

Notes on Neuroengineering

Introduction

[Neuroengineering](#) is a biomedical engineering field that provides a systematic framework for understanding complex processes in the brain [1]. Research in neuroengineering could allow for novel technologies that interface with the brain [2, 3]. Neural engineering encompasses neural regrowth and repair [4, 5]. Neural growth is influenced by genetic factors [6] which may be relevant to neural enhancement research [7-9].

References

1. Edelman, B. J., Johnson, N., Sohrabpour, A., Tong, S., Thakor, N., & He, B. (2015). Systems neuroengineering: understanding and interacting with the brain. *Engineering*, 1(3), 292-308.
2. Chiappalone, M., Cota, V. R., Carè, M., Di Florio, M., Beaubois, R., Buccelli, S., ... & Levi, T. (2022). Neuromorphic-based neuroprostheses for brain rewiring: state-of-the-art and perspectives in neuroengineering. *Brain sciences*, 12(11), 1578.
3. Won, S. M., Cai, L., Gutruf, P., & Rogers, J. A. (2023). Wireless and battery-free technologies for neuroengineering. *Nature Biomedical Engineering*, 7(4), 405-423.
4. Schmidt CE, Leach JB. Neural tissue engineering: strategies for repair and regeneration. *Annu Rev Biomed Eng*. 2003;5:293-347. doi:10.1146/annurev.bioeng.5.011303.120731
5. Li Y, Ma Z, Ren Y, et al. Tissue Engineering Strategies for Peripheral Nerve Regeneration. *Front Neurol*. 2021;12:768267. Published 2021 Nov 16. doi:10.3389/fneur.2021.768267
6. Seidlitz J, Mallard TT, Vogel JW, et al. The molecular genetic landscape of human brain size variation. *Cell Rep*. 2023;42(11):113439. doi:10.1016/j.celrep.2023.113439
7. Dresler M, Sandberg A, Bublitz C, et al. Hacking the Brain: Dimensions of Cognitive Enhancement. *ACS Chem Neurosci*. 2019;10(3):1137-1148. doi:10.1021/acscchemneuro.8b00571
8. Marazziti D, Avella MT, Ivaldi T, et al. Neuroenhancement: State of the Art and Future Perspectives. *Clin Neuropsychiatry*. 2021;18(3):137-169. doi:10.36131/cnfioritieditore20210303
9. Violante IR, Okyere P (2024) Can neurotechnology revolutionize cognitive enhancement? *PLoS Biol* 22(10): e3002831. <https://doi.org/10.1371/journal.pbio.3002831>