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Poster Sessions

Generation of cortical organoids with axial polarity from marmoset embryonic stem cells

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In clinical trials, the success rate of drug development in psychiatric disorders is less than 10%. This lower level could be attributed to differences in some brain functions between rodents and humans. To improve this issue, we should use not only rodents but also non-human primates as both *in vivo* and *in vitro* models for evaluating drug efficacy. Accumulating evidence indicates that organoids recapitulate many aspects of human brain development *in vitro* and facilitates human neurobiology. Therefore, to construct an *in vitro* system of non-human primates, we aimed to establish a differentiation method that induces cortical organoids from marmoset embryonic stem cells (cjESCs). We found the expression of the telencephalon markers Foxg1 and Emx1/2 in cjESC-derived organoids. We further performed a long-term culture to induce mature neurons in the organoids. Immunohistochemistry revealed that Tbr1⁺/Ctip2⁺ cells were distributed around Pax6⁺/Sox2⁺ clusters, suggesting that cjESCs differentiated into mature neurons in the outer layer surrounding the neuroepithelium-like structure. We conclude that cjESC-derived cortical organoids have cytoarchitecture similar to the developing marmoset brain. Future research will analyze neural networks of the cortical organoids, such as synapse formation and spontaneous neuronal activity, by two-photon imaging.