Prostate cancer

Microultrasonography-guided prostate cancer biopsy

The incorporation of magnetic resonance imaging (MRI) into the prostate cancer diagnostic workflow has substantially improved detection of clinically significant prostate cancer (defined as Gleason grade group ≥2) but also has some limitations, such as the need for sophisticated imaging facilities that are not accessible in every institution. Microultrasonography, which has an incredibly high resolution (70-µm resolution), could be a valid alternative to MRI in prostate biopsy.

The OPTIMUM randomized controlled trial was conducted to assess the non-inferiority of microultrasonography-guided biopsy compared with MRI plus conventional ultrasonography fusion-guided biopsy for the detection of clinically significant prostate cancer in biopsy-naive men, and the results were published in *JAMA*.

A total of 802 men were randomized to receive biopsy guided by microultrasonography, MRI plus conventional ultrasonography or microultrasonography plus MRI. Clinically significant prostate cancer was detected in 57 men (47.1%) in the microultrasonography group and 141 men (42.6%) in the MRI plus conventional ultrasonography group, indicating non-inferiority of microultrasonography compared with MRI plus conventional ultrasonography (difference 3.52% (95% CI −3.95 to 10.92%); non-inferiority $P < 0.001$), which was the primary outcome of the study. The secondary outcome of the study, which was non-inferiority of combined microultrasonography plus MRI-guided biopsy versus MRI plus conventional ultrasonography-guided biopsy, was also reached (difference 4.29% (95% CI −4.06 to 12.63%); non-inferiority $P < 0.001$).

Results from this study indicate microultrasonography as a potential alternative to MRI for image-guided prostate biopsy. The authors suggested that future studies should focus on assessing the performance of microultrasonography in other clinical scenarios.

Maria Chiara Masone

Original article: Kinnaird, A. et al. Microultrasonography-guided vs MRI-guided biopsy for prostate cancer diagnosis: the OPTIMUM randomized clinical trial. *JAMA* https://doi.org/10.1001/jama.2025.3579 (2025)

Sexual medicine

Neural control of male sexual behaviours

Copulatory behaviour in rodents follows a stereotypical sequence of actions consisting in mounting, intromission and ejaculation. Different brain regions, including the nucleus accumbens (NAc), and different neurotransmitters, particularly dopamine (DA) and acetylcholine (ACh), have been shown to have a role in regulating copulatory behaviours, but the exact neural mechanisms regulating the transitions from mounting to intromission to ejaculation remain elusive.

A new study published in *Neuron* investigates how ACh modulates DA dynamics in different subregions of NAc to regulate male sexual behaviours.

Fibre photometry was used to monitor DA dynamics in the NAc of C57BL/6J male mice by using a DA sensor. DA fluctuations that aligned with sexual behaviour transitions were observed specifically in the ventral shell of the NAc (vsNAc), with a rhythmic DA activity observed during intromission, suggesting a local DA-mediated regulatory mechanism controlling male sexual behaviour transitions. Fibre photometry with ACh and DA sensors was then used to monitor the dynamics of both neurotransmitters in the vsNAc and showed the existence of dual ACh and DA rhythms during intromission.

Activation of cholinergic neurons in the NAc through optogenetics in ex vivo brain slices induced a robust increase in DA release. Conversely, stimulation of DA signalling regulated ACh release in the vsNAc, suggesting that these dual ACh–DA rhythms are generated by reciprocal interactions between ACh and DA signalling in the vsNAc. Notably, ACh rhythms preceded and persisted during intromission, suggesting that ACh and DA signalling initiate and sustain intromission, respectively. Last, the authors observed a slowdown of DA rhythm just before ejaculation, and optogenetic-mediated activation of cholinergic neurons in the vsNAc resulted in a similar slowdown of DA rhythm followed by immediate ejaculation, suggesting that the timing of ejaculation is an actively regulated process.

"Our findings suggest that dual acetylcholine–dopamine dynamics in the ventral shell of the NAc has a crucial role in orchestrating the sequential transitions of male sexual behaviours, particularly the transition from intromission to ejaculation," comments corresponding author Qinghua Liu. "This insight bridges the gap between motivational and motor aspects of sexual behaviour, offering a new perspective on the neurochemical mechanisms underlying ejaculation control." Liu also comments about the clinical importance of these findings: "Clinically, our study has important implications for understanding ejaculation dysfunctions, such as premature ejaculation, which are common side effects of psychiatric disorders and psychotropic medications. Considering that many psychotropic drugs alter DA signalling, our results suggest that disruptions in DA release patterns could contribute to these dysfunctions," concluding "This knowledge might guide the development of improved therapeutic strategies for sexual dysfunctions associated with psychiatric treatments."

Maria Chiara Masone

Original article: Miyasaka, A. et al. Sequential transitions of male sexual behaviors driven by dual acetylcholine-dopamine dynamics. *Neuron* https://doi.org/10.1016/j.neuron.2025.01.032 (2025)