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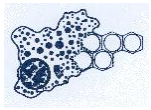
Cell Biology in Environmental Toxicology (CBET) consolidated research group: Nanotoxicology research line



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Presentation of the CBET group

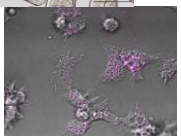
Since 1985 the group of "Cell Biology in Environmental Toxicology" of the University of the Basque Country develops research and teaching activities within the Environmental Toxicology field (both aquatic and terrestrial ecosystems). The group, recognized since 2001 as consolidated research group, is composed of 10 university lecturers and researchers, 4 postdoc researchers and 12 PhD students. The group´s lab contains facilities for histology, light, fluorescence and electron microscopy, image analysis, cell fractionation and biochemistry, cell culture and molecular biology. The group has aquaria facilities for development of large experiments and mesocosm experiments and a zebrafish facility at the Faculty of Science and Technology and at the Research Centre for Experimental Marine Biology and Biotechnology, Plentzia Marine Station PiE-UPV/EHU. The group coordinates three Masters (two recognized with the Erasmus Mundus label) and two Doctoral Programmes (Environmental Contamination and Toxicology, Marine Environment and Resources) and offers several international postgraduate courses.

The main field of expertise of the group is in development of early warning cell and molecular biomarkers of pollution exposure and effects, and in toxicity testing of environmental pollutants using standard and novel toxicity tests in cells *in vitro*, algae, invertebrates and vertebrates.

Main research lines of the group are:

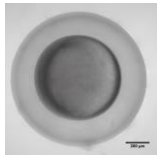
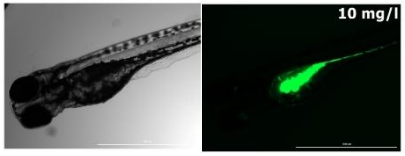
- Ecosystem health assessment
- Effects of petroleum hydrocarbons, oil spills and produced water
- Endocrine disruption
- Toxicogenomics
- Chemical carcinogenesis
- Nanotoxicology

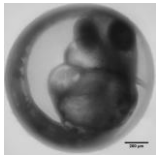


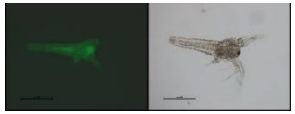


R+D+I services offered

- Scientific and technical advising. Areas: pollution, accidental spills, environmental toxicology, use of biomarkers, cell culture and in vitro systems, microscopy, molecular, cell and tissue organization of animals.
- Scientific education: Masters, postgraduate courses, specialization courses, PhD programmes, laboratory training and internships.
- Assessment of environmental quality (marine, estuarine, and terrestrial environments).
- Monitoring programmes of environmental pollution.
- Toxicity testing (REACH legislation).
- Determination of biological activity of chemicals.
- Histopathological diagnosis of fish and shellfish diseases.
- Processing of samples for histology, light and electron microscopy, cryotechniques.
- Quantification of levels of specific proteins, enzyme activities, gene expression, immunolabelling, cell structure.
- Estabulation and maintenance of experimental animals. Marine aquaria. Zebrafish facility. Terrarium. Facilities to run chemical exposure experiments.




Nanotoxicology research line

In the Nanotoxicology field, we have been involved in several projects including NanoReTox (EU 7th FP, 2008-2012), NanoCancer (Spanish MEC, 2010-2012), NanoSilverOmics (Spanish MINECO, 2013-2015), Enter (EU Cost Action, 2013-2017), NanoToxT (Basque Gov Saiotek, 2013-2014) and NanoGune (Basque Gov Etortek, 2014-2015). Currently we are carrying out the project NanoCarrierERA-NACE (Spanish MINECO, 2016-2020) and we are part of the National Network of Excellence in Nanotechnology and Food (Spanish MINECO, 2017-2019).

The **main goals** of the Nanotoxicology research line are:
- Understanding the behaviour of nanomaterials in different exposure media
- Determination of uptake, bioaccumulation, bioavailability, fate, and cellular and tissue distribution of nanomaterials in organisms.
- Identification of mechanisms of action and adverse effects of nanomaterials in organisms
- Toxicity profiling of nanomaterials
- Risk assessment of nanomaterials in aquatic and terrestrial ecosystems

Selected publications

DUROUDIER, N; KATSUMITI, A; MIKOLACZYK, M; SCHÄFER, J; BILBAO, E; CAJARAVILLE, MP. 2019. Dietary exposure of mussels to PVP/PEI coated Ag nanoparticles causes Ag accumulation in adults and abnormal embryo development in their offspring. *Science of the Total Environment*, 655: 48-60.

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JIMENO-ROMERO, A; ORON, M; CAJARAVILLE, MP; MARIGÓMEZ, I; SOTO, M. 2016. Nanoparticle size and combined toxicity of TiO_2 and DSLS (surfactant) contribute to lysosomal responses in digestive cells of mussels exposed to TiO_2 nanoparticles. *Nanotoxicology*, 10: 1168-76.

KATSUMITI, A; AROSTEGUI, I; ORON, M; GILLILAND, D; VALSAMI-JONES, E; CAJARAVILLE, MP. 2016. Cytotoxicity of Au, ZnO and SiO2 nanoparticles using in vitro assays with mussel hemocytes and gill cells: relevance of size, shape and additives. *Nanotoxicology*, 10: 185-193.

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