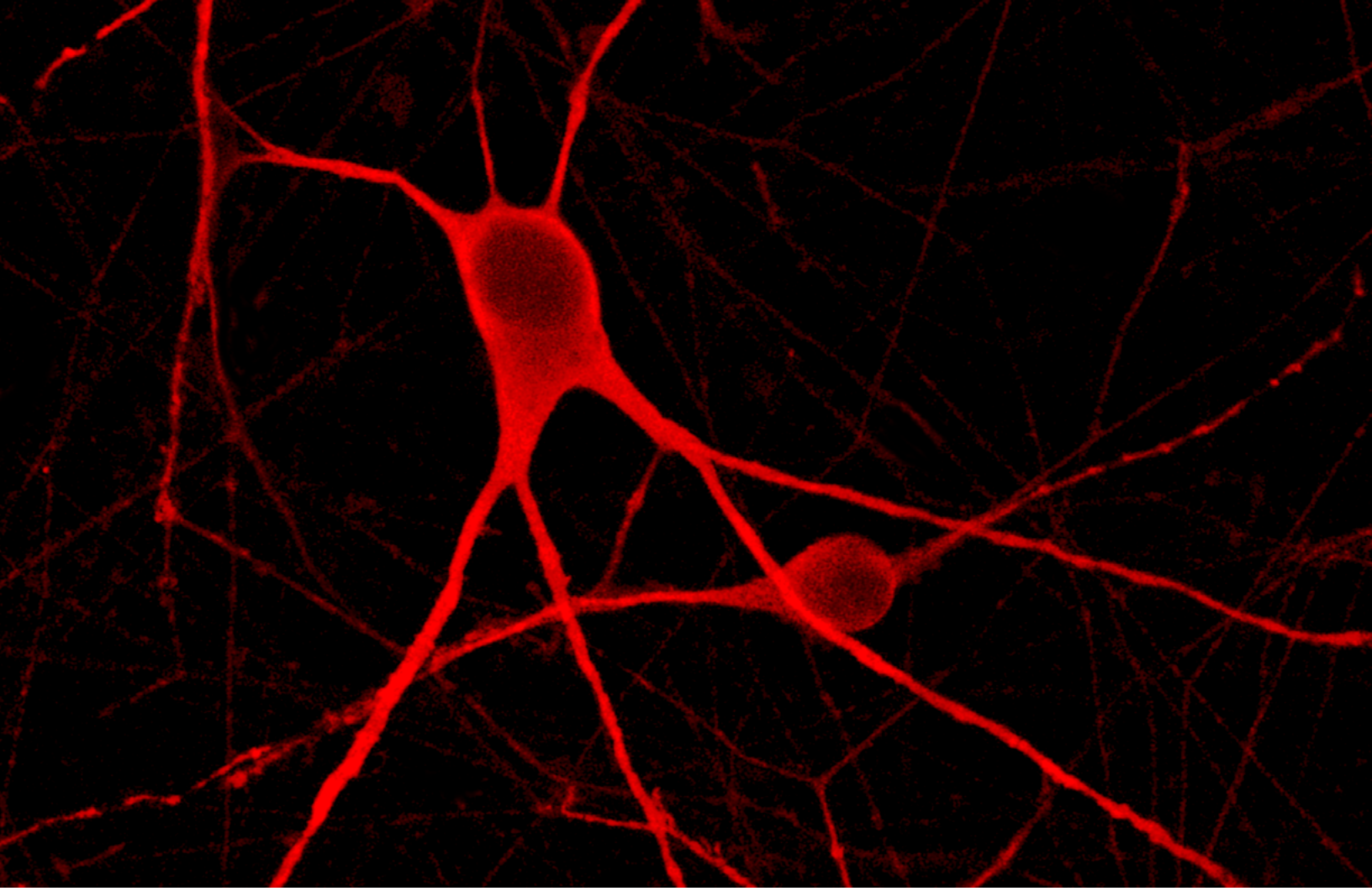


ioMotor Neurons™

Human iPSC-derived motor neurons

Learn more about ioMotor Neurons

ioCells™

About the cells

ioMotor Neurons have been precision reprogrammed from human induced pluripotent stem cells (iPSC) using opti-ox™ technology. Within days, cells convert consistently to defined, functional motor neurons, showing the expression of key lower motor neuron marker genes MNX1(HB9), FOXP1, ISL2 and cholinergic markers CHAT & SLC18A3 (VAChT) by day 4.

ioMotor Neurons represent an accurate in vitro model of lower motor neurons (indicated spinal – cervical region identity), enabling scientists to build physiological relevance into their experiments at scales from single cell analysis to high content imaging, helping bridge translational gaps in motor neuron disease research and neurotoxicology.

