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Short Communication

Bacterial LPS Overrides Adenosine Treatment of Epileptic Seizures

Martins Ian James[1,2,3]*

[1]*Centre of Excellence in Alzheimer's Disease Research and Care, School of Medical Sciences, Edith Cowan University, Joondalup, Australia*

[2]*School of Psychiatry and Clinical Neurosciences, The University of Western Australia, Nedlands, Australia*

[3]*McCusker Alzheimer's Research Foundation, Hollywood Medical Centre, 85 Monash Avenue, Suite 22, Nedlands, Australia*

***Corresponding Author**: Martins Ian James, School of Medical Sciences, Edith Cowan University, 270 Joondalup Drive, Joondalup, Western Australia, Australia.

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Epilepsy is now one of the most important neurological diseases that affects millions of individuals in the world [1,2]. The role of microbiological factors that induce epileptic seizures has become of critical importance [3,4] and the understanding of bacterial lipopolysaccharides (LPS) and their induction of seizures has been investigated [3]. LPS are endotoxins and essential components of the outer membrane of all Gram-negative bacteria [5]. Scientific exploration of diet and LPS [6] indicates that diet [6] may play a major role in the manifestation of epilepsy and seizures in various countries [1,2]. Evaluating treatment strategies such as drug and adenosine therapy [7,8] for the management of epilepsy has become important and improvement in epilepsy drug treatment may require careful nutritional strategies to prevent LPS induced epilepsy [3,4].

Mutations in genes that effect mitochondrial function are connected to seizures and mitochondria are required for neuron function and synaptic transmission [9-11]. The links between insulin resistance and mitochondrial apoptosis [12] with relevance to seizures has escalated and indicated that LPS may repress specific anti-aging genes required for mitochondrial biogenesis [12]. The anti-aging gene Sirtuin 1 (Sirt 1) is important to mitochondria and neuron survival [6,12] and its inactivation may lead to neuron death relevant to epilepsy [6,9-11] (Figure 1). LPS is involved in the repression of Sirt 1 [13] with interference in Sirt 1's essential role in mitochondrial biogenesis [12].

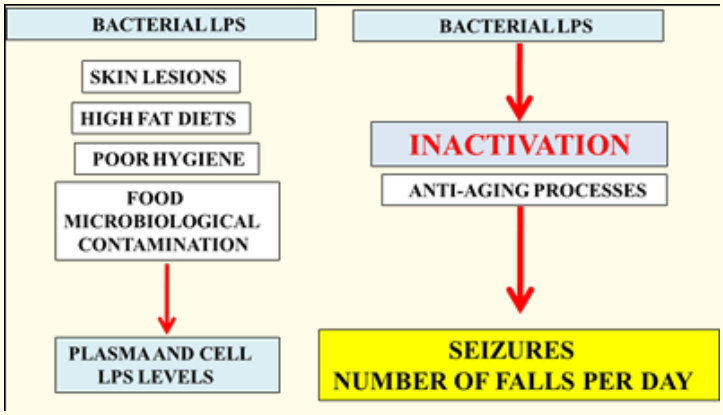

Figure 1: *The levels of LPS in the plasma and cells are determined by transport of LPS across the skin and intestine that are mediated by high fat diets, microbiological contamination and poor hygiene. Adenosine treatment of epilepsy can be supersed by LPS which has increased to alarming levels in the developing world (22). Major interests in LPS repression of the anti-aging gene Sirt 1 is now relevant to epileptic seizures that without Sirt 1 activation epilepsy and the number of seizures may increase per day.*

Nitric oxide (NO) and prevention of epilepsy and seizures is now important to anti-epileptic drug therapy with NO important in neuromodulation and neurotransmitter release with relevance to anti-convulsive actions [7]. Adenosine is important to neuromodulation and NO homeostasis with relevance to epileptic conditions [8]. Adenosine is critical to mitochondrial function with effects on NO that maintain mitochondrial function [14,15]. Sirt 1 is involved in appetite and sleep regulation and its regulation of cell NO homeostasis [16,17] is determined by cellular LPS levels [12] (Figure 1) that influence adenosine receptors [18-20] with relevance to adenosine treatment of epigenetic epilepsy seizures.

High fat diets stimulate LPS absorption with LPS binding to various lipoproteins for transport to various cells and tissues [21]. LPS inserts itself into the membranes of various cells with transformation of membrane cholesterol flux between lipoproteins and cells [22]. Skin lesions may allow LPS transport into the blood plasma with accelerated transfer to various cells and tissues (Figure 1). Hygiene practices are essential to prevent microbiological contamination with elevated LPS levels that have reached epidemic proportions in the developing world [22]. Diets that contain Sirt 1 activators [12,23] are essential to override inhibitory LPS effects on epileptic drug and adenosine treatment with relevance to seizures. Appetite control and Sirt 1 activators stimulate mitochondrial biogenesis with relevance to the reduction in the number of seizures per day. Sirt 1 inhibitors such as alcohol and palmitic acid [12] should be avoided to allow important epileptic drug and adenosine therapy with relevance to foam cell formation, cardiovascular disease and epilepsy [24-28].

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