COURSE and SYMPOSIUM

LIPID MEDIATORS IN INFLAMMATORY PROCESSES

Preliminary Program

Both activities, courses, and symposium, will provide insights on the role of lipids in signaling, physiology, and pathology. The content will follow three main blocks:

I. BIOCHEMISTRY OF LIPIDS. Biochemical aspects of lipid compounds.

a) Fundamentals and nutrition. Chemical properties of lipids, classification, food sources as well as health-related aspects.

1. Lipids: Structure, classification, sources, and functions (Beatriz Sánchez).

2. Nutritional aspects of lipids and their health effects (Jacqueline Lucas).

3. Metabolism of polyunsaturated fatty acids (Irene Wood).

4. Role of lipids in inflammation (Lucia González).

Practical session 1. Sample processing and extraction of lipids (Beatriz Sánchez and Irene Wood).

b) Cellular lipid biology and signaling role. Lipid mediators on inflammation, the role of lipids in signaling pathways (cyclo-oxygenase, lipoxygenase, and CYP P450 pathways). The action of modified fatty acids (oxidized and nitrated) during inflammation.

5. Signaling pathways of arachidonic acid and its pharmacological relevance (Lawrence Marnett).

6. Signaling mediated by lipid metabolites in cells of the immune system (Lucía Gonzalez).

7. Fatty acid metabolism in oxidative and nitro-oxidative stress (Andrés Trostchansky).

8. Lipids in platelet function, antiplatelet agents and microvesicles biomarkers (Eduardo Fuentes).

9. Post-translational modifications mediated by modified fatty acids (Rafael Radi).

Practical session 2. Biological effects of lipid metabolites (Lucía González).

II. ANALYTICAL METHODS. Available tools for processing, identification, detection, and quantification of lipids and their metabolites in different matrices, including biological samples.

10. Fundamental aspects of lipidomics (Gustavo Bonacci)

11. Lipid profile, detection of lipid markers (Mauricio Mastrogiovanni)

12. Detection of endogenous nitrated fatty acids and their metabolites (Bruce Freeman)

13. Analysis of oxylipins by Mass Spectrometry (MS) (Sayuri Miyamoto)

Practical session 3. Lipid detection tools (Gustavo Bonacci/Mauricio Mastrogiovanni) Practical session 4. Software and lipidomic analysis (Sayuri Miyamoto/Andrés Trostchansky)

III. IMPLICATION OF LIPIDS IN PATHOLOGIES. Pathophysiological processes involving the action of lipids, pro-inflammatory and/or the resolutive role of lipid metabolites in pathologies, lipid mediators as clinical markers.

14. Alterations in lipid metabolism in neurodegenerative diseases (Sayuri Miyamoto).

15. Lipid oxidation *vs* nitration in cardiovascular pathologies and neuroinflammation (Homero Rubbo).

16. COX-2 inhibitors as new therapeutic tools (Lawrence Marnett).

17. Clinical and therapeutic aspects of nitrated fatty acids (Bruce Freeman).

SEMINARS

1. Alterations in lipid metabolism of spinal cord linked to amyotrophic lateral sclerosis. *Sci Rep* 2019, 9: 11642 (Sayuri Miyamoto)

2. Gas-phase fragmentation analysis of nitro-fatty acids. *J Am Soc Mass Spectrom* 2011; 22: 1534-51 (Gustavo Bonacci)

3. Fluorescent indomethacin-dansyl conjugates utilize the membrane-binding domain of cyclooxygenase-2 to block the opening to the active site. *J Biol Chem* 2019; 294: 8690-8698 (Lawrence Marnett)

4. Electrophiles modulate glutathione reductase activity via alkylation and upregulation of glutathione biosynthesis. *Redox Biol* 2019; 21: 101050 (Bruce Freeman)

5. Study of the interactions between Edaglitazone and Ciglitazone with PPARγ and their antiplatelet profile. *Life Sci* 2017; 186:59-65 (Eduardo Fuentes).

During the course, each invited foreign teacher will participate in two classes and during the seminar session, in which students will present and discuss original articles of great impact.

Finally, the invited professors will participate in the symposium, organized along the same axes, showing their research lines and main results in the area. The symposium will be targeted to students and the academic public.