

### POSTER 3

## **THE BIZARRE MASTER SEX DETERMINANT OF SALMONIDS TRIGGERS ITS ACTION BY DIRECTLY HIJACKING THE CONSERVED GONADAL DIFFERENTIATION PATHWAY.**

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### **Introduction**

Evolutionary novelties require rewiring of transcriptional networks and/or the evolution of new gene functions. Sex determination (SD), as one of the most plastic evolutionary processes, requires such novelties. But studies on the evolution of vertebrate SD revealed that new master SD genes are always recruited from genes involved in the downstream SD regulatory genetic network. Only one exception to this rule is currently known in vertebrates with the intriguing case of the salmonid master SD gene (*sdY*), which arose from the duplication of an immune-related gene. This leaves the open question on how such a gene from outside the classical sex-differentiation cascade can still function as a SD gene.

### **Methods**

Yeast two-hybrid screening was performed on a late differentiating rainbow trout testicular library using as bait the coding sequence for SdY. Cell transfections (co-localization and luciferase assays) with *sdY*, *sfl* and *foxl2* plasmid constructs were performed by incubating cells with Polyethylenimine in HEK 293T cells or by electroporation in RTG2 cells. Co-immunoprecipitations were carried out after transfection of flagged SdY and Foxl2 proteins in HEK293T cells. Expressions of *sdY*, *foxl2a*, *foxl2b* and *cyp19a1a* were measured by qPCR, and *in-situ* hybridization was performed using digoxigenin labeled PCR-amplified RNA probes.

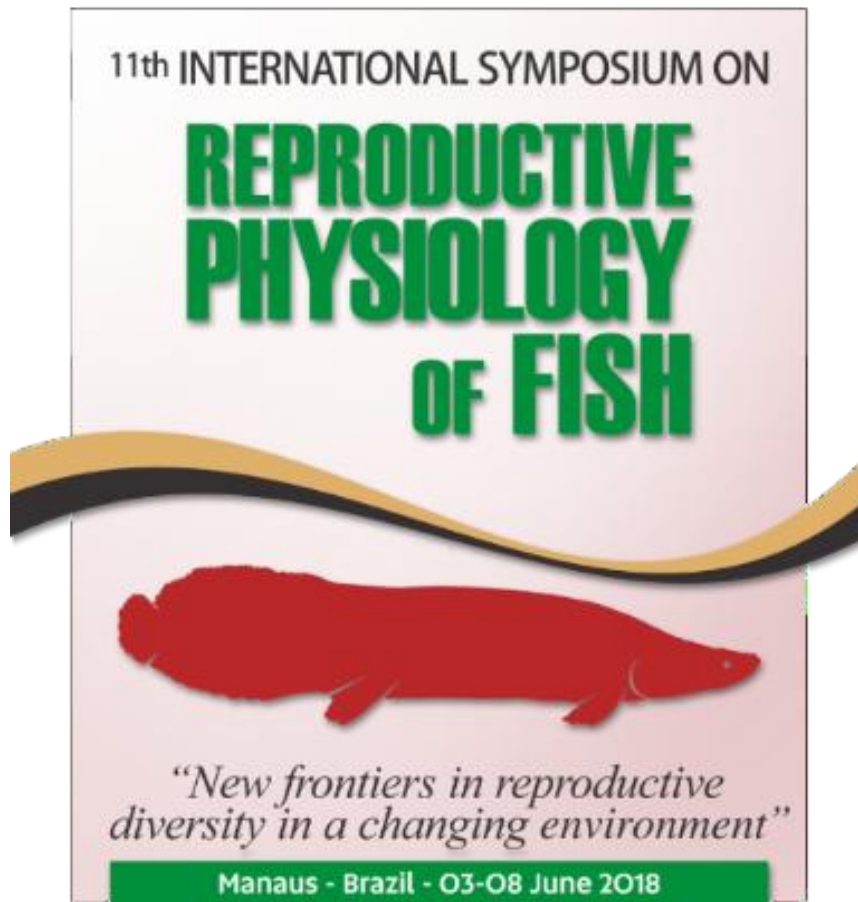
### **Results and Discussion**

Here we show that SdY directly bridges with the classical vertebrate sex-differentiation cascade by specifically interacting with the forkhead box domain of the female determining transcription factor, Foxl2. In cooperation with Sf1, the SdY:Foxl2 complex prevents the activation of the aromatase (*cyp19a1a*) promoter. By blocking a positive loop of regulation needed for the synthesis of estrogens in the early differentiating gonad, SdY impedes a preset female differentiation pathway, allowing testicular differentiation to proceed.

### **Conclusion**

These results suggest that innovation at the top of vertebrate sex-determination pathways is rather constrained in order to cope with the regulation of the classical sex-differentiation cascade.

# PROGRAM AND ABSTRACTS



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