Transcranial Magnetic Stimulation Assisted Drug Development

Validation and implementation in early phase development of novel drugs targeting cortical excitability

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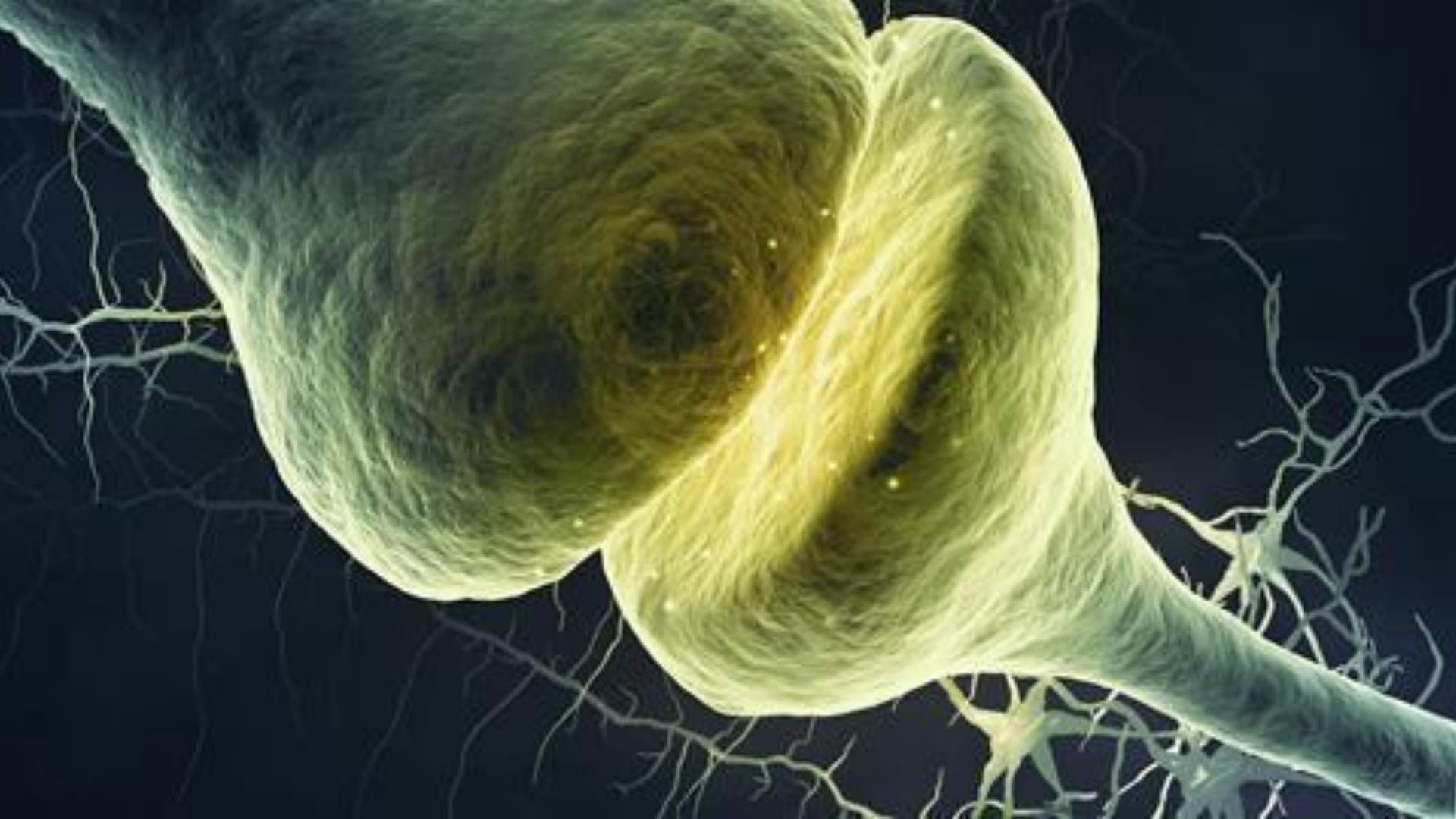
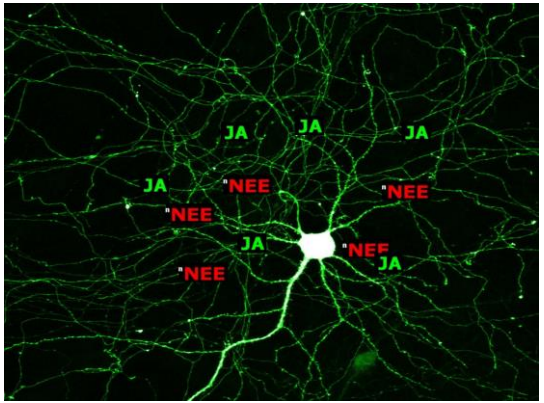
TADD-talk TechMed Event 6-Nov-2024

