

EDITORIAL

Antibiotic Use and Nuclear Receptor Inactivation Linked to Mitophagy in Diabetes and Chronic Diseases

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Editorial

Antibiotic overuse, antibiotic resistance and the risk of induction of diabetes have raised concerns with use of the dose of antibiotics in various communities [1-6]. The risks of infections in diabetes and neurodegenerative diseases [7-9] have increased antibiotic use in these individuals. Mitophagy in diabetes and neurodegeneration have been associated with poor mitochondrial quality control and autophagic degradation of mitochondria relevant to mitochondrial apoptosis associated with multisystem organ disease [10-13]. The association between infections, antibiotic use and mitophagy [14-16] has raised concerns with relevance to the doses of antibiotics in mitochondrial dynamics and antibiotic induced mitophagy in these chronic diseases with irreversible cell death associated antibiotics and multisystem organ disease.

Non Alcoholic Fatty Liver Disease (NAFLD) has now been linked to diabetes and neurodegenerative diseases [17-19] with the nuclear receptor Sirtuin 1 (Sirt 1) now closely associated with these chronic diseases [20]. Defective Sirt 1 has been associated with the induction of NAFLD, diabetes and neurodegeneration [21, 22] and its role in hepatic drug metabolism may inactivate glucose/cholesterol homeostasis with defective drug metabolism relevant to insulin resistance and various chronic diseases [20]. Excessive antibiotic use may damage the liver [23] and inactivate Sirt 1 with excessive antimicrobial drug use connected with Sirt 1 repression linked to mitophagy, programmed cell death and chronic disease [24]. Antibiotic use (dose) and antibiotic resistance is now relevant to Sirt 1's activity in the liver with Sirt 1 critical to hepatic antibiotic clearance and metabolism [25]. Sirt 1's role in antibiotic treatment and therapy is connected to chronic disease with NAFLD (Figure 1) primarily involved in the multiple system organ disease and diabetes (Figure 1). Antimicrobials such as Indian spices (doses) and caffeine should be carefully controlled [26] with relevance to inactivation of antibiotic use in medicine, diabetes and chronic diseases.

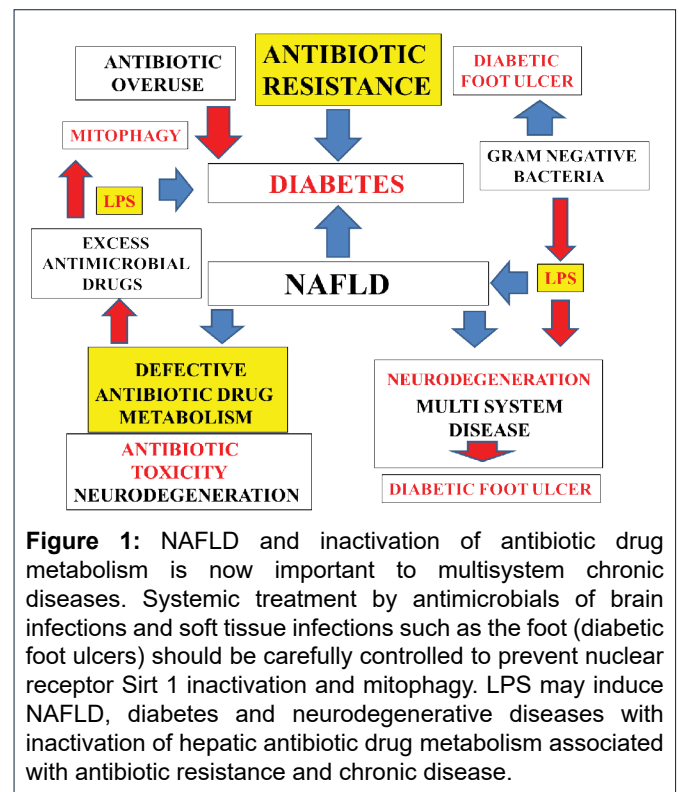


Figure 1: NAFLD and inactivation of antibiotic drug metabolism is now important to multisystem chronic diseases. Systemic treatment by antimicrobials of brain infections and soft tissue infections such as the foot (diabetic foot ulcers) should be carefully controlled to prevent nuclear receptor Sirt 1 inactivation and mitophagy. LPS may induce NAFLD, diabetes and neurodegenerative diseases with inactivation of hepatic antibiotic drug metabolism associated with antibiotic resistance and chronic disease.

Systemic treatment with the use of antimicrobial drugs to prevent infections in neurodegenerative diseases [7-9] and soft tissues infections such as foot infections and diabetic foot ulcer infections [27-31] should be carefully controlled with relevance to toxicity to mitochondria and cells. Gram negative bacterial infections may release bacterial Lipopolysaccharides (LPS)

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after antimicrobial treatment [32] that may induce mitophagy insulin resistance and NAFLD (Figure 1). LPS may completely inactivate hepatic liver antimicrobial drug metabolism [25, 33] with relevance to antimicrobial drug treatment in diabetes and neurodegenerative diseases. Maintenance of liver antimicrobial drug metabolism and systemic therapy may involve a diet that maintains nuclear receptor Sirt 1 activation [20-22] to prevent LPS induced Sirt 1 repression associated with diabetes and neurodegenerative diseases.

Conclusion

NAFLD is now relevant to defective antimicrobial drug metabolism in diabetes and neurodegenerative diseases. The NAFLD epidemic is expected by the year 2050 to effect between 20-30% of the global population. Excessive systemic administration of antibiotic use with NAFLD should be avoided to prevent excessive LPS release with antibiotic use associated with mitophagy in NAFLD and multisystem diseases that include diabetes, neurodegenerative diseases and soft tissue diseases such as diabetic foot ulcer.

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