

Syllabus Module 234

Module : 234	Major C “ Critical windows of exposures and vulnerability “
UE coordinator	Robert Barouki
Dates	December 12th to 16th 2016
Credits/ECTS	3
Duration	5 days of 6 hours face to face, and personal or group work (estimation 15h)
UE description	The toxicity of chemicals or of other environmental stressors is highly dependent on exposure conditions and on the particular vulnerability of the exposed individual or group of persons. The module will address these issues with some emphasis on vulnerability during development and growth and on occupational exposures. The module is essentially multidisciplinary with epidemiological, toxicological and social sciences perspectives. The following items will be discussed: importance of windows of exposure to carcinogens or reprotoxic agents during pregnancy, in early life and at the workplace; vulnerability of children to physical agents; transgenerational epigenetic effects both in experimental animals and in humans; examples of gene-environment interaction and mechanistic basis of vulnerability, notably during development
Prerequisites	Basic knowledge on biological mechanisms of disease and molecular biology. Such background is provided in the M1 EOHS modules (for example module 118).
Course learning objectives	<ul style="list-style-type: none"> • Describe the hypothesis of the developmental origin of adult health and disease (DOHaD) • Identify the role of parental exposure at work or in the general environment in developmental toxicity • Describe gene-environment interactions in fetal development and disease
UE Structure (details of sessions title/speaker/date/duration)	<ul style="list-style-type: none"> - Toxicological basis of vulnerability. Robert Barouki - Environmental exposure and genetic susceptibility in Parkinson Disease. Alexis Elbaz - Epigenetics in Health and Disease. Jonathan Weitzman - Gene-environment interaction in fetal development and disease. Michel Vekemans - Children exposure to electromagnetic waves. Joe Wiart - Social vulnerability. Yorghos Remvikos - Is adulthood fertility affected by prenatal or childhood exposure to environmental hazards ? Epidemiological and toxicological evidence. Bernard Jégou - Reprotoxic agents at the workplace or as drugs. Paper discussion. Bernard Jégou - Developmental vulnerability to neurotoxicity. Philippe Grandjean - 'Precautionary assessment of critical windows'. Philippe Grandjean - “Transgenerational Epigenetic Effects and Endocrine Disruptors: Experimental approach”. Michael K. Skinner
Course requirement	<u>Assignments</u> : The courses are highly interactive; students are expected to do some reading before attending the course (required readings are posted on the site before the course).
Grading and assessment	On table test of 2 hours : scientific paper reading and answers to a set of questions. Grade on 20 at least equal to 10.
Location	George Sand EHESP Campus in Paris
Readings	<p>MW Gillman. Developmental Origins of Health and Disease. N Engl J Med. 2005; 353(17): 1848–1850.</p> <p>P Grandjean, PJ Landrigan. Developmental neurotoxicity of industrial chemicals. Lancet 2006; 368: 2167–78</p> <p>RL. Jirtle, MK.Skinner. Environmental epigenomics and disease susceptibility. Nature Reviews, Genetics, 2007 (8): 253-262</p>

Module 234 contributes to the acquisition objectives of the following general competencies:

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| 1. Describe the direct and indirect human, ecological and safety effects of major environmental and occupational agents. | X |
| 2. Describe genetic, physiologic and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards. | X |
| 3. Describe national and European regulatory programs, guidelines and authorities that control environmental health issues. | |
| 4. Specify current environmental risk assessment methods. | |
| 5. Specify approaches for assessing, preventing and controlling environmental hazards that pose risks to human health and safety. | |
| 6. Explain the general mechanisms of toxicity in eliciting a toxic response to environmental exposures. | X |
| 7. Discuss various risk management and risk communication approaches in relation to issues of environmental justice and equity. | |
| 8. Develop a testable model of environmental insult. | X |