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## Characterization of the sex determining system(s) of the Mexican tetra, *Astyanax mexicanus*

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### **Characterization of the sex determining system(s) of the Mexican tetra, *Astyanax mexicanus*.**

In vertebrates, a remarkable diversity of sex determining mechanisms is observed, ranging from environmental to genetic sex determination (ESD and GSD). In teleosts, sex determination mechanisms include both environmental and genetic regulation and are extremely diverse, changeable, and labile. In addition, many sex-determining genes have been already found in this group of vertebrates showing that sex determination genes can be extremely variable even between closely related organisms. Hence, teleost fish have emerged as interesting models to study the macroevolution of sex determining mechanisms within vertebrates.

The cavefish *Astyanax mexicanus* belongs to the Characiform group. Different populations of *A. mexicanus* have been described, including pigmented river-dwelling and several depigmented blind cave populations. These populations are still inter-fertile and cave populations are known to have evolved from an ancestral surface population less than 100,000 years ago. In addition, these *Astyanax* populations can be also reared under laboratory conditions quite easily and are amenable to genetic manipulations. Altogether this makes surface and cave populations a particularly interesting evolutionary genetic model system for comparative and microevolution studies. We thus initiated studies on the evolution of sex determination and sex determining genes in *A. mexicanus* using restriction site-associated DNA sequencing (RAD-Seq) and Pool-sequencing (Pool-Seq) approaches to identify sex-biased molecular markers in both cavefish originating from the Pachón cave and surface fish populations.

Our first results led to the identification of a XX/XY sex determination system and a candidate master sex-determining gene in the Pachón cave population. But surprisingly this sex determination system is not completely conserved in the surface population as we found in this population a very strong but not complete sex linkage

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# Paradigm shift in sex chromosome evolution

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