

*It is a great pleasure for me to conclude these "Journées Chevreul" Lipids & Brain 2 who were a great success by the number of participants (more than 180) coming from Europe and France, but also from North America, Australia, India, Iran and Japan. We could have a thought for our Japanese colleagues who have made the effort to come in France in this context so painful.*

*First of all, many thanks to all the speakers for the quality and their up-to-date presentations. These days were organized by la Société Française d'Etudes sur les Lipides (SFEL) and are the follow-up to previous successful "Journées Chevreul" on this topic which were held in Paris four years ago. Our scientific society is an old french society founded in 1943, with over more than 100 members working in the field of lipids both in the industry, technology and in academic research laboratories. The aim of our society is to ensure trade in this area organizing 2 meetings each year. Our society is a member of EUFOEDLIPID and is a partner in the French journal Oléagineux, Corps Gras, Lipides (OCL).*

*Omega-3 and the brain, and the specific role of DHA but also EPA, is a fascinating topic of both fundamental and clinical research. Omega-3 fatty acids are closely implicated, either directly as membrane components or indirectly as precursors of active metabolites in an extraordinary diversity of regulation pathways. Probably, there is no other example of nutrients that cumulate the particular features of being indispensable components of membrane genesis, modulators of the membrane dynamics and functions, and being at the same time endogenous mediators in cell signalling and gene expression. New and original data presented here therefore illustrate this diversity of action of DHA. This PUFA is involved in the field of neuroprotection and neural survival involving several cell signaling pathways: first as a metabolic precursor of the Neuroprotectin D1 as described Professor Nicolas Bazan (Neuroscience*

*Center of Excellence, New Orleans, USA). Nicolas Bazan has reported the potency of this protective sentinel during the process of neurodegeneration. In the brain cells, NPD1 could modulate both the synthesis of beta-amyloid peptide and the regulation of anti- and pro-apoptotic proteins, which in turn promotes neural cell survival. Second as a modulator of the synthesis of phosphatidylserine which affects the membrane translocation and activation of AKT for example and therefore neuronal survival. But DHA could also regulate many other signalling pathways affecting notably neurogenesis, cell cycle, synaptogenesis, glutamatergic synaptic activity. These pathways are very complex and involve the regulation of several synaptic proteins via nuclear transcription factors and also endocannabinoid signaling. Several other original topics have been discussed as brain PUFA uptake and metabolism, DHA imaging for neurotransmission approach, omega-3 fatty acids in spinal cord injury but also in neuroinflammation and well-being, and the importance of omega-3 PUFA in the retina physiology. The impact of other lipids on brain health have been also discussed (cholesterol and alzheimer's disease).*

*But what about Nutrition and human health? All authors claim that omega-6 and omega-3 fatty acids in the diets and their balance could affect infant brain development and the risk of many neuropathologies. For the infant development which has required lengthy investment of energy, whether lower DHA accretion in brain of formula-fed term infants impairs neurophysiological performances is not clearly established, infants born at earliest gestations are the most vulnerable to DHA insufficiency as reported Professor Robert Gibson. Anyway, infant clinical studies are usually easy to interpret as meaning that the child's diet is unique. One of the main actual question in this field of research is to evaluate the impact of maternal nutrition during pregnancy and lactation on infant health as*

## CONCLUSION

presented by Professors Robert Gibson and Maria Makrides. For the impact of intake of omega-3 fatty acids on depression, ageing brain and Alzheimer disease, we can observe that epidemiological studies supporting fish or long-chain PUFA consumption as a dietary factor modulating the incidence of such pathologies showed disparate results as reported for example Dr Michel Lucas for depression, perhaps due to several factors specific of the studied population (low basal level of omega-3 long-chain PUFA consumption therefore showing an interaction with PUFA precursors). Therefore, large clinical studies are needed to explore the effects of DHA or EPA supplementation but they are

expensive, and show unexpected results, disappointing some would say. In these studies, can we do select populations with low levels of omega-3 consumption, use dose-effect protocols? Or as said Dr Stephen Cunnane do we use a combination of nutrients (this clinical approach has been illustrated by the presentation of Dr J. Sijben for Alzheimer's disease)? It is great matter of debate.

To finish this conclusion, I would like to thank again the speakers and all the participants for coming to this meeting, I wish you a pleasant return journey or a pleasant tour in Paris. We hope that you will return to the next "Journées Chevreul Lipids & Brain 3".

I would like to thank all the sponsors whose assistance was invaluable in organizing this meeting, Lesieur, Polaris, Unilever, MinamiNutrition, ViforPharma, l'Oréal, Axellus, Milumel, St Hubert, Valorex, Vande putte, Corman, Mylnefield, and Soparind Bongrain, but also all the members and people who helped organize this meeting Bernadette, Nicole, Jean-Marc, Pierre, Harvard, Anne-Marie, Isabelle, Fabrice, Jean-Claude and Alain. I would like to thank particularly Bernadette Delplanque who was the main leader in the organization of this meeting.

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## CONCLUSION