MST CHDR Centre for Human Drug Research

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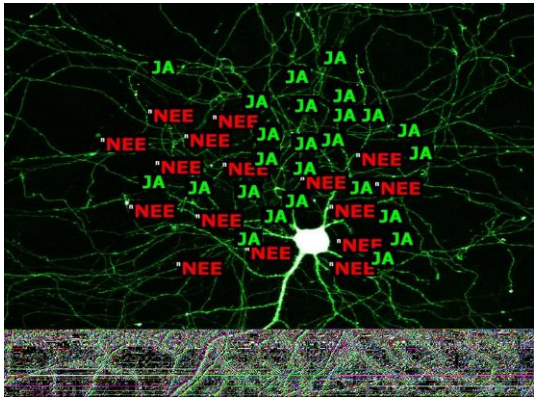
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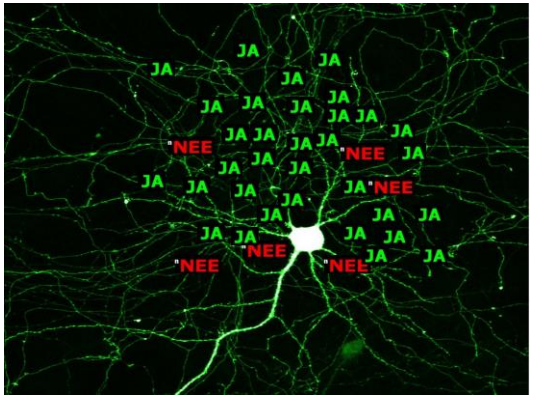
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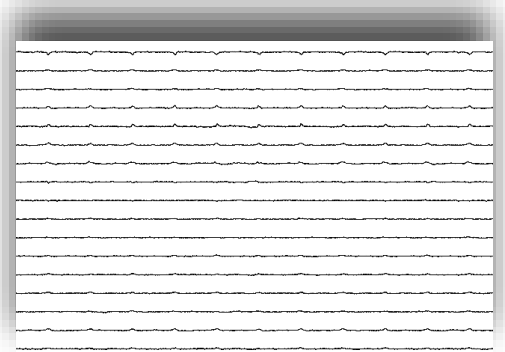

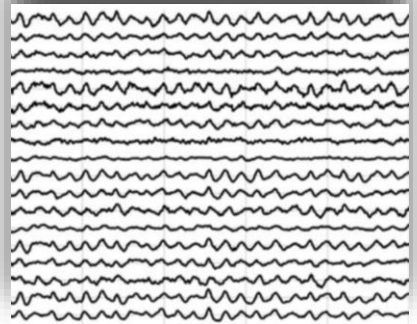

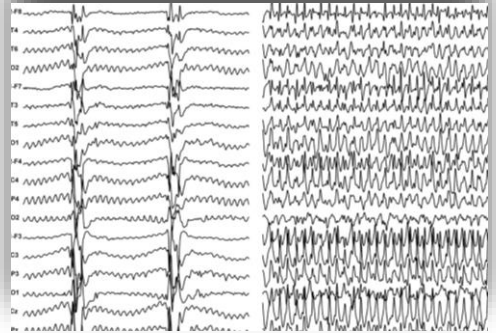

Transcranial Magnetic Stimulation (TMS)

