# Spicy Food Consumption and Pain Tolerance: A Literature Review of Emerging Evidence

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## Background

Capsaicin, the pungent compound in chili peppers, activates transient receptor potential vanilloid 1 (TRPV1) receptors on nociceptive neurons and is well established as a topical analgesic. However, whether habitual dietary spicy food consumption modulates pain tolerance remains unclear. This narrative review synthesizes emerging evidence on the relationship between spicy food intake and pain sensitivity, examining acute versus chronic effects, underlying neurobiological mechanisms, and the role of psychological factors.

## Methods

A comprehensive literature search was conducted across MEDLINE, EMBASE, Cochrane Library, and PubMed through 2026. Studies examining the effects of oral capsaicin exposure or habitual spicy food consumption on experimental or clinical pain outcomes were included. Both human and preclinical mechanistic studies were reviewed.

**Disclosures & Ethics**

- **COI:** Authors declare no conflicts of interest.
- **IRB:** Exempt per OBH policy (devoid of patient identifiable data).
- **Off-Label:** No off-label drug or unapproved device use described.

## Results / Evidence

| Exposure Type | Objective Thresholds | Psychological Appraisal | Primary Mechanism |
|---|---|---|---|
| **Acute Oral Capsaicin** | Increased pressure & cold pain thresholds; decreased heat pain intensity. | Reduced perceived pain unpleasantness. | TRPV1 activation causing Ca-dependent receptor desensitization & central opioidergic activation. |
| **Chronic Habitual (≥3 days/wk)** | Lower basal pressure & cold pain thresholds. | Lower subjective pain sensitivity & reduced fear of pain. | Peripheral nociceptive sensitization paired with cognitive habituation. |
| **Phenotype / Preference** | Baseline pain tolerance equal between users & non-users. | Liking driven by sensation seeking & culture. | Dietary exposure drives changes (nurture over nature). |

## Discussion and Conclusions

The relationship between spicy food consumption and pain tolerance is complex and paradoxical. Acute capsaicin exposure produces robust short-term analgesia through TRPV1 desensitization and engagement of endogenous inhibitory systems, while chronic dietary intake may lower basal pain thresholds despite reducing subjective pain sensitivity. These findings have implications for understanding individual variability in pain perception and for optimizing capsaicin-based analgesic strategies. Future longitudinal and interventional studies are needed to clarify the causal direction of these associations and to determine whether dietary capsaicin exposure can be leveraged as an adjunctive pain management strategy.

**Key Conclusions:**

1. **Acute:** Robust short-term systemic analgesia.
2. **Chronic:** Paradoxical peripheral sensitization.
3. **Psychology:** Decoupling of physical threshold & pain fear.
4. **Therapy:** Potential adjunctive dietary strategies.

## References

1. Frias B, Merighi A. Capsaicin, Nociception and Pain. Molecules. 2016 Jun 1;21(6):797. doi:10.3390/MOLECULES21060797 PubMed PMID: 27322240.
2. Zhou Y, Chen T, Peng Y, Zheng J, Yang Z. Acute spicy stimulation reduces laser-induced heat pain perception in healthy adults. Physiol Behav. 2026 Jun 1;310. doi:10.1016/j.physbeh.2026.115309 PubMed PMID: 41825627.
3. He B, Shao M, Wu J, Wang J, Wei Z, Chen L, et al. The analgesic effect and neural mechanism of spicy food intake. Soc Cogn Affect Neurosci. 2025;20(1). doi:10.1093/SCAN/NSAF040 PubMed PMID: 40314109.
4. Duan G, Wu Z, Duan Z, Yang G, Fang L, Chen F, et al. Effects of Spicy Stimulation and Spicy-Food Consumption on Human Pain Sensitivity: A Healthy Volunteer Study. Journal of Pain. 2020 Jul 1;21(7–8):848–57. doi:10.1016/j.jpain.2019.11.011 PubMed PMID: 31783132.
5. Arora V, Campbell JN, Chung MK. Fight fire with fire: Neurobiology of capsaicin-induced analgesia for chronic pain. Pharmacol Ther. 2021 Apr 1;220. doi:10.1016/j.pharmthera.2020.107743 PubMed PMID: 33181192.
6. Gjerstad J, Tjølsen A, Svendsen F, Hole K. Inhibition of spinal nociceptive responses after intramuscular injection of capsaicin involves activation of noradrenergic and opioid systems. Brain Res. 2000 Mar 17;859(1):132–6. doi:10.1016/S0006-8993(00)01970-3 PubMed PMID: 10720622.
7. Bach FW, Yaksh TL. Release of β-endorphin immunoreactivity into ventriculo-cisternal perfusate by lumbar intrathecal capsaicin in the rat. Brain Res. 1995 Dec 1;701(1–2):192–200. doi:10.1016/0006-8993(95)01003-1 PubMed PMID: 8925284.
8. Gear RW, Aley KO, Levine JD. Pain-induced analgesia mediated by mesolimbic reward circuits. J Neurosci. 1999 Aug 15;19(16):7175–81. doi:10.1523/JNEUROSCI.19-16-07175.1999 PubMed PMID: 10436070.
9. Ludy MJ, Mattes RD. Comparison of sensory, physiological, personality, and cultural attributes in regular spicy food users and non-users. Appetite. 2012 Feb;58(1):19–27. doi:10.1016/j.appet.2011.09.018 PubMed PMID: 21986186.
10. Byrnes NK, Hayes JE. Personality factors predict spicy food liking and intake. Food Qual Prefer. 2013 Apr;28(1):213–21. doi:10.1016/j.foodqual.2012.09.008