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Education
M.Tech., PhD

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To Understand the Neural Circuit Involved in Itch and Pain Sensation

Research emphasis:

Pruritus (commonly known as itch) and pain are the two most common form of somatosensory perceptions which are implicated in variety of diseases and in our regular day-to-day life. The research interest of my lab is (1) to determine the cellular and molecular mechanisms underlying chronic itch and possibly pain in mice; (2) to characterize the subtype of itch and pain-responsive neurons in the spinal cord; (3) tracing the neural circuit for itch sensation in the spinal cord and CNS; (4) to discover the degree to which specific mechanisms of itch are conserved across mammalian species. My lab will use an interdisciplinary approach including molecular genetics, deep sequencing, functional imaging, electrophysiology, optogenetics along with pharmacological and mouse behavior to identify the biological relevant ligands and receptors that are involved in itch and pain.

Selected publications:

Goswami SC, Mishra SK, Maric D, Kaszas K, Gonnella GL, Clokie SJ, Kominski DH, Gross JR, Keller JK, Mannes AJ, Hoon MA, Iadarola MJ, Molecular signatures of TRPV1 nociceptive neurons revealed by RNA-Seq of rat and mouse DRG transcriptomes. *J. of Pain* 2014, Dec;15(12):1338-59.

Mishra SK and Hoon MA, The Cells and Circuitry for Itch Responses in Mice. *Science* May 24, 2013, Vol.340 no. 6135 pp. 968-971

Mishra SK, Holzman S and Hoon MA, A nociceptive signaling role for neuromedin B. *Journal of Neuroscience*, 2012, 32(25):8686-95

Mishra SK, Tisel S, Orestes P, Bhangoo S, Hoon M, TrpV1-lineage neurons are required for thermal sensation. *The EMBO Journal*, 2011, 30, 582-93

Application:

- Acute and chronic itch
- Chronic Pain

Collaboration potential:

- Acute and chronic itch pathways
- Neural circuit for pain