Minocycline: Far beyond an antibiotic.

Garrido-Mesa N, Zarzuelo A, Gálvez J.

Source
Centro de Investigaciones Biomédicas en Red - Enfermedades Hepáticas y Digestivas (CIBER-EHD), Department of Pharmacology, Center for Biomedical Research, University of Granada, Granada, Spain.

Abstract

Minocycline is a second-generation, semi-synthetic tetracycline that has been in therapeutic use for over 30 years because of its antibiotic properties against both Gram-positive and Gram-negative bacteria. It is mainly used in the treatment of acne vulgaris and some sexually transmitted diseases. Recently, it has been reported that tetracyclines can exert a variety of biological actions that are independent of their anti-microbial activity, including anti-inflammatory and anti-apoptotic activities, and inhibition proteolysis, angiogenesis, and tumour metastasis. These findings specifically concern to minocycline since it has recently been found to have multiple non-antibiotic biological effects that are beneficial in experimental models of various diseases with an inflammatory basis, including dermatitis, periodontitis, atherosclerosis, and autoimmune disorders such as rheumatoid arthritis and inflammatory bowel disease. Of note, minocycline has also emerged as the most effective tetracycline derivative at providing neuroprotection. This effect has been confirmed in experimental models of ischaemia, traumatic brain injury, and neuropathic pain, and of several neurodegenerative conditions including Parkinson's disease, Huntington's disease, amyotrophic lateral sclerosis, Alzheimer's disease, multiple sclerosis, and spinal cord injury. Moreover, other pre-clinical studies have shown its ability to inhibit malignant cell growth and activation and replication of human immunodeficiency virus, and to prevent bone resorption. Considering the above-mentioned findings, this review will cover the most important topics in the pharmacology of minocycline to date, supporting its evaluation as a new therapeutic approach for many of the diseases described herein.


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