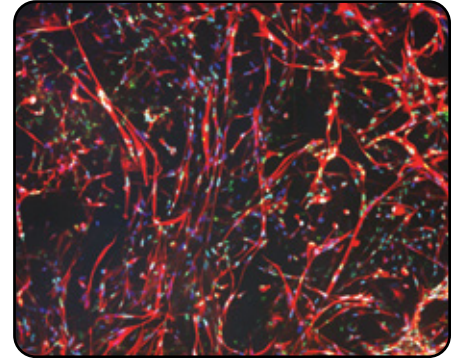


RealBrain® Human Neural 3D Micro-Tissues

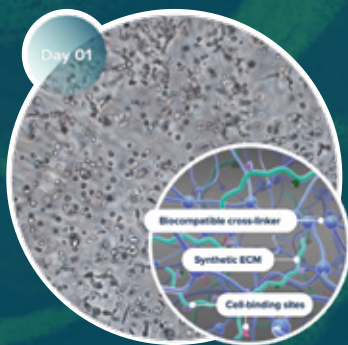


COMPLEXITY WITHOUT THE COMPROMISE

RealBrain® Technology captures the complexity of the brain by differentiating neural stem cells in an advanced, chemically defined polymer matrix. The resultant 3D models contain a heterogeneous cell population with functional neural networks in a cell-secreted Extra Cellular Matrix (ECM) RealBrain® Models are fully compatible with 96- and 384-well plate formats, are produced in just 3 weeks, and offer excellent reproducibility and optical clarity.

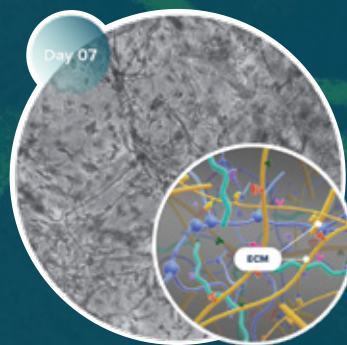


Maximum projection image of a spherical micro-tissue
Red: GFAP. Green: Sox2. Blue: DAPI



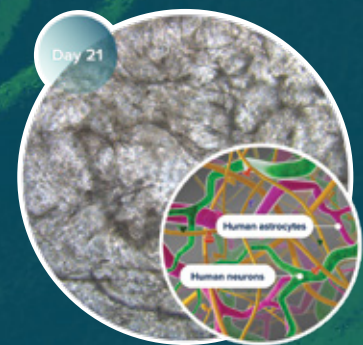
RealBrain® Matrix

The chemically defined RealBrain® Matrix (blue and green components) closely mimics the biological cues of CNS tissue. It encourages stem cell differentiation and secretion of natural extra-cellular matrix (ECM), and is fully remodelled by the cells during maturation



Developing Neural Networks

The RealBrain® Matrix promotes differentiating stem cells to secrete enzymes and ECM proteins that replace the synthetic polymers. The natural extra-cellular matrix (ECM) acts as a reservoir of signalling molecules that direct neural stem cell proliferation and differentiation.



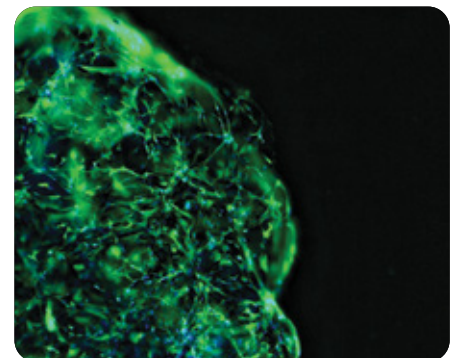
Mature Micro-Tissues

RealBrain® micro-tissues present extensive neuronal networks and a heterogeneous mix of neuronal cell-types that mimic *in-vivo* neural tissue with patterning and sulci reminiscent of the human cortex. The chemically defined matrix has been replaced by cell-secreted ECM.

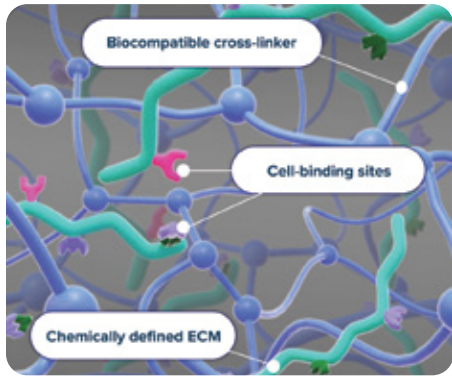
Functionally mature neural networks

The heterogeneous cell population of neurons, astrocytes and glia demonstrates a range of neural functionality

- Synaptic maturity: Functional synapses with pre- & post-synaptic markers
- and responsiveness: Neurotransmitters including acetylcholine, serotonin, norepinephrine
- and voltage gated channels: K⁺ and Na⁺ currents across a range of membrane potentials
- and CNS-specific gene expression: Axon guidance, neural growth and development, neurotransmission, GPCRs



Mature neural networks in ArtiBrain™.
Green: beta3 tubulin. Blue: DAPI



Chemically defined matrix drives development

RealBrain® Models are formed utilising the chemically defined RealBrain® Matrix.

The matrix is specifically designed to activate neural development and differentiation, whilst in parallel allowing cells to remodel the matrix as natural ECM is secreted.

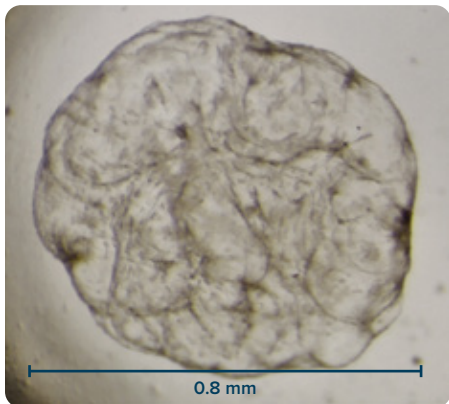
The cell population in mature RealBrain® Models comprises neurons, astrocytes and glia embedded in a fully natural ECM that has replaced the starting matrix.



High-throughput manufacturing

RealBrain® micro-tissues are produced in an automated process offering commercial scalability and high reproducibility.

RealBrain® Micro-Tissues can be manufactured rapidly and reproducibly in either 96- or 384-well format, using compact liquid handlers. Large-scale robotic platforms are not required.



Bright Field image of a single RealBrain® micro-tissue

RealBrain® Product Platform

Tessara has an initial pipeline of four RealBrain® Models spanning normal and disease states:

ARTIBrain™ Model: Captures the complexity of normal mature human brain tissue

ADBrain™ Model: Models the pathophysiology of Alzheimer's Disease

TBIBrain™ Model: Recapitulates the scarring of Traumatic Brain Injury

DEVBrain™ Model: Demonstrates the developmental processes of the human brain

Product Overview

Starting Cell Type	Neural progenitor cells
Scaffold RealBrain® Matrix	Defined, degradable and tuneable
Full Maturity	21 days
Mature Phenotype	Glia/Neurons/NPCs/ECM
Format	96 or 384 wells
Plate Manufacturing	Supplied ready to use, or at your facility
High optical clarity	Yes
Broad disease applicability	Yes
Acute & chronic toxicity	Yes

