



# CAPSAICIN

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Capsaicin is best known for its ability to produce the spicy sensation felt when consuming various peppers from the Capsicum genus of fruiting plants. The compound was first isolated in the early 19th century. However, it is believed that hot pepper extracts have roots in medicine that go back thousands of years. Interestingly, while capsaicin is primarily used for its analgesic effect, its initial effects on the skin are a transient burning/painful feeling, which can last a few days or even weeks when first applying it. Some brand names of topical capsaicin include Capsagel, Salonpas-Hot and Zostrix.

## **Mechanism:**

Capsaicin binds to and activates the transient receptor potential cation channel subfamily V member 1 (TRPV1) receptor, a member of the transient receptor potential (TRP) family. The TRPV1 receptor is primarily found on neurons responsible for sensing nociception (pain) and thermoreception (heat). Activation of these neurons causes release of stored neuropeptides such as substance P and calcitonin gene-related peptide (CGRP), which play a role in causing someone to feel pain and/or itch. Once the neuron has been repeatedly activated via the TRPV1 receptor, it becomes depleted of these neuropeptides, and the neuron is desensitized to further stimulation via the receptor. The initial application of capsaicin causes a burning/painful sensation because of the initial release of neuropeptides. Once depleted of them, the neuron has a decreased capability to promote the sensation of pain and itch via capsaicin or other extrinsic causes. It is by this mechanism that capsaicin derives its positive pharmacologic attributes for dermatologic use.

## **Indications:**

Capsaicin is primarily used topically in dermatology for localized areas of chronic pruritis (itch) and chronic neuropathic (nerve) pain. One of its most common and only FDA approved uses is for pain due to postherpetic neuralgia. Generally, for treating postherpetic neuralgia, capsaicin is used as an adjuvant treatment along with other therapies such as anticonvulsants, tricyclic antidepressants and opiate medications.

Other off-label dermatologic uses include:

- **Notalgia paresthetica**
- Hemodialysis-associated pruritis
- **Brachioradial pruritis**
- Reflex sympathetic dystrophy
- Pain due to psoralen plus ultraviolet A (**PUVA**) therapy or tumor infiltration
- **Erythromelalgia**
- **Psoriasis**
- Vulvar vestibulitis

## **Side effects:**

Most side effects of capsaicin are localized to areas of application with the most common effect being a burning/painful sensation for the first few days to weeks of applications. This occurs in up to 80% of patients. This effect can be mitigated by initially applying topical lidocaine prior to treatment, and keeping the tube in the refrigerator. Other local side effects include: pruritis (itching), erythema (red skin), swelling and xerosis (dryness).

Systemic side effects can occur and include: brady- or tachycardia (slow or fast heart rate), hypo- or hypertension (low or high blood pressure), allergic reactions and sneezing.

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It is important to note that topical capsaicin is a pregnancy category C medication, meaning studies have shown that the medication can have adverse effects on the fetus of non-human animals. However, it may still be considered as a treatment for pregnant woman if the benefits outweigh the risks.

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