

## POSTER 2

### **TRANSCRIPTIONAL REWIRING OF THE MEDAKA SEX DETERMINING DMRT1 GENE DUPLICATE AFTER CO-OPTION OF NESTED TRANSPOSABLE ELEMENTS**

Schartl, M.(1, 2, 3), Schories, S.(1), Wakamatsu, Y.(1), Nagao, Y.(4), Hashimoto, H.(4), Bertin, C.(7), Mourot, B.(7), Schmidt, C.(1), Wilhelm, D.(5), Centanin, L.(6), Guiguen, Y.(7) and Herpin, A.(1, 7 \*).

(1) University of Wuerzburg, Physiological Chemistry, Biocenter, 97074 Wuerzburg, Germany. (2) Comprehensive Cancer Center Mainfranken, University Hospital, 97080 Wuerzburg, Germany. (3) Texas Institute for Advanced Study and Department of Biology, Texas A&M University, College Station, Texas 77843, USA. (4) Bioscience and Biotechnology Center, Nagoya University, Furo-cho, Chikusa-ku, Nagoya, Aichi, Japan. (5) University of Melbourne, Department of Anatomy & Neuroscience, Parkville, Victoria 3010, Australia. (6) University of Heidelberg, Centre for Organismal Studies (COS), Heidelberg, Germany. (7) INRA, UR1037 Fish Physiology and Genomics, F-35000 Rennes, France. (\*) email: amaury.herpin@inra.fr

#### **Introduction**

Sex-determination relies on the proper control of a hierarchically structured network of genes. Our analysis shows that the medaka master male determiner *dmrt1bY* was subjected to a profound rearrangement of its regulatory landscape concomitantly to the acquisition of a dominant position within the sex-determining network.

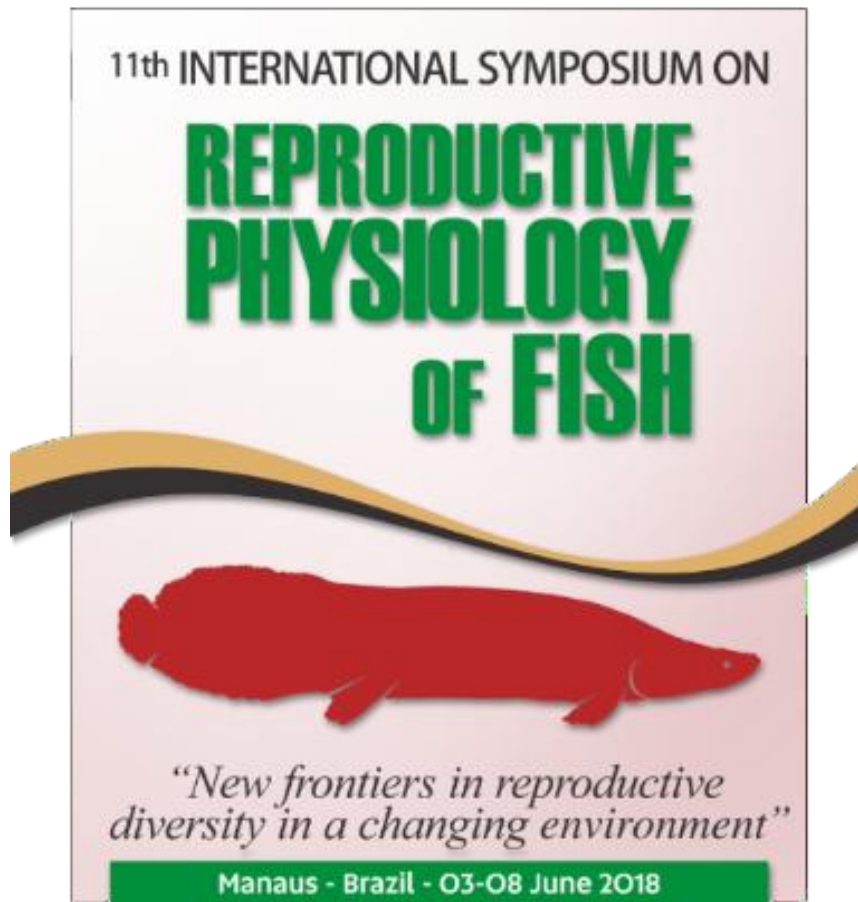
#### **Results and Discussion**

Requiring a complete rewiring of the regulatory network, this evolutionary innovation was brought about by the exaptation of a transposable element (TE) called *Izanagi*. This element acts as a silencer to turn off the *dmrt1bY* gene after it has fulfilled its function. Above this simple feedback regulation, we found that another TE, *Rex1*, has jumped into *Izanagi*. *Rex1* brought in a preformed regulatory element for the transcription factor Sox5. Sox5 has not been implicated in sexual development in any metazoan. We demonstrate its critically implication in gonadal development of medaka and possibly of mice. Sox5 medaka mutants have complete female-to-male sex-reversal.

#### **Conclusion**

Our work reveals a dual role for *sox5* during sex determination: first being an evolutionary conserved important regulator of germ cell number in medaka, and second, *de novo* regulating *dmrt1* transcriptional activity during primary sex determination after it has been recruited following transcriptional rewiring of *dmrt1* promoter due to exaptation of a transposable element.

# PROGRAM AND ABSTRACTS



**11 ISRF  
2018**