Barker AT et al. The Lancet. 1985; de Goede AA et al. Clin Neurophysiol. 2016

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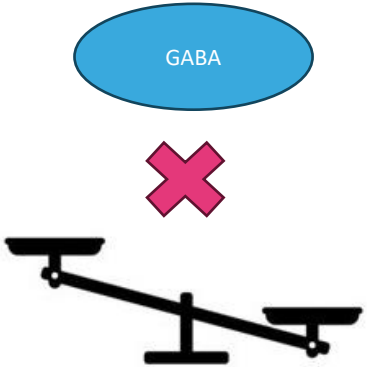
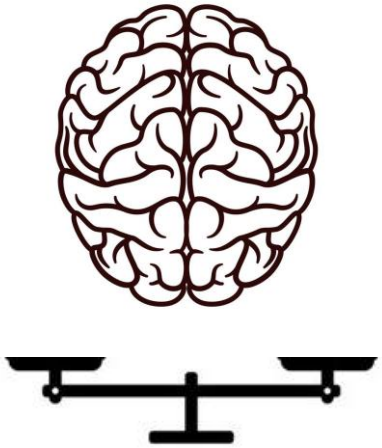




Inhibition

Sodium channel blocker/ GABA agonist
SV_2A ligand
Benzodiazepines ($GABA_AR$ agonist)

Neurosteroid ($GABA_AR$ agonist)

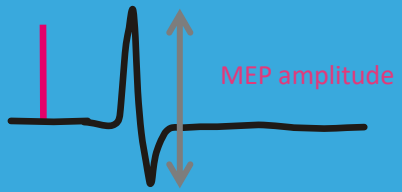
Excitation

S-Ketamine (NMDAR antagonist)

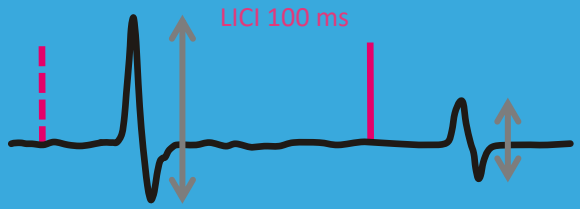
Novel AMPAR agonist
Immunomodulator (glutamate inhibitor)

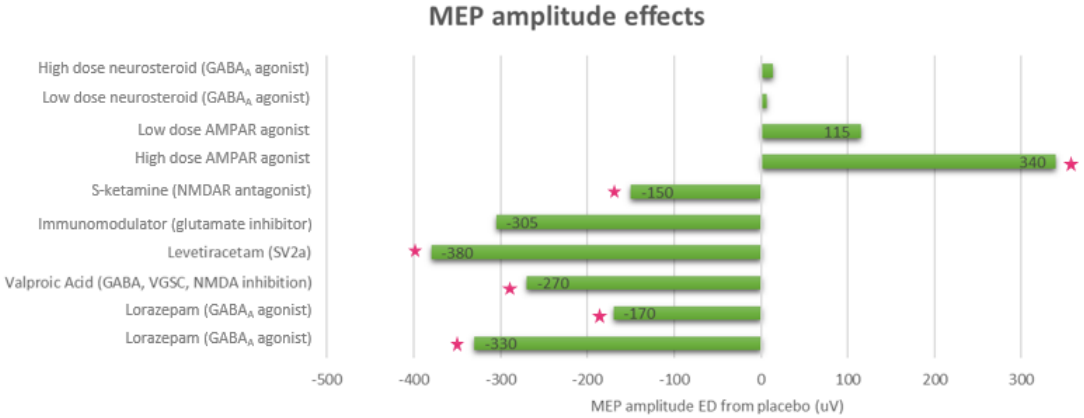
TMS biomarkers for excitation/inhibition

