

Postdoctoral Research Fellows

Within the UMR I-02 SEBIO (Reims, France). For more information [UMR I-02 SEBIO](#).

The MOBIDIC project (MOllusc Bivalves as inDICators of contamination of water bodies by protozoan parasites) aims to define a tool for diagnosing contamination of water bodies by protozoan parasites based on measurements of protozoa bioaccumulation in aquatic invertebrates. In the framework of the ANR (French national research agency) 2015 proposal, the project is based on transverse questions related to the sanitary quality (human pathogens) of aquatic environments and the development of diagnostic tools.

Various natural water bodies render important ecosystemic services as resources (drinking and irrigation waters), but also for recreational or commercial (shellfish farming) ends. As a consequence, the quality of water bodies is an issue at the national and European levels, and brings about significant societal expectations in terms of maintaining water quality. Aside from the risk of direct exposure for humans through the consumption of raw coastal shellfish, the ability of protozoa to accumulate in these coastal and continental species could represent an alternative choice as an evaluation tool of water contamination to avoid the limitation due to the water matrix. It would also break away from current approaches to protozoa research (Lucy et al., 2008; Palos-Ladeiro et al., 2013, Palos-Ladeiro et al., 2014). In fact, contrary to a water matrix, using attached filter-feeding organisms as a matrix makes contamination measurements representative of their living environment. Measurements in biological matrices (mussels) will i) limit the variability (temporal integration) of measurements as compared to measurements on water samples ii) convey the degree of contamination of water bodies more reliably, and thus facilitate comparisons. To achieve the different objectives, our multidisciplinary consortium will associate environmental sciences (ecotoxicology and ecophysiology) and the fields of health (parasitology) on the one hand, and academic, institutional and private partners to combine basic and applied research and transfer skills to stakeholders, on the other hand.

The postdoctoral fellowship will investigate the potential effects of the environmental form of protozoa, the (oo)cysts, on mussel's health, particularly on immune responses. For our tool to be usable on a large geographical scale and allow for comparisons among different water sources (freshwater and coastal water), the project proposes to consider two species, the blue mussel (*Mytilus edulis*) and the zebra mussel (*Dreissena polymorpha*). These species are already largely used in biomonitoring frameworks. They both accumulate the three protozoa, *Toxoplasma gondii*, *Cryptosporidium parvum* and *Giardia duodenalis*, and ensure the freshwater-seawater continuum. Nonetheless, few data are available in the literature about the potential effects of these protozoa on the physiology of accumulating organisms. In the framework of this project, special attention will be paid to studying the immune system, especially hemocytes involved in the cellular and humoral responses to parasites. Individual cells, such as bivalve hemocyte, must carry out a series of complex tasks to ensure organism homeostasis. Thus, understanding how the immune system mounts an effective but regulated response to foreign environmental pathogens is essentially in cell biology and, *in fine*, to develop relevant biomarker.

References:

Lucy, FE., Graczyk, TK., Tamang, L., Miraflor, A., Minchin, D., 2008. Biomonitoring of surface and coastal water for *Cryptosporidium*, *Giardia*, and human-virulent microsporidia using molluscan shellfish. *Par. Res* 103,1369-1375.

Palos Ladeiro, M., Bigot, A., Aubert, D., Hohweyer, J., Favennec, F., Villena, I., Geffard A., 2013. Protozoa interaction with aquatic invertebrate: interest for watercourses biomonitoring. *Env Sci Poll Res* 20, 778–789.

Palos-Ladeiro, M., Aubert, D., Villena, I., Geffard, A., Bigot, A., 2014. Bioaccumulation of human waterborne protozoa by zebra mussel (*Dreissena polymorpha*): interest for water biomonitoring. *Wat Res*, 48, 148-155.

Deadline for application: August, 15th 2016.

Keywords: host-pathogen interaction, hemocyte response, cellular/humoral responses, cell biology

Application:

The application may be written in English or French, and should contain the following elements:

1. CV (including date of birth, when and where PhD was awarded, employment record, other relevant merits);
2. An application letter that includes a brief summary of past scientific achievements (max 1 page);
3. A plan for the research during the postdoctoral fellowship (max 5 pages);
4. List of publications;
5. Names of three referees, with email-addresses and telephone numbers.

Application should be compiled in one single pdf file and sent by email to:

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