9 Characterization of a zebrafish model for acute organophosphorus poisoning M.D. Faria, CESAM, University of Aveiro / Biology; E. Prats, CSIC; F. Padros, FDDS Universitat Autònoma de Barcelona; P. Babin, Universités Bordeaux 1 et 2; J. Cachot, Université Bordeaux / EPOC; N. Vinas, Mississippi State University / Environmental Laboratory; A. Knoll-Gellida, G. Mathieu, A. Tingaud-Sequeira, MRGM-Université de Bordeaux; F. Le Bihanic, EPOC / Bat B eme etage; A.M. Soares, Universidade de Aveiro / Department of Biology and CESAM; D. Raldua, IDAEA-CSIC. Organophosphorus (OP) compounds are currently the most commonly used pesticides in the world. Acute OP poisoning (OPP), with around 3 million cases and 300,000 deaths annually, is a major public health problem. The molecular initiating event leading to OPP is the inhibition of the acetylcholinesterase (AChE), resulting in the accumulation of the neurotransmitter acetylcholine (ACh) in the cholinergic synapses. However, the pathways conducting to some of the adverse outcomes in OPP, specially those related to the intermediate syndrome (IMS), are not well-understood. Zebrafish is an animal model increasingly used in biomedical research, including human toxicology as well as ecotoxicology. Although the modes of action (MoA) leading to toxicity for OP pesticides in zebrafish embryos has been recently described, reported adverse pathways are more related to the developmental toxicity of OP compounds than with the OPP. In this study we use a prototypic OP compound, chlorpyrifos-oxon (CPO), to develop a zebrafish model of OPP. The acute effects of mild, moderate and high CPO concentrations on zebrafish larvae have been studied at different levels of organization including molecular (transcriptomic analysis by RNAseq, biochemical responses), cellular, tissue and organismal (gross morphology and behavioral effects [visual motor response (VMR) and touch-evoked escape response]). Three phenotypes were identified by gross-morphology and behavioral analysis. The mildest phenotype was characterized by a progressive decrease in the VMR paralleling the inhibition of the AChE activity. The second phenotype was characterized by a shortening of the trunk length and paralysis, what is consistent with the nicotinic sympthoms of an acute cholinergic crisis, where the AChE inhibition results in a progressive accumulation of ACh in the neuromuscular junctions, overactivation of the nicotinic ACh receptors and overexcitation of the muscle fibers. Finally, the most severe phenotype, induced mainly by high CPO concentrations, was related to the induction of oxidative stress in the central nervous system and muscle fibers, with a strong disruption in both tissues. In conclusion, the adverse outcome pathways of the different phenotypes have been dissected empirically and the results obtained show that exposed zebrafish mimic many aspects of the human OPP, therefore allowing the use of this model for identifying new antidotes against cholinergic syndrome and IMS.