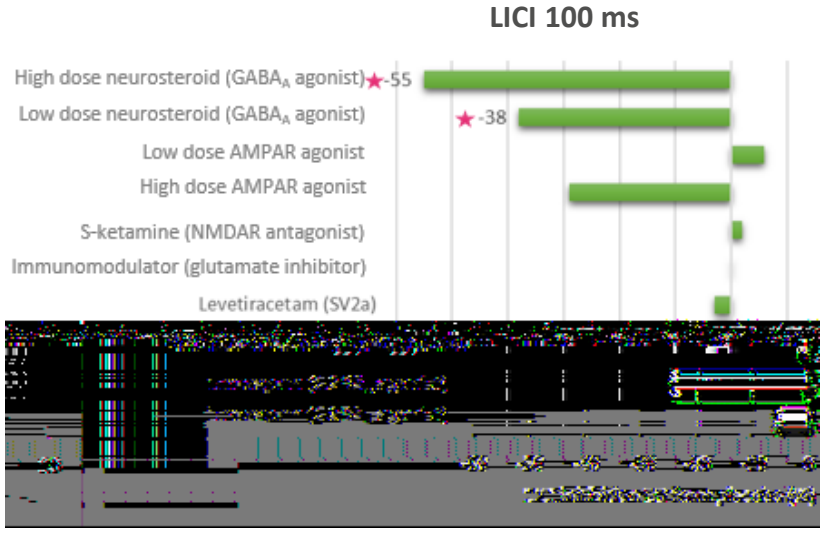
› Single-pulse TMS-EMG



› Paired-pulse TMS-EMG



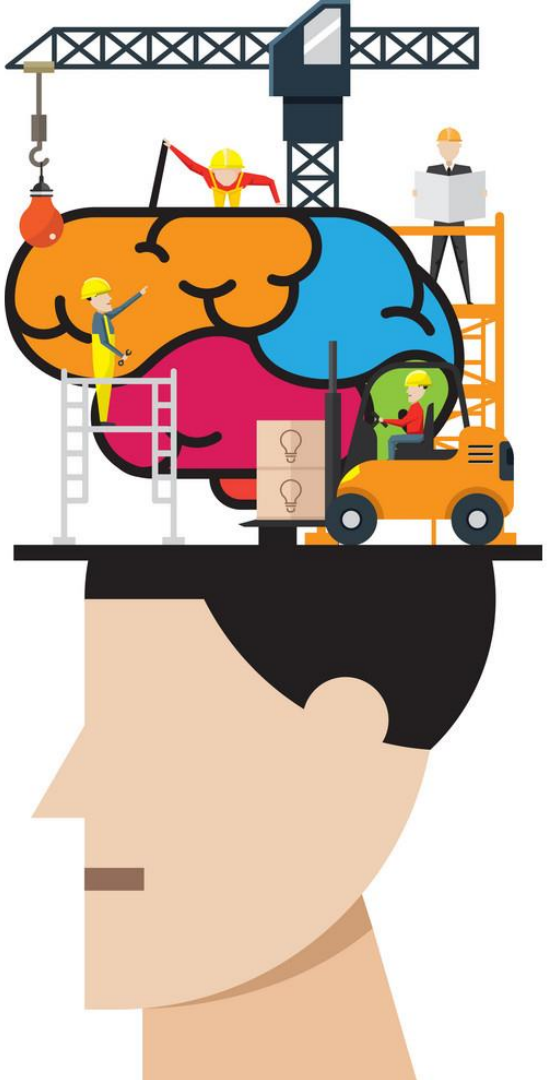




Conclusions & Future perspectives

- TMS adds value in early phase drug development!
  - Effects align with known mechanisms of action
  - Distinguish between novel and benchmark drugs
  - Dose-proportional effects → dose selection

- What's next? Keep on building!
  - More benchmark drugs
  - More selective drugs
  - Correlation TMS and other excitation/inhibition biomarkers
  - Healthy volunteers → Patients → Personalized medicine



Thank you for your attention!

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