Preface: Microvesicles in Human Diseases and their Role in Intercellular Communication and Signaling

The aim of this special section is to present the emerging role of extracellular vesicles (EVs) in pathophysiology. The concept of EVs has gained increasing importance in biomedicine during the past few years; new questions continue to arise and many older questions are finding new answers. It is our belief that the articles in this special section will attract the interest of many investigators, will provide valuable new information to readers, and will inspire many more studies.

Thus, several reviews have been selected to explain the importance of microvesicles in human diseases, analyzing their role from the viewpoint of molecular and cell biology.

Extracellular Vesicles as a Potential Mediators of Epigenetic Reprogramming. Post-translational modifications of histones or DNA methylation regulate many natural processes, such as embryogenesis or cellular homeostasis, and their alteration can lead to the development of several pathologies, including cancer. This extracellular vesicle–dependent epigenetic reprogramming is well discussed by Anna Lewandowska Ronnegren.

Tissue Cross-Talk and Exosomal-MicroRNAs. The interest in EVs has increased further as a result of the discovery of exosomal microRNAs, potential biomarkers for the detection of diseases at an early stage. Micol Marchetti investigates the biochemical and physiological features of exosomes, focusing on the role of microRNAs as tissue cross-talk instruments, a new pathway of cell communication.

Extracellular Vesicle–Mediated Transfer of MicroRNAs in Atherosclerosis. Cardiovascular diseases are the most important health problem in the Western world, along with cancer. Atherosclerosis is a major cause of cardiovascular diseases. In this review, Federica Vannini and Francesco Russo describe a way to use microRNAs as a biomarker for atherosclerosis, and they identify those that may be important therapeutic targets for clinical applications.

Extracellular Vesicles: Evolving Contributors in Autoimmunity. The emerging roles of extracellular vesicles in immune signaling and inflammation are evaluated and discussed by Stergios Katsiougianis. In particular, he analyzes several autoimmune diseases (i.e., rheumatoid arthritis, systemic lupus erythematosus, Sjogren’s syndrome, systemic sclerosis and antiphospholipid syndrome), providing new potential therapeutic strategies with the implication of EVs.

Exosomes, Ectosomes and the Two Together: Physiology and Pathology. The promising potential of vesicles in therapy should not be restricted to exosomes.

Because most functions of cells and tissues are regulated by the cooperation between ectosomes and exosomes, Jacopo Meldolesi explains the different properties of both vesicles, the procedure to isolate them from the mixture of extracellular vesicles, and their important role in physiology and pathology.

CircularRNAs and Exosomes: the New Frontier of Cancer Diagnosis. Circular RNAs are important contributors in extracellular vesicles. This class of long noncoding RNAs may represent new circulating biomarkers for cancer diagnosis. This new frontier for biomedical research is shown by Flavia Scoyni and Rosalba Giugno.

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Guest Editors:
Federica Vannini
Institute of Life Sciences-Scuola Superiore Sant’Anna (SSSUP)
National Research Council (CNR)
Pisa, Italy

Francesco Russo
National Research Council (CNR)
Department of Computer Science, University of Pisa
Pisa, Italy