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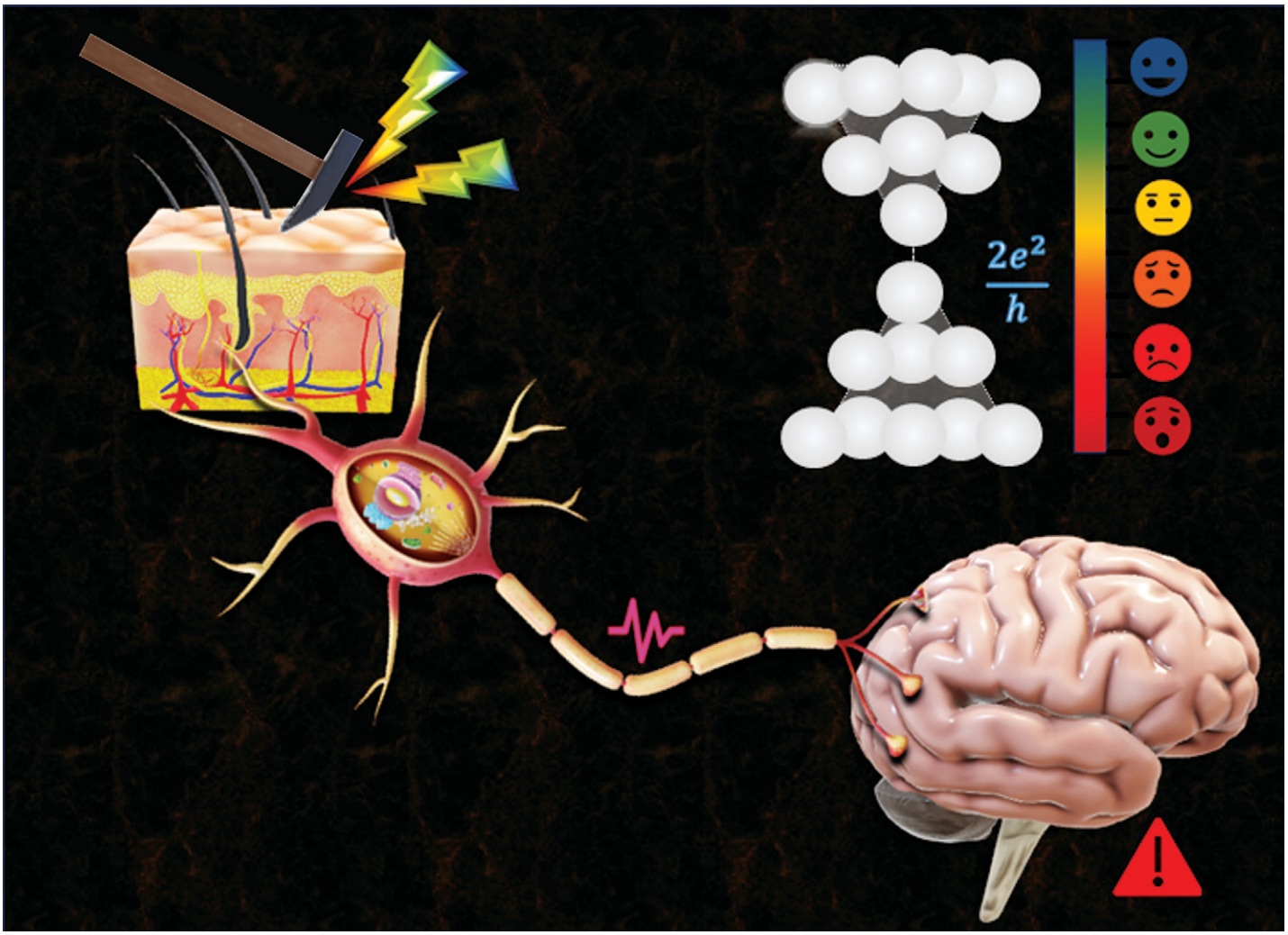

Showcasing research from Dr. Alpana Nayak's laboratory, Department of Physics, Indian Institute of Technology Patna, Bihar, India.

Artificial nociceptor using an $Ag/Ag_2S/Pt$ atomic switch

Pain is a crucial sensation for organisms to adapt to dynamic environments, hence a key capability for realistic machine intelligence. We present an $Ag/Ag_2S/Pt$ atomic switch as an artificial nociceptor, where voltage-dependent conductance modulation mirrors stimulus-dependent pain sensation. The voltage-dependent switching time, governed by different rate-limiting processes, parallels the varying response times of nociceptors. Quantized conductance levels encode distinct pain intensities, analogous to NMDAR channel openings in nociceptor networks. This work highlights signal-dependent conductance modulation in the $Ag/Ag_2S/Pt$ atomic switch, mimicking biological pain pathways and enhancing neuromorphic defense mechanisms.

As featured in:

See Anwesha Mahapatra and Alpana Nayak, *RSC Appl. Interfaces*, 2024, **1**, 711.

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