



## Antibiotic-induced neuropathy

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### Introduction ▲▼

#### Overview

Antibiotic-induced neuropathy is a rare complication of several antimicrobial agents. In this article, the author discusses antibiotics that have been associated with peripheral neuropathy, focusing on those in general use and with the most established associations, and detailing the possible underlying pathophysiologic mechanisms leading to neuropathy. In most cases, the antibiotics result in a predominantly sensory axonopathy with a "dying back" of distal segments, and patients improve after the drug is discontinued.

#### Historical note and terminology

Although the Egyptians may have been the first to appreciate the antibiotic properties of some living matter when they applied moldy bread to wounds, and Sir Alexander Fleming discovered penicillin in 1928 and showed that it was active against *Staphylococcus* in culture, it wasn't until Rene Dubos isolated tyrothricin from the soil microbe *Bacillus brevis* in 1939 that an antibiotic was isolated and used successfully to treat human disease.

The term antibiotic derives from the Greek, meaning "against life." Strictly speaking, an antibiotic is a substance that is produced by 1 microorganism that is able to inhibit the growth or kill other microorganisms. More generally, the term is used to refer to any naturally produced, semi-synthetic, or synthetic compound that acts against microorganisms, and includes antibacterials, antifungals, antiprotozoals, and anthelmintics. Antivirals can be loosely considered antibiotics, and the only members of that class associated with significant peripheral neuropathy are the nucleoside analogs, used against HIV-1, which characteristically cause a distal symmetric dysesthetic sensory neuropathy, and podophyllin resin, which is used to treat warts caused by human papilloma virus and is associated with a sensory and autonomic neuropathy; neither of these will be addressed here.

Several antibiotics are associated with peripheral neuropathy. With some notable exceptions, these toxic effects are rare compared to the relatively high incidence of neuropathy associated with antiretroviral drugs and antineoplastic agents. Despite widespread antibiotic use, most of the associations are based on relatively few case reports, and on fewer detailed animal studies to support an underlying pathogenic mechanism. The essential basis of a connection relies at a minimum on a temporal association with drug intake, followed by symptomatic stabilization, improvement or resolution after stopping the drug. Table 1 lists those antimicrobials that have been associated with peripheral neuropathy. This review will cover antimicrobials that are in more general use and those with well-established associations. Antimicrobials (which have been associated solely with damage to cranial nerves or their end organs), such as the aminoglycosides (which are oto- and vestibulotoxic) and vancomycin (which is vestibulotoxic) are not covered. Suramin, which is not approved in the United States but which is used elsewhere as an antiprotozoal agent, and is under investigation as an antineoplastic drug, is covered.

**Table 1. Antimicrobials Associated with Peripheral Neuropathy**

- Chloramphenicol
- Chloroquine
- Cloiquinol
- Dapsone
- Ethambutol
- Fluoroquinolones
- Griseofulvin
- Isoniazid
- Linezolid
- Mefloquine
- Metronidazole
- Nitrofurantoin
- Podophyllin resin
- Suramin

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