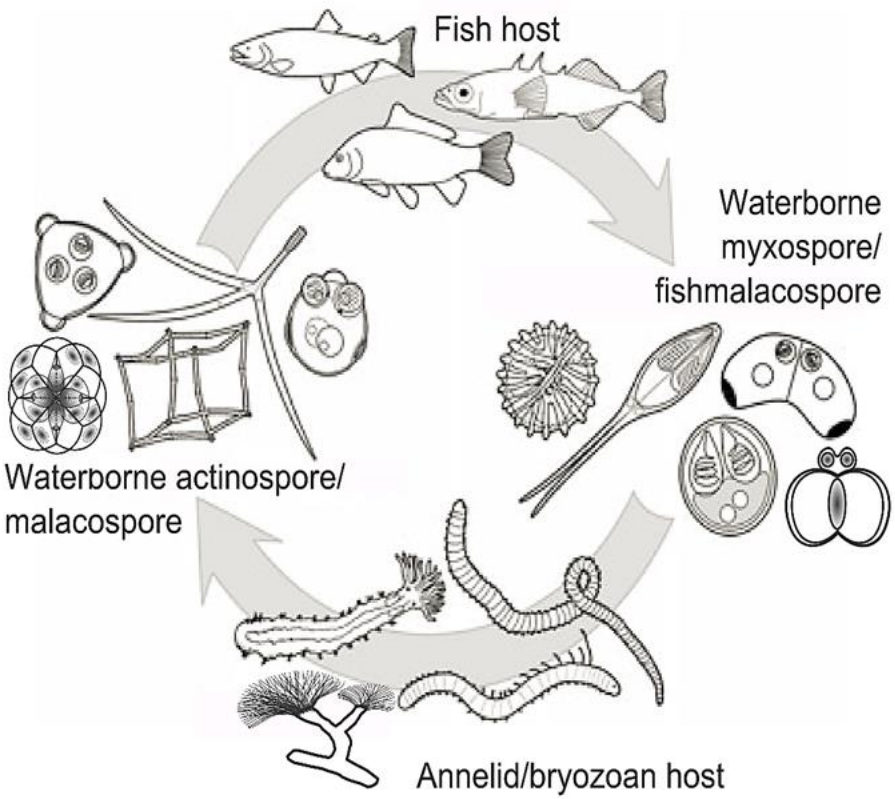

**Carps and cyprinids**

| | |
|---|---|
| 10 % | Catla carp |
| 12 % | Carassius |
| 14 % | Bighead carp |
| 16 % | Common carp |
| 20 % | Silver carp |
| 22 % | Grass carp |



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634429. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

# Myxozoa infections of carp




- Myxozoans = extremely reduced cnidarians
- Common carp being a host to more than 50 species
- Some asymptomatic, others (*Thelohanellus kitauei, Sphaerospora molnari, Myxobolus cerebralis)* can decimate whole ponds
- Prevention and therapy missing



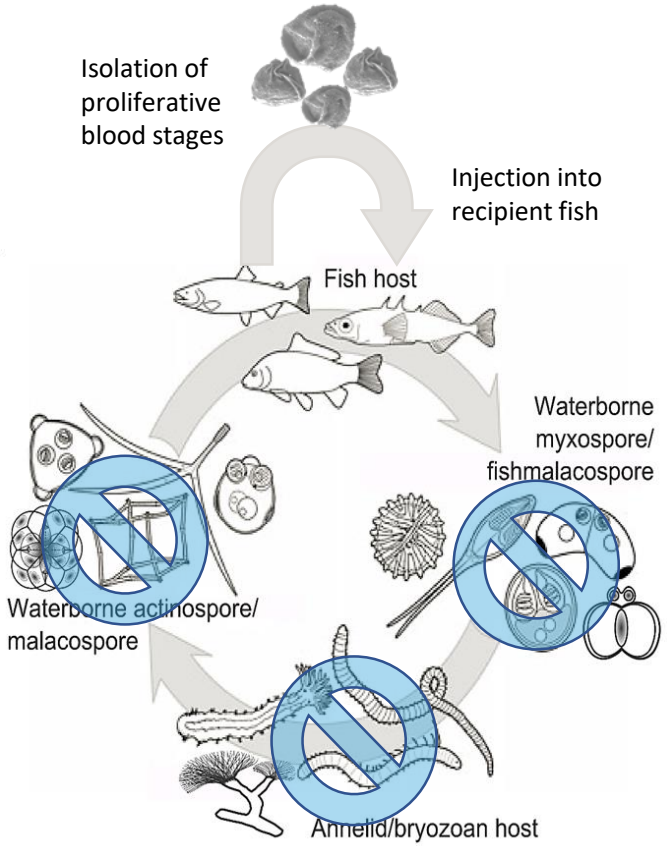
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634429. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

