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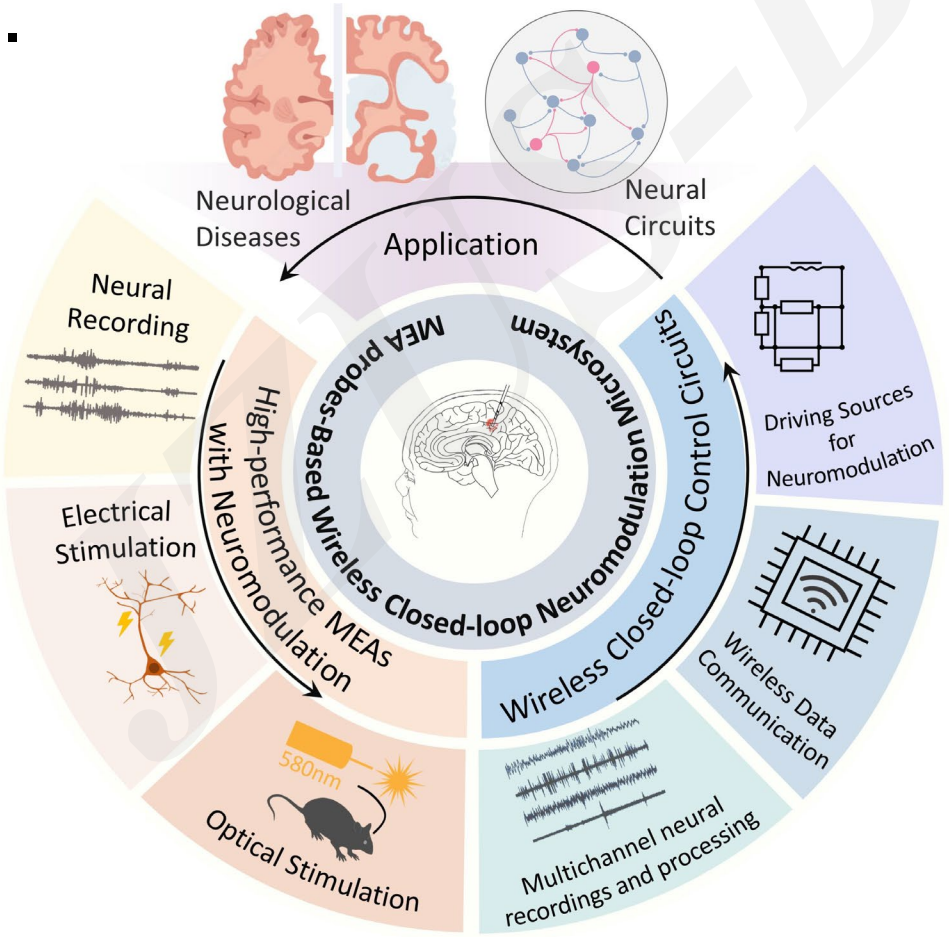
Wireless closed-loop deep brain stimulation using microelectrode array probes

Key words: **Wireless closed-loop deep brain stimulation (CL-DBS) microsystem; Deep brain stimulation (DBS); Microelectrode array (MEA) probes; Optical stimulation; Electrical stimulation**

Review Summary

This review mainly focused on the core components of wireless CL-DBS microsystems using MEA probes, especially in optical stimulation and electrical stimulation.



Innovation points

- **This review overviewed deep brain stimulation using MEA probes, rather than studies that exclusively focus on electrocorticogram.**

- **This review overviewed main components in wireless CL-DBS microsystems, rather than studies that exclusively focus on DBS systems.**

- **We delve deeper into the critical biomarkers that different diseases can focus on, including spike and LFP, in a clinical scenario.**

- **Important challenges, and research opportunities for this microsystem to address societal changes are described. This review offers novel therapeutic options for psychiatric disorders in the future.**

Figure 4

Innovation points

A series of comprehensive figures were presented to summarize the neural probes integrated with different stimulation. Components and applications of CL-DBS were overviewed as well.

Figure 3| Examples of MEA probes with integrated optical stimulation.

Figure 5| Improvements in modulation and detection.

Table 1| Different wireless types of data communication.

Table 2| A summary of driving energy.

Table 3| Summary of targets and feedbacks in disease therapy.