

# **STSM Scientific Report**

## **COST-STSM-FA1205-17397, from March 16th to May 31st**

### **1- Purpose of the STSM:**

This STSM was developed to continue the collaborative work on the European eel sexual maturation between the laboratories of Pr Juan Asturiano, at the Polytechnic University of Valencia (ICTA-UPV), and of Dr Sylvie Dufour, at the French National Museum of Natural History (BOREA CNRS/MNHN), in Paris.

The European eel is an endangered species, whose sexual reproduction is not yet controlled in aquaculture. The purpose of this project is to study the impact of environmental factors, such as temperature, on the experimental maturation in eels, to improve the gamete quality. In fact, when they begin their oceanic migration to reach their reproduction site, the European eels are blocked at a pre-pubertal stage. During oceanic migration, environmental and internal factors will act together to remove the blockade and enhance sexual maturation.

In the first part of this project we focused on male eels and on the expression of the steroid receptor ER $\alpha$  during experimental maturation.

Another part of this project was to continue the work on female eels, and on the expression of vitellogenin receptor (VTGR) during experimental maturation.

Finally, another collaborative project was developed during this stay, consisting in the characterization of new target genes in the European and Japanese eel genomes. This part was done in collaboration with the team of Dr Ibon Cancio of the CBET Research Group, Research Centre for Experimental Marine Biology and Biotechnology, University of the Basque Country.

### **2- Description of the work carried out during the STSM:**

#### **Project ER $\alpha$ :**

Two groups of male eels were experimentally matured by weekly injections of human chorionic gonadotropin (hCG), during 6 weeks. One group was maintained at 20°C and the second group was maintained at 10 °C. Animals were sacrificed at different time during the maturation process, i.e. 0 weeks, 2 weeks, 4 weeks, and 6 weeks. Testes were collected. RNA was extracted from the samples and reverse transcribed into cDNA. The testis expression of ER $\alpha$  was measured by qPCR.

#### **Project VTGR:**

Finalization of the study of the vitellogenin receptor (VTGR) in the European eel was achieved with Marina Morini, PhD student in the host laboratory. More particularly, phylogenetic analyses on the receptors belonging to the super-family of low density lipoprotein receptors (LDLR), including VTGR, was performed in vertebrates. These analyses were performed using the Maximum Likelihood (ML) method.

#### **Project new sequence characterization:**

We searched for the presence in the eel of genes belonging to the gtf3a (general transcription factor IIIa) family. BLAST analyses were performed on the European and Japanese eel genomes, using NCBI sequences from various actinopterygian (spotted gar and teleosts) species as queries. Additional researches on the conservation of the gene structure in vertebrates were performed to complete the characterization of these genes

in the eel genomes.

### **3- Description of the main results obtained:**

#### **Project ERA:**

The expression of ERA was significantly increased during experimental maturation in male testis, suggesting its role in the maturation process. The experiment showed also a significant difference between the expression of ERA in the group maintained at 20°C and the group maintained at 10°C. ERA expression was higher in testis of the 20°C male group, than in the 10°C male group. Further studies will focus on the expression of the other estradiol receptors in males.

#### **Project VTGR:**

Phylogeny analyses of the LDLR super family showed that the vertebrate LDLR sequences clustered in three monophyletic groups. The VTGR group was made of two sub-groups, one sub-group composed by actinopterygian sequences and one sub-group composed by sarcopterygian sequences. The eel VTGR sequence clustered at the basis of the group composed by the teleost VTGR sequences.

#### **Project new sequence characterization:**

In both the European and Japanese eel genomes, we could characterize the presence of a gtf3aa gene. We also evidenced the absence of an eel gtf3ab. Most of the teleost species possess two paralogs, gtf3aa and gtf3ab genes, as a result from the whole genome duplication event that occurred specifically in this group. We hypothesized that the eel may have lost the gtf3ab gene, after the elopomorph emergence.

### **4- Future collaboration with the host institution (if applicable):**

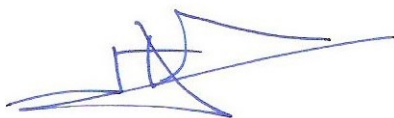
This STSM will result in the continuation of the long-term collaboration between the two laboratories of Pr Juan Asturiano and Dr Sylvie Dufour.

### **5- Foreseen publications/articles resulting from the STSM (if applicable):**

The VTGR collaborative work with Pr Asturiano team, especially with PhD student Marina Morini, will be finalized and published.

### **6- Confirmation by the host institution of the successful execution of the STSM:**

Dr Juan F. Asturiano, ICTA-UPV, Valencia, certifies that Dr Anne-Gaelle Lafont visited his laboratory as a guest researcher from March 16th to May 31st of 2014, thanks to a grant awarded by Short Term Scientific Mission, COST Action FA1205. Dr Lafont has performed experiments and participated to collaborative projects between ICTA-UPV, Valencia, and BOREA CNRS/MNHN, Paris.



Signed:  
Dr Juan F. Asturiano



Signed:  
Dr Anne-Gaelle Lafont