Using multidisciplinary approach including genetic, molecular, bio-analytical, biochemical & pharmacological tools, my lab is interested in understanding how neuro-inflammatory processes are engaged in periphery & CNS during development of chronic neuropathic pain with particular focus on: peroxynitrite induced nitroxidative stress, ceramide-to-S1P pathway, & A3A adenosine receptor. We are exploring contribution of these pathways in development of opioid-induced hyperalgesia & antinociceptive tolerance known to hamper effective use of opioids for pain mgmt. Our efforts have opened new field of pain research directed toward modulating critical mediators of pain rather than masking symptoms through traditional approaches. Novel chemical entities specifically target these pathways are evaluated through our collaborative efforts with ultimate goal of initiating proof of concept clinical trials. Already important efficacy increases by synergizing our targeted interventions with currently used analgesics have been noted. These large increases in pain relief achievable by targeting multiple synergistic pathways provide clear path forward for reducing dose and toxicities observed with currently used analgesic drugs.

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