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The role of mitochondria - inflammatory crosstalk in clinical settings**Katarzyna Swist-Szulik**

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Introduction: Mitochondria plays a crucial role in cellular bioenergetics, immune responses, calcium homeostasis and apoptosis and thus are important to support cell homeostasis and viability. Mitochondrial diseases caused by mutations of mitochondrial DNA or of nuclear genes that encode mitochondrial proteins are leading to multisystemic and life limiting disorders (Fig.1.). Additionally, it has been recently highlighted that coexistence of mitochondrial dysfunction and inflammation is a background for many diseases with important health and social issues such as diabetes, cancer, neurodegenerative disorders and cardiac failure (1-6).

Aims: To review current knowledge and clinical aspect of mitochondria and inflammatory crosstalk from the experience of clinician working in the field of paediatric intensive care.

Methods: As a clinician treating critically ill children I observed that some patients with cancer, post bone marrow transplant or cardiac surgery and primary mitochondrial diseases responded to additional stress such as surgery or infection with overwhelming inflammatory responses leading to multiorgan failure and death. In these situations, currently available treatments including antibiotics, ventilatory, cardiolovascular and renal supports used in paediatric intensive care were ineffective. I collected the data from clinical observations and hypothesised that that overwhelming inflammatory responses could be triggered by changes in mitochondrial function and further intensified due to additive effect of cellular stress.

Results and Conclusions: The clinical data and some experimental studies provide evidence that mitochondrial dysfunction and abnormal inflammatory responses plays a role in acute such as sepsis and chronic such as metabolic and neurodegenerative disorders. Mitochondrial dysfunction is as well considered in pathogenesis of sepsis and multiple organ dysfunction syndrome (MODS). While it is still difficult to confirm the cause and effect mechanism it nevertheless creates a new path for translational research and therapeutic interventions focused on protection of mitochondrial function or acceleration of mitochondrial recovery.

Biography

Katarzyna Swist-Szulik is working as a consultant in paediatric intensive care and has her passion in research on the role of mitochondria in inflammatory signalling. She is pursuing her PhD on the role of mitochondrial dysfunction in intercellular crosstalk between myeloid and non-myeloid cells. There are building evidence that mitochondria-inflammatory interactions are relevant to many disease processes such as inflammatory myopathies, neurodegenerative diseases, autoimmune diseases as well as multiorgan failure and drug induced sterile inflammation. Katarzyna is working on developing the translation research investigating mitochondria-inflammatory relationship. Outside work Katarzyna is a mother of two wonderful children, an adventurer, ultramarathon runner and finisher of Marathon des Sables in 2015.

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