Benchtop benefits

QUICK AND EASY

Within 4 days post revival cells are ready for experimentation, displaying motor neuronal morphology without clumping.

DEFINED

>80% cells express key lower motor neuron markers indicating a spinal motor neuron identity (cervical region). >99.9% neuronal population.

FUNCTIONAL

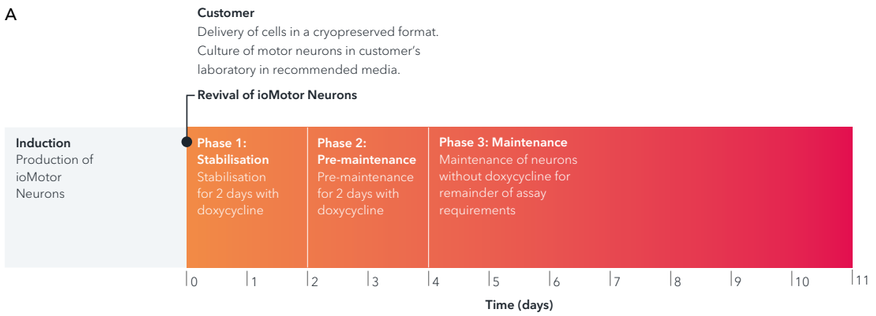
Cells arrive programmed to rapidly mature upon revival. One medium is required in a two-phase protocol.

Ready within days

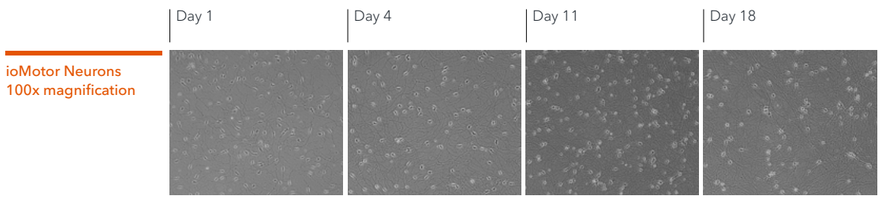
A. The protocol for the generation of ioMotor Neurons is a three-phase process: 1. Stabilisation for 2 days. 2. Pre-maintenance for an additional 2 days. 3. Maintenance of cells for the duration of assay requirements.

B. ioMotor Neurons acquire a rapid motor neuronal phenotype, without clumping; forming a homogenous neuronal network by day 4. Day 1 to 18 post-thawing. 100x magnification.

A



B

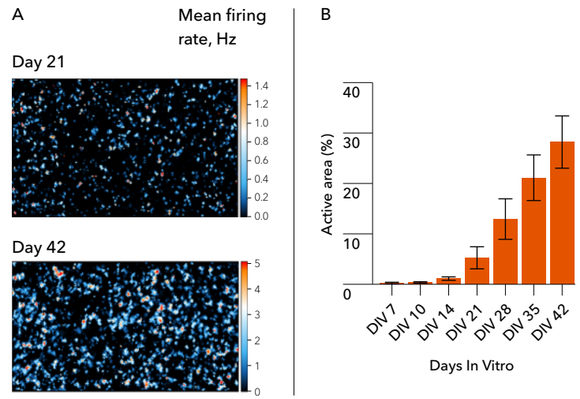


Rapid gain of functional activity

ioMotor Neurons show activity in astrocyte co-culture that increases over time as networks mature. Demonstrated by MEA.

