UNIVERSIDAD Đ CÓRDOBA

# Global Science Education and Research Seminars

## *Academic Year 2017/2018*

Campus de Rabanales, Sala de Grados “Manuel Medina”

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Christian Salesse graduated in biophysics from the Université du Québec à Tois-Rivières (UQTR). He was then a postdoctoral fellow at Mainz Universität in Germany. He then became professor at the UQTR for 14 years until he moved to Université Laval in 2002. He has been a fellow from Fonds de Recherche – Québec Santé (FRQS) from the Junior 1 to the National level. He is also adjunct professor at Jilin University in China.

He was an invited professor at several universities in France and Portugal. He is the head of the Vision research unit at the Centre de recherche du CHU de Quebec and of the retina division of the FRQS Vision research network. He organized several provincial and international meetings.

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## Lecithin retinol acyltransferase: enzymatic and structural information and membrane binding of a protein involved in the retinoids visual cycle

Light absorption by the chromophore (11-*cis*-retinal) of the visual pigment (rhodopsin) of rod photoreceptors results in its isomerization to all-*trans*-retinal which is then recycled to 11-*cis*-retinal through the «retinoids visual cycle». One of the key enzymes of the visual cycle is lecithin retinol acyltransferase (LRAT) which is a membrane-associated protein. A truncated LRAT (tLRAT) without its N- and C-terminal α-helices has been expressed. We have recently developed the first reliable method to characterize its biochemical properties in details. Then, the uniformly $^{15}N$,$^{13}C$-labeled C161S/C168S-tLRAT sample allowed us to assign 100% of backbone amides and 100% of the $^{13}C'$, $^{13}C^{\alpha}$ and $^{13}C^{\beta}$ by Nuclear Magnetic Resonance (NMR). We derived the secondary structure of tLRAT based on the assigned chemical shifts. Moreover, several mutations of LRAT are leading to a complete loss of vision. These mutants have very little or no enzymatic activity. The comparison between our $^{15}N$-Heteronuclear Single Quantum Coherence (HSQC) NMR spectra of tLRAT and these tLRAT mutants allowed to suggest that these mutations result in local structural changes in the protein. The respective contribution of the N- and C-terminal segments of LRAT to its membrane anchoring has been studied and membrane binding experiments with tLRAT suggested that it has a strong affinity for membranes despite the absence of its N- and C-terminal hydrophobic segments. Other regions of LRAT must be involved in its membrane anchoring such as an α-helical internal segment that we have identified from our NMR characterization.