Topic

Problem statement

To better understand myelination, remyelination and demyelination, we will develop a 3D in vitro brain-tissue-like model mimicking the brain tissue in term of stiffness, viscoelasticity, tensile strength, relaxation time-scales, and adhesion. The product will provide simple relationships of myelination to biophysical and biochemical properties as key indicators for improving therapeutic studies.

Problem description

As the older adult population increases, there is an unprecedented urgency to make significant progress in drug therapies for neurodegenerative diseases (NDD). Today, in the United States, there are about more than 1 million people suffering from Parkinson disease and 5.3 million cases of Alzheimer’s disease (Institute for Neurodegenerative Disorders). By 2050, the number of Alzheimer’s patient will be increased 4-fold (figure 1).

NDD is caused by autoimmune inflammatory damages against myelin in the central nervous system (CNS). Thus, pharmaceutical research of drugs promoting CNS remyelination, or screening methods for anti-inflammatory agents as well as methods to deliver efficiently these drugs to site of neuroinflammation or degeneration, could improve significantly patient’s life by delaying or even preventing neurodegeneration.

In the adult brain remyelination happens through either activation of neural progenitor cells (NPCs), which proliferate and differentiate into mature oligodendrocytes (mOLs) or reactivation of resident oligodendrocyte precursor cells (OPCs) which can differentiate in mOLs. This complex OPC differentiation process decreases with aging or disease progression. There are a variety of drugs promoting CNS remyelination in clinical trials and yet oligodendrogenesis is a process not fully understood.

Key Industry Insight

In 2021, the Neurodegenrative Disease Market was valued at approximatevely USD 39 billions according Zion Market Research study and is estimated to grow to about USD billions by 2028 (figure 2).

**Figures 1 and 2**

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| The Cost of Dementia | CNS Market Size |
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