

5th World Congress on Biotechnology

June 25-27, 2014 Valencia Conference Centre, Valencia, Spain

Hyper thermo philic phosphotriesterases/lactonases: Structure, function and applications

Giuseppe Manco

National Research Council of Italy, Italy

Recently, a new family of microbial lactonases with promiscuous phosphotriesterase activity has been discovered, dubbed R_{PTE}-Like Lactonases (PLL) and ascribed to the amidohydrolase superfamily. Among members of this family are enzymes found in the Archaea: *Sulfolobus solfataricus* and *Sulfolobus acidocaldarius*, which show high thermophilicity and thermal resistance. From a biotechnological point of view enzymes endowed with phosphotriesterase (PTE) activity are attractive objects of study because are capable to hydrolyze the organophosphate phosphotriesters (OPs), a class of worldwide used synthetic compounds employed both as insecticides and chemical warfare agents. From the viewpoint of basic research, studies of catalytic promiscuity offer clues to understand the natural evolution of enzymes and to translate this knowledge into *in vitro* adaptation of catalysts to specific human needs. Thermostable enzymes able to hydrolyze natural lactones and promiscuously OPs are currently considered good candidates for the set-up of efficient anti-microbial and detoxification tools respectively. The author will report their attempts to follow these two paths. It will be shown that thermostable PLLs are effective in interfering with quorum-sensing mediated expression of virulence factors *in vitro* and *in vivo*. On the other hand successful approaches of increasing PTE activity by molecular evolution in archaeal enzymes will also be reported.

Biography

Giuseppe Manco is Senior Staff Researcher (1st Researcher) and Group Leader at Institute of Protein Biochemistry, National Research Council (CNR) of Italy. He graduated in Biological Sciences at the University Federico II of Naples in 1987 and in 1989 he got the Diploma to exert the Profession of Biologist at the same University. Then he moved to CNR working as recipient of several fellowships first at the International Institute of Genetics and Biophysics and then at the Institute of Protein Biochemistry and Enzymology. In 1995 he was for a short period at NIH, Bethesda, USA in the Lab of E. Stadtman and R. Levine as visiting scientist. Starting from 1994 until 1997 he was hired as Researcher at the Institute of Protein Biochemistry and Enzymology with a non-permanent position, which became permanent in October 1997. In 2001 he became Senior Staff Researcher (1st Researcher) in the same Institute. From 2003 to 2009 he was elected member of the Institute Committee. Since 1998 Dr Manco started leading his independent research group and as such had the responsibility of Regional, National and International projects. At the moment he is coordinating a large Italian project from the Italian Ministry of Research (MIUR) in the field of Security and Environment. He is member of the CNBRE group of SERIT (Security Research in Italy) a consortium between CNR and Finmeccanica; member of the Group of Technological Transfer of the Regional District in Biotechnology "Campania Biosciences"; member of the Italian Society of Microbiology. He is co-author of more than 100 papers in the field of biochemistry and molecular biology.

g.manco@ibp.cnr.it