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Preface

Mitochondrial Physiology and Pathology

This special issue is published on the occasion of the Bari International Symposium on "Mitochondrial Physiology and Pathology," Bari, Italy, June 2008, IUBMB Symposium S1/2008.

In the more recent years, the structure and mechanistic aspects of membrane bound energy transfer systems have been disclosed at a detailed atomic level. At the same time, the integrated regulation of mitochondrial functions was investigated at genetic, molecular, and cellular level. This rapidly expanding knowledge is providing a rational basis to define the role of mitochondria in cellular physiology and pathology.

On the medical side, a progressively increasing number of primary mitochondrial diseases, associated with mutations in the mitochondrial and nuclear genes coding for structural subunits of the oxidative phosphorylation complexes, signal transduction proteins, and ancillary systems are identified. The progress made in the mechanistic and physiological features of these systems, in combination with advanced technologies in functional genomics, proteomics, and cellular and ultrastructural imaging, opens today unexpected possibilities to unravel pathogenetic mechanisms, extending from genes to clinical manifestation of diseases, and to develop new therapeutical approaches.

Furthermore, evidence is accumulating showing a central role of mitochondrial dysfunction in neurodegenerative disorders as well as in viral and neoplastic diseases.

The present issue collects reviews, as well as original observations, on the above aspects of mitochondrial physiology and pathology.

The articles, all contributed by authors actively working in the field, are collected in 3 sections: Functional Mitochondrial Genomics, Mitochondrial Pathophysiology, and Mitochondrial Medicine.

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Dr. Sergio Papa is a professor of Biochemistry at the University of Bari, where he contributed to establish the Department of Medical Biochemistry and the Institute of Biomembranes and Bioenergetics of the Italian Research Council. He is MD and LD in Biochemistry and Molecular Biology. His research concerned various aspects of mitochondrial bioenergetics: substrate metabolism, mechanism of oxidative phosphorylation, allosteric mechanism of redox proton pumps, mitochondrial extension of the cAMP cascade, and mitochondrial diseases. He contributed to establish and run the International Bari Conferences on Bioenergetics, held regularly from 1965 up to now, and is a recipient of the Italian National Prize "Guido Dorso" for the Section Research 1984; Mendel Medal of Czech Academy of Sciences 1988; Professor Honoris Causa Lomonosov State University, Moscow; and Professor Honoris Causa, Moron University Argentina.

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