# Our model and our approach

ParaFishControl

- *Sphaerospora molnari*:
  destroys respiratory epithelia in the gills of carp

- *Blood stages enable continuous in vivo model of disease*

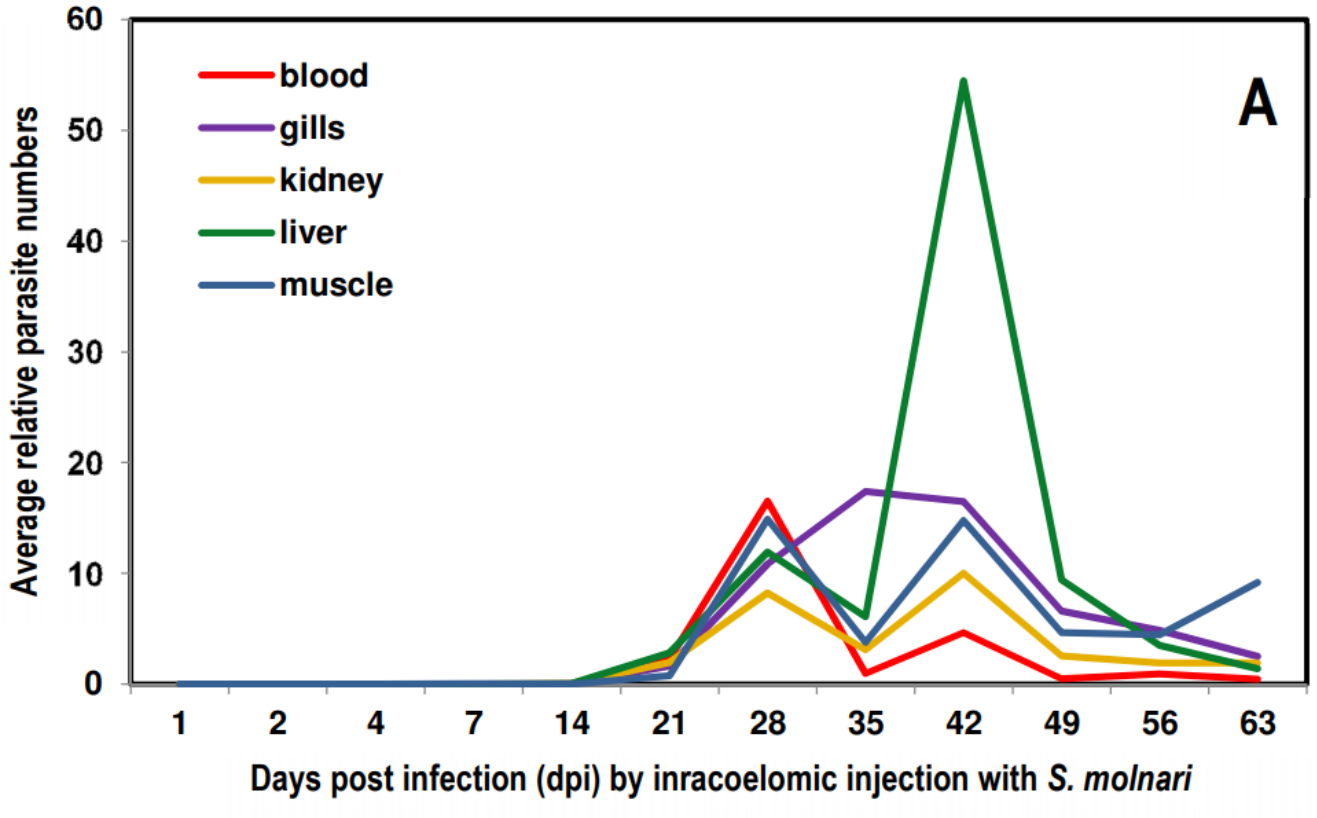





This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634429. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

