PRETERM BIRTH AND BRAIN INJURY

PREM STEM

When is a baby born preterm?

Before 28 weeks — Extremely preterm

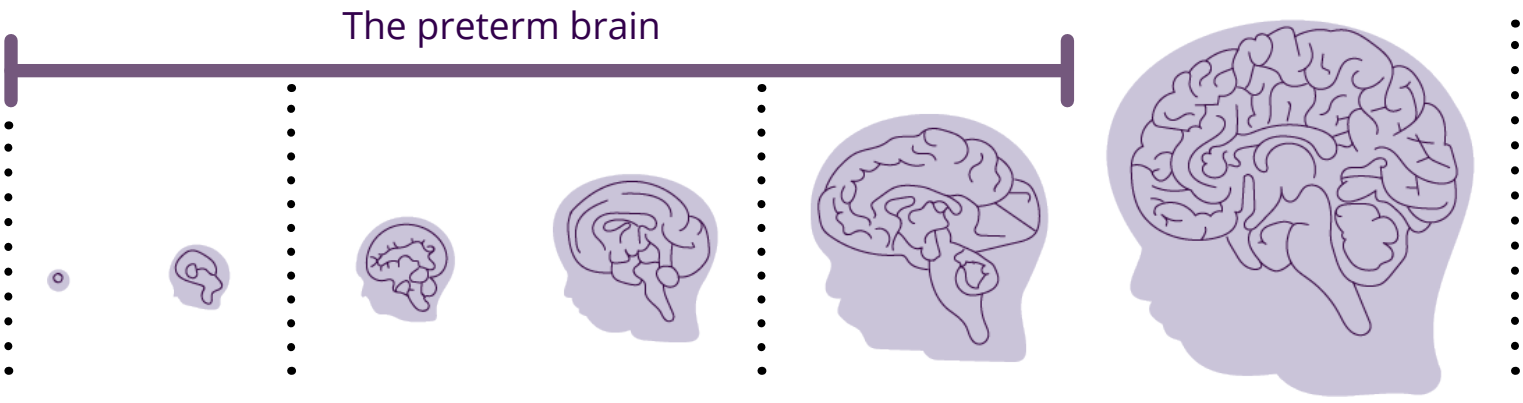
28-32 weeks — Very preterm

32-37 weeks — Late preterm

The average length of pregnancy, or gestation, is 40 weeks

In the European Union 400,000 babies are born preterm every year

Preterm birth disturbs the development of the baby's brain



Trimester 1

Neural tube develops and forms the basic regions of the brain

Trimester 2

More complicated brain structures start to develop as more neurons are added to the brain

Trimester 3

The brain nearly doubles in size during the final trimester! Babies born preterm have to make these huge changes while confronted with challenges from the real world

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 874721. Results reflect the author's view only. The European Commission is not responsible for any use that may be made of the information it contains.

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What can cause preterm brain injury?

Infection which leads to the mother's body producing inflammatory factors

Exposure of the baby in utero to inflammation as a response to an inflammatory agent

Exposure after birth to infection, e.g. sepsis

Lack of adequate nutrition after birth

Damage to glial cells (those which support neurons)

Ischemia (restricted or decreased blood flow in the brain)

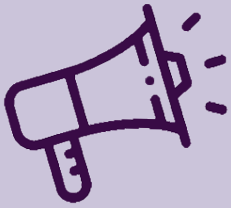
Asphyxiation (lack of oxygen)

Preeclampsia (high blood pressure and increased protein levels in the mother's urine)

What can be the long-term effects of preterm brain damage?

- Cognitive impairment
- Visual disturbances
- Autism
- Epilepsy
- Cerebral palsy
- Delayed development

Key messages



We have treatments and interventions which can improve the effects of brain injury, for example by reducing pain and increasing mobility

However, there are no therapies to repair or reverse brain damage

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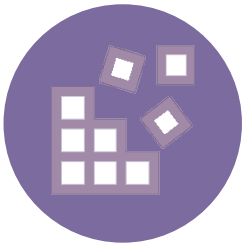
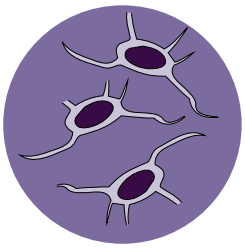
PREMSTEM

The PREMSTEM project is investigating stem cells as a repair mechanism to treat brain damage in preterm babies



Stem cells: The body's building blocks!



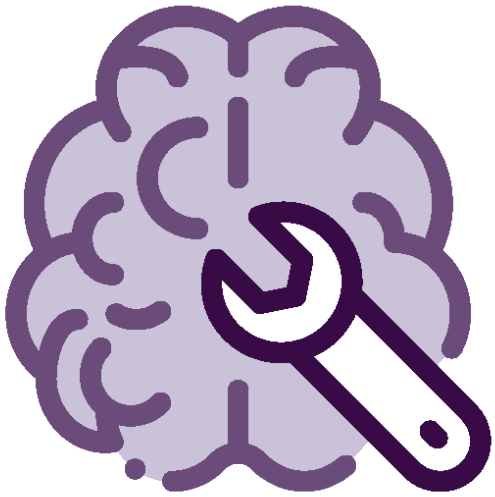
We use donated human Mesenchymal Stem Cells (hMSCs) taken from umbilical cord tissue in our research

Stem cells help the brain to help itself!

Stem cell treatments make and release amazing trophic factors that can:

Stimulate the brain's own stem cells to become active and start repair processes

Reduce inflammation and allow new connections between cells to occur



Support the (re)building of blood vessels to bring nutrients to the brain

Enable cells to insulate and improve connectivity between brain regions

A trophic factor is a molecule that supports cell survival

premstem.eu

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