No laughing matter: understanding rapid antidepressant effects with nitrous oxide

My lab investigates neurobiological mechanisms underlying rapid antidepressant effects in animal models. We recently discovered that isoflurane, a commonly used volatile anesthetic, rapidly regulates key molecular signaling events implicated in rapid antidepressant actions produced by subanesthetic ketamine: activation of BDNF receptor TrkB and inhibition of GSK3β (Antila et al, *Scientific Reports*, 2017). These findings provide novel insights into the putative antidepressant potential of isoflurane and other anesthetics (e.g., Langer et al, 1995). Our unpublished data demonstrate that nitrous oxide (laughing gas), another putative rapid-acting antidepressant, bring very similar acute effects on TrkB and GSK3β signaling. In this talk I will present our theoretical framework regarding the shared principles how rapid-acting antidepressants target these signaling events.

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