# Understanding the life cycle

ParaFishControl

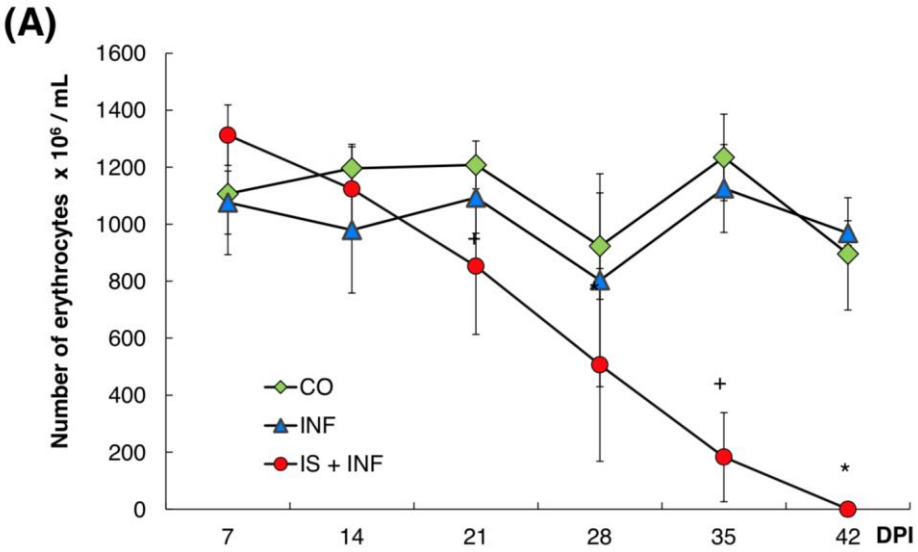


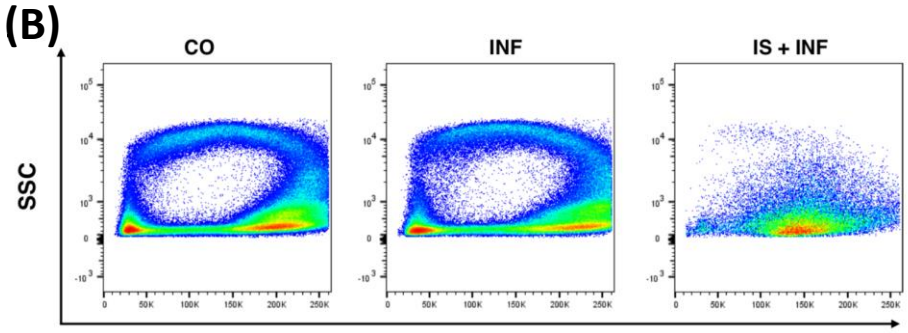


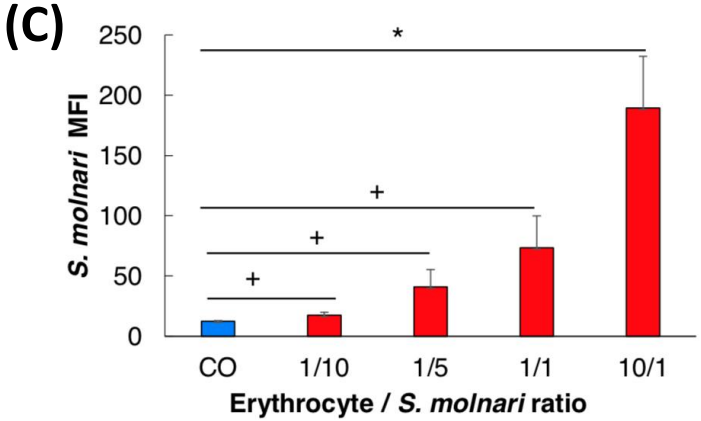

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634429. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

