



Clinical Pharmacology & Toxicology Pearl of the Week

~ Ivermectin ~

Introduction

- ✓ Ivermectin is an antiparasitic drug that is used to treat several tropical diseases, including onchocerciasis (River blindness) and other helminthiases.
- ✓ In addition, some topical forms of ivermectin are approved to treat external parasites like head lice and for skin conditions such as rosacea.

Theoretical role in viral infections

- ✓ Reports from in vitro studies suggest that ivermectin acts by inhibiting the host importin alpha/beta-1 nuclear transport proteins, which are part of a key intracellular transport process that viruses hijack to enhance infection by suppressing the host's antiviral response.
- ✓ In addition, ivermectin docking may interfere with the attachment of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) spike protein to the human cell membrane.
- ✓ Some studies of ivermectin have also reported potential anti-inflammatory properties, which have been postulated to be beneficial in people with COVID-19.
- ✓ Ivermectin has been shown to inhibit the replication of SARS-CoV-2 in cell cultures. However, pharmacokinetic and pharmacodynamic studies suggest that achieving the plasma concentrations necessary for the antiviral efficacy detected in vitro would require administration of doses up to 100-fold higher than those approved for use in humans.
- ✓ Even though ivermectin appears to accumulate in the lung tissue, predicted systemic plasma and lung tissue concentrations are much lower than 2 μM , the half-maximal inhibitory concentration (IC₅₀) against SARS-CoV-2 in vitro.
- ✓ Despite this in vitro activity, no clinical trials have reported a clinical benefit for ivermectin in patients with these viruses.
- ✓ **Ivermectin is currently not approved for the treatment of any viral infection, including COVID-19.**

Human toxicity

- ✓ Ivermectin is a minor cytochrome P450 3A4 substrate and a p-glycoprotein substrate.
 - Potential exists for drug interactions with medications metabolized through 3A4 such as warfarin
- ✓ Generally well tolerated in doses meant for humans (i.e. 3-24 mg).
 - Adverse effects may include dizziness, pruritus, nausea, or diarrhea.
- ✓ More serious adverse events include seizures, coma, encephalopathy, ataxia, hypotension, especially if humans take doses meant for large animals like horses.

Statements from Health and Regulatory Agencies

- ✓ [AHS recommends against Ivermectin for the prevention or treatment of COVID-19](#)
- ✓ [Health Canada Safety Alert on Ivermectin to treat or prevent COVID-19](#)
- ✓ [FDA warns against the use of veterinary Ivermectin in humans](#)
- ✓ [NIH COVID-19 treatment guidelines](#)



The Calgary Clinical Pharmacology physician consultation service is available Mon-Fri, 8am-5pm. The on-call physician is listed in ROCA. Click [HERE](#) for more details.



The Poison and Drug Information Service (PADIS) is available 24/7 for questions related to poisonings. Please call 1-800-332-1414, and select option 1.