A. Mean firing rates (Hz) increase substantially throughout the course of the experiment.

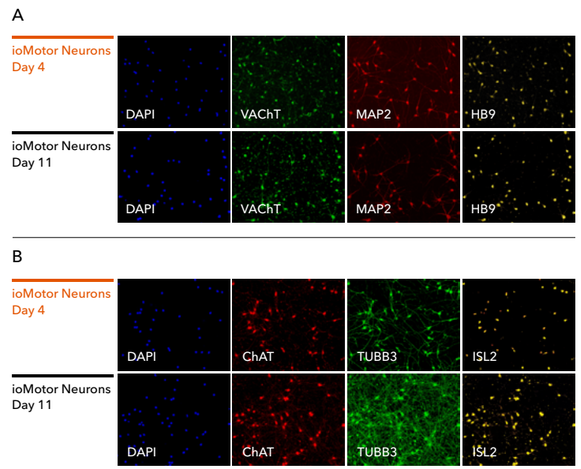
B. Spontaneous neuronal activity is exhibited from as early as day 14 and continues to increase up to the final measured timepoint, day 42.



Immunocytochemistry (ICC) shows protein expression of key motor neuron markers

A. ICC on post-revival day 4 and day 11 demonstrates homogenous expression of the pan-neuronal protein MAP2, motor neuron specific marker HB9, the cholinergic marker VAChT and nuclear staining (DAPI).

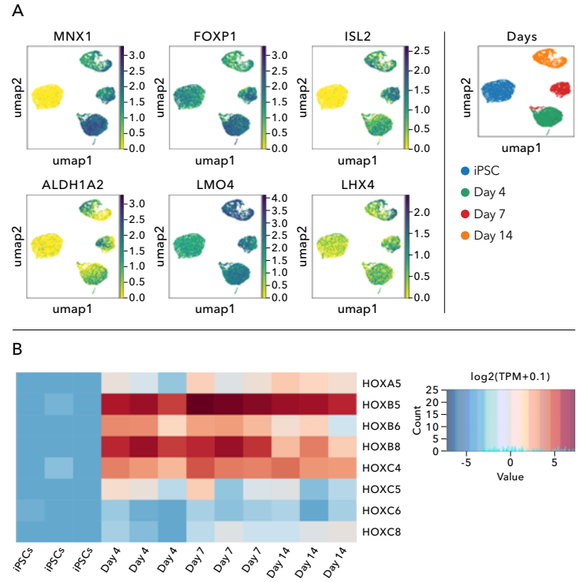
B. Homogenous expression of the pan-neuronal protein TUBB3, motor neuron specific marker ISL2, the cholinergic marker ChAT and nuclear staining (DAPI).



RNA-sequencing indicates a spinal motor neuron (cervical region) identity for ioMotor Neurons

A. Single cell RNA-sequencing analysis shows the expression of the key spinal motor neuron marker genes MNX1 (HB9), FOXP1, and ISL2 is detected in the culture from day 4, with >80% of cells expressing MNX1 by day 14.

B. The expression of HOX genes was evaluated using bulk RNA sequencing data. This heatmap shows expression of genes from the B cluster and expression of HOXC4 and HOXC5. This data, together with the marker expression from single cell RNA sequencing, suggests that ioMotor Neurons have a spinal cord (cervical region) identity.



Product information

Cat code
ioEA1027

Starting material
Human iPSC line

Seeding compatibility
6, 12, 24, 96 and 384 well plates

Shipping info
Dry ice

Donor
Caucasian adult male
(skin fibroblast)

Vial size
Small: >1 x 10^6 viable cells

Quality control
Sterility, protein expression and gene expression

Differentiation method
opti-ox™ cell reprogramming

Recommended seeding density
>30,000 cells/cm^2

User storage
LN2 or -150°C

Format
Cryopreserved cells

Product use
ioCells™ are for research use only

Applications
Neurodegeneration research
ALS disease modelling
Electrophysiological analysis
Drug development & discovery
Neuromuscular research
Neurotoxicology

bit.bio
THE CELL CODING COMPANY

Who we are

bit.bio combines the concepts of cell programming and biology to provide human cells for research, drug discovery and cell therapy, enabling a new generation of medicines.

This is possible with our precision human cellular reprogramming technology opti-ox™ – a gene engineering approach that enables unlimited batches of any human cell to be manufactured consistently at scale

For general information,
email info@bit.bio

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