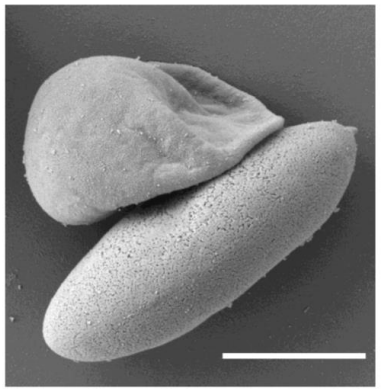
# Understanding the pathology

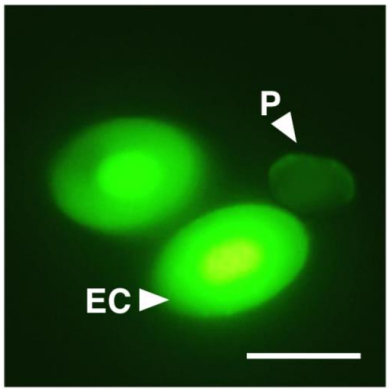
ParaFishControl



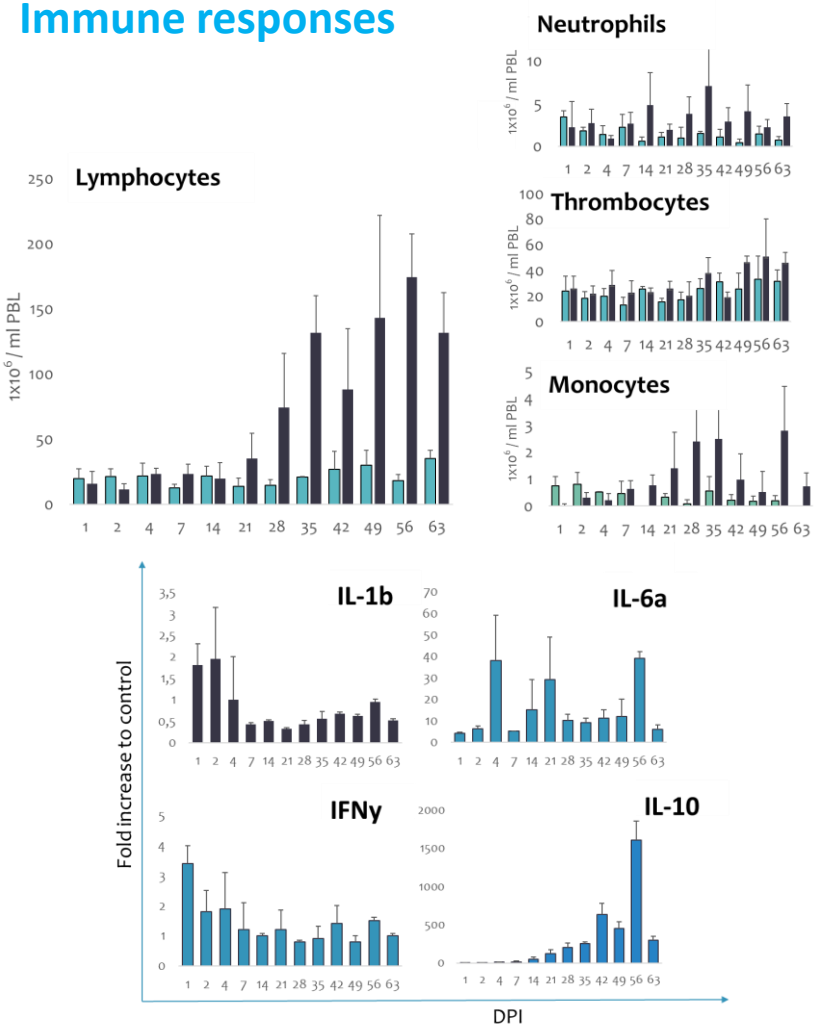



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634429. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

