

Human cell reprogramming technologies offer access to live human neurons from patients and provide a new alternative for modeling neurological disorders in vitro. Neural electrical activity is the essence of nervous system function in vivo. Therefore, we examined neuronal activity in media widely used to culture neurons. We found that classic basal media, as well as serum, impair action potential generation and synaptic communication. To overcome this problem, we designed a new neuronal medium (BrainPhys basal + serum-free supplements) in which we adjusted the concentrations of inorganic salts, neuroactive amino acids, and energetic substrates. We then tested that this medium adequately supports neuronal activity and survival of human neurons in culture. Long-term exposure to this physiological medium also improved the proportion of neurons that were synaptically active. The medium was designed to culture human neurons but also proved adequate for rodent neurons. The improvement in BrainPhys basal medium to support neurophysiological activity is an important step toward reducing the gap between brain physiological conditions in vivo and neuronal models in vitro <sup>1)</sup>.

<sup>1)</sup>

Bardy C, van den Hurk M, Eames T, Marchand C, Hernandez RV, Kellogg M, Gorris M, Galet B, Palomares V, Brown J, Bang AG, Mertens J, Böhnke L, Boyer L, Simon S, Gage FH. Neuronal medium that supports basic synaptic functions and activity of human neurons in vitro. Proc Natl Acad Sci U S A. 2015 May 19;112(20):E2725-34. doi: 10.1073/pnas.1504393112. Epub 2015 Apr 13. Erratum in: Proc Natl Acad Sci U S A. 2015 Jun 23;112(25):E3312. PubMed PMID: 25870293; PubMed Central PMCID: PMC4443325.

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