

**Institut d'Alembert Seminar / July 07<sup>th</sup>, 2023 at 10:00 am  
Amphi Lagrange – 1Z14 – North Building**

**THE HUMAN SERINOSOME: SHEDDING LIGHT ON SERINE  
METABOLISM IN ALZHEIMER'S DISEASE**



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**Presentation:**

The non-essential amino acid L-serine (L-Ser) plays a relevant role in intermediary metabolism in eukaryotic cells: it is a precursor for the signaling molecules glycine (Gly) and D-serine (D-Ser), which are involved in excitatory neurotransmission through the activation of NMDARs. In the mammalian brain, L-Ser is mainly synthesized endogenously through the conversion of the glycolytic intermediate 3-phosphoglycerate via a linear, three-step pathway (the phosphorylated pathway, PP). Patients with deficiencies in L-Ser synthetic enzymes exhibit marked decreased levels of both L-Ser and Gly in plasma and cerebrospinal fluid and are affected by severe neurological impairment. We recently identified a cytosolic metabolic assembly (called “serinosome”) in differentiated astrocytes made by the three enzymes of the PP and reported that alterations in the PP enzymes and serine levels are apparent in males during aging and in females during Alzheimer's disease onset.

**Biography:**

Prof. Dr. Loredano Pollegioni is full professor of Biochemistry at the University of Insubria (Varese, Italy), treasurer of IUBMB, and head of The Protein Factory 2.0 lab ([www.theproteinfactory2.it](http://www.theproteinfactory2.it)). He received in 1986 his B.Sc in Biology (with honour) at University of Milan (Italy) and in 2003-2004 carried out his Postdoctoral training in Enzymology at University of Michigan (USA). His scientific career focused, as a general topic, on the structure-function relationships in enzymatic proteins by using a multidisciplinary methodological approach. This experience has been exploited in the field of protein biochemistry and biotechnology investigating dozens of enzymes. In last years, prof. Pollegioni specialised in the evolution of enzymatic activities by using rational (site-directed mutagenesis) and directed evolution (random and site-saturation mutagenesis) methods. A second main field of research is related to the role of D-amino acids: the metabolism of D-serine, and its precursor L-serine, has been investigated in the human brain under physiological and pathological conditions. He has published over 270 peer-review papers on these topics and several patents.