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PLENARY SESSION

Dr. IBÓN CANCIO, UNIVERSITY OF BASQUE COUNTRY

MOLECULAR MARKERS OF FISH SEX DIFFERENTIATION FOR THE BIOMONITORING OF THE EFFECTS OF XENOESTROGENS IN COASTAL AREAS

Fish being so diverse have evolved multiple mechanisms to adapt to alterations in their environment. As vertebrates sharing many molecular/physiological mechanisms with mammals they constitute good models to study responses to pollution and as such they are widely used as sentinel organisms in pollution monitoring programs.

A group of chemical compounds, xenoestrogens, are of especial interest as they interact with the sex-differentiation process in fish, severely affecting their reproductive capacity and population resilience to pollution. In the Basque coast we are studying different populations of thicklip grey mullets (*Chelon labrosus*), that as a consequence of exposure to xenoestrogens develop intersex condition; production of oocytes in testis. Oocyte differentiation in testis is preceded by an ovary-like transcriptional profile, which can be used as an early biological warning tool to identify environmental presence of xenoestrogens.

Our research group has described that a simple electrophoresis of total RNA extracted from gonads, allows identification of high levels of 5S rRNA present in oocytes, diagnostically identifying intersex testis. This is so because the oocyte is a cell investing in reproduction, and thus it needs to accumulate molecules that will allow early embryo development. All the genes necessary for 5S rRNA production (*gtf3a*) and ribosomal assembly (*42sp43*, *importins*, *rpl5*, *rpl11*), together with other more classical markers (*cyp19a1*, *amh*, *dmrt1* or vitellogenin in liver) can be used as biomarkers of xenoestrogenic exposure and oocyte differentiation at the transcriptional level. They can also provide indication of intersex severity in a given fish population. Moreover, these markers have proved to be useful to study the process of complete sex reversal in zebrafish experimentally exposed to methyltestosterone or estradiol. Presently, our research group will use such markers to monitor the reproductive capacity of intersex affected populations.

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