



The Laboratory of Environmental Toxicology (www.ciimar.up.pt/letox) opens PhD and Pos-Doc positions in the field of endocrine disruption in aquatic animals. The selected candidates will submit an application to the 2010 *Fundação para a Ciência e Tecnologia* fellowship calls (<http://alfa.fct.mctes.pt/>), and perform their research in the scope of one of the ongoing projects:

Title: PTDC/MAR/68106/2006

The modulation of retinoic acid signalling pathways by environmental pollutants in teleosts

During the last decade, numerous studies have demonstrated the generalized occurrence of endocrine disruption in wildlife. The majority of the studies on endocrine disrupting chemicals (EDCs) have focused on the effects of estrogenic compounds. Information is scarcer on the effects of aquatic endocrine disrupters in other pathways. Recent data obtained from gastropods and Human cells lines, indicates that metabolic pathways controlled by nuclear receptors from the retinoid acid signalling module (i.e, RXRs, RARs) may be highly sensitive to disruption by ubiquitous aquatic contaminants, although almost no research on this topic has been done with teleost fish. Since retinoids play a pivotal role in many biological functions (such as embryonic development and reproduction) in a vast diversity of living organisms, research on the chemical induced disruption of these pathways have been identified as urgent. Thus, this grant proposal intends to contribute for a better understanding of the molecular and biochemical mechanisms underlying endocrine disruption by emergent and priority pollutants in aquatic animals, particularly those interfering with the retinoid signalling pathways (RA). In many cases, it is not possible to extrapolate data obtained from human research to other organisms, particularly invertebrates. Therefore, the research will be performed taking into consideration an evolutionary context. The expected outputs may have important impacts in the understanding of the mechanisms of toxicity of chemicals acting through RA signalling pathways, thus contributing for improving risk assessment. The selected candidates are expected to use a large set of experimental methodologies, i.e., Real-time PCR, in situ hybridization, enzymatic assays, Elisa, chromatographic techniques.

Title: PTDC/MAR/105199/2008

The invertebrate repertoire of nuclear receptors: evolutionary and endocrine disruption insights

The origin and diversification of the endocrine/hormonal systems represents a fundamental research issue in biology. Critical components of these systems are the Nuclear Receptors (NRs). NRs form an important superfamily of ligand-dependent and independent transcription factors that regulate numerous biological processes. Significantly, the NR evolutionary inherited capacity to be ligand-activated is of crucial relevance, since it makes them prime targets of endocrine disrupting chemicals (EDCs). In this research proposal we aim at addressing the taxonomic scope of NR-mediated endocrine disruption? The answer to this subject is very much linked to the phylogenetic distribution and diversity of NR in Bilaterians. Thus, the applicant will address this hypothesis by performing an exhaustive data mining analysis of unpublished invertebrate genomes and EST databases, to determine invertebrate NR complement in different phyla. To experimentally test whether the found NRs are prone to disruption, we will consider 4 invertebrate species which roughly occupy the same ecosystem (the coastal shores) and that represent a broad phylogenetic sampling within the Bilateria tree. These include four marine invertebrate species, *Nucella lapillus* (Mollusk), *Platynereis dumerellii* (Annelid), *Branchiostoma lanceolatum* (invertebrate chordate), and the Echinoderm *Paracentrotus lividus*. Most importantly, we wish to determine binding affinities of the described NRs in the different species to natural ligands as well as know model xenobiotics and emergent pollutants, through binding assays. Expression studies under exposure conditions should help to complement our insight into broader mechanisms of disruption between different phyla. The final purpose is to improve risk assessment of a wide range of EDCs, including emergent pollutants, and to develop a methodology which rapidly screens chemical compounds for their ability to interact with invertebrate NRs.

Deadline: Applications (detail CV) must be sent by email to Dr. Miguel Santos (santos@ciimar.up.pt) before 26 July 2010.

Candidate Profile

PhD: The applicants should have a good degree (15 out of 20) or 14 plus master's degree and should have Portuguese nationality or a residence certificate.

Post-Doc: The applicants should hold a PhD degree and a good publication records. Experience in molecular biology, phylogeny and evolution, and/or chromatographic techniques (HPLC-MS or GC-MS) are advantageous.