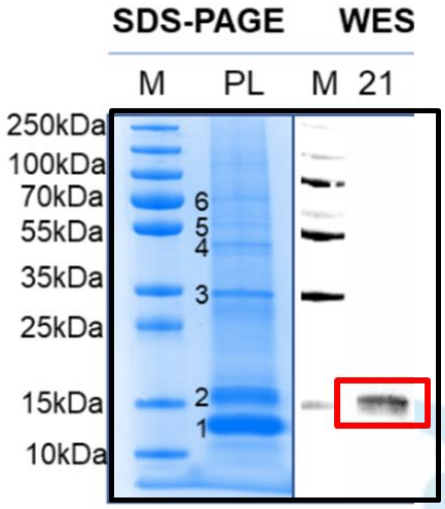
# Understanding host responses

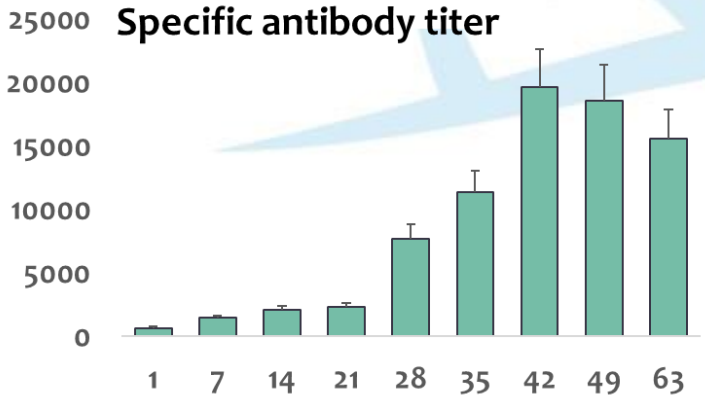
ParaFishControl

## Immune responses




## Antibody responses



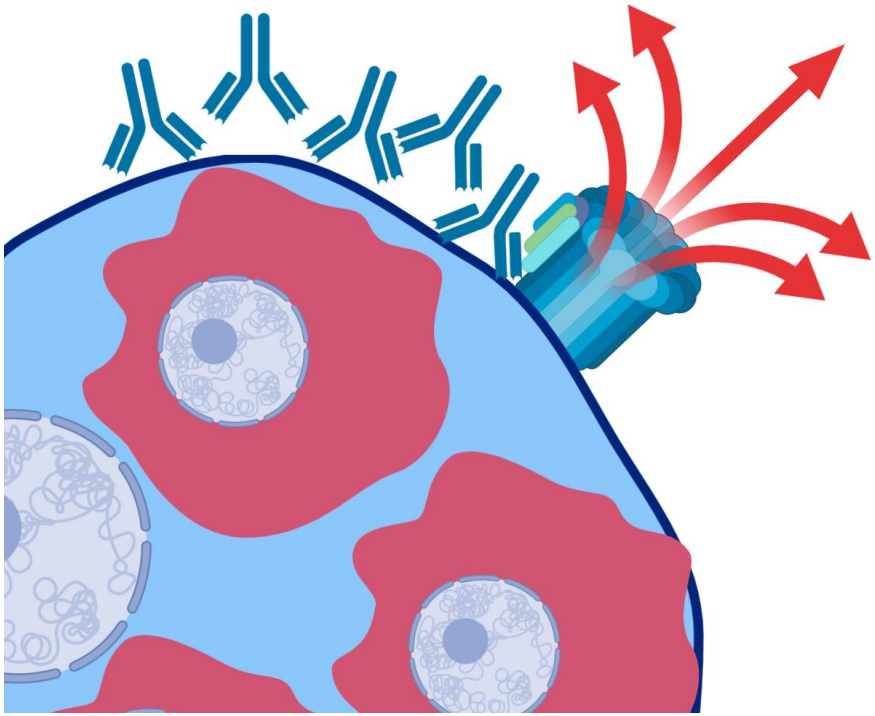



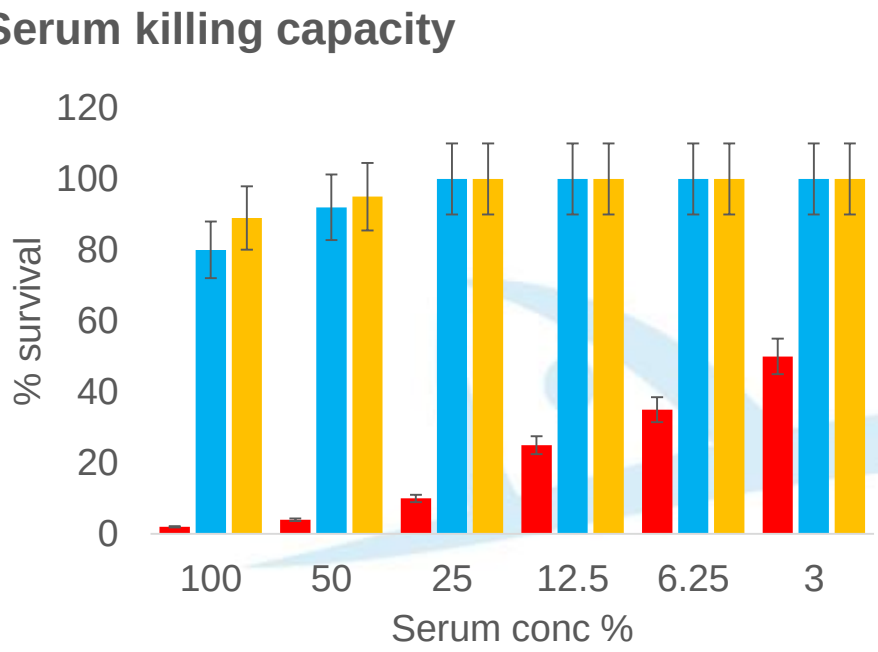



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634429. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

# Understanding protection

ParaFishControl








This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634429. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

# Conclusions

ParaFishControl

- We established continuous *in vivo* model for the study of myxozoan biology allowing :
  - In depth understanding of the disease pathology
  - Understanding of the role of innate and adaptive immunity
  - Identification of candidate antigens
  - Prevention of disease through vaccines and immunostimulants / additives.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634429. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.

# Thank You

# ParaFishControl

Tomas Korytar

tkorytar@paru.cas.cz



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634429. This output reflects the views only of the author(s), and the European Union cannot be held responsible for any use which may be made of the information contained therein.