# PREMSTEM CONFERENCE

## RESEARCH INTO NEONATAL BRAIN REPAIR

## 13-15 MAY 2025, BARCELONA

## PROGRAMME

Venue: Hotel SB Diagonal Zero
Plaça de Llevant, s/n, Sant Martí
08019 Barcelona
Spain

PREM STEM

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# CONTENTS

## In this programme



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# ABOUT THE CONFERENCE

## Welcome from Pierre Gressens

### PREMSTEM Coordinator

As the coordinator of the PREMSTEM consortium, it is my pleasure to welcome you to Barcelona for the major event of our Horizon 2020 project. PREMSTEM started in 2020 and, now in the final year of our research, we are looking forward to spending the coming days discussing and sharing research into the topics we have been addressing through our different work packages.

As you'll see, the programme addresses research into neonatal brain repair from different angles and it is exciting to have the opportunity to invite researchers from around the world to present their latest endeavours in these areas.

The agenda for the coming days includes a session on the following topics, each chaired by one or more members of the PREMSTEM consortium:

- Novel and innovative approaches to screening
- Using large animal translational models and how to do it better
- In vitro studies of stem cell activities
- Cell based therapies in animal studies
- Imaging modalities
- Alternatives and adjuncts to stem cells (extracellular vesicles)
- From pre-clinical work to an approved therapy
- Learnings from co-creation: involving external stakeholders in research

We are very pleased to welcome members from across the neonatal community to this event, including clinicians, scientists, patient advisors and parents, and to spend these days with those working to improve the lives of the most vulnerable patients of our society, as well as the lives of their families. This is indeed very much in the spirit of the PREMSTEM project.

Our keynote speaker, Atul Malhotra, has flown from Australia to share with us his experiences and insights of bringing a stem cell-based therapy to the clinic – the pitfalls, the lessons learned and the successes. We cannot wait to hear from Atul and all of our speakers this week.

On behalf of the PREMSTEM Conference organising committee, we look forward to a few days of fruitful discussions and knowledge sharing.

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# ORGANISING COMMITTEE

## Local hosts and main organisers

| | |
|---|---|
| Estelle Drobac | Inserm (France) |
| Bobbi Fleiss | RMIT University (Australia) |
| Pierre Gressens | Inserm (France) |
| Nicola Pelizzi | Chiesi Farmaceutici (Italy) |
| Delphine Smagghe | Inserm Transfert (France) |
| Hannah Tribe | RMIT Europe (Spain) |

## Scientific committee and abstract reviewers

| | |
|---|---|
| Ivo Bendix | University Hospital Essen (Germany) |
| Remy Blatch-Williams | Cerebral Palsy Alliance (Australia) |
| Caroline de Theije | UMC Utrecht (The Netherlands) |
| Ursula Felderhoff-Müser | University Hospital Essen (Germany) |
| Megan Finch-Edmondson | Cerebral Palsy Alliance (Australia) |
| Martina Gabrielli | CNR Institute of Neuroscience (Italy); Nottingham Trent University (UK) |
| Henrik Hagberg | University of Gothenburg (Sweden) |
| Helmut Hummler | Global Foundation for the Care of Newborn Infants (Germany) |
| Cora Nijboer | UMC Utrecht (The Netherlands) |
| Daan Ophelders | Maastricht University (The Netherlands) |
| Teresa Primavesi-Poggio | Global Foundation for the Care of Newborn Infants (Germany) |
| Francesca Ricci | Chiesi Farmaceutici (Italy) |
| Meray Serdar | University Hospital Essen (Germany) |
| Mickael Tanter | Iconeus/Inserm/Physics for Medicine Paris (France) |
| Yohan van de Looij | University of Geneva (Switzerland) |
| Renate van der Molen | Radboudumc (The Netherlands) |
| Claudia Verderio | CNR Institute of Neuroscience (Italy) |
| Gaurav Verma | University of Gothenburg (Sweden) |
| Tim Wolfs | Maastricht University (The Netherlands) |

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# ABOUT PREMSTEM

## The brain injury in the premature born infant: stem cell regeneration research network (PREMSTEM)

### Advancing stem cell therapy for preterm babies born with brain injuries

**Coordinator:** Institut National de la Santé et de la Recherche Medicale (Inserm)
**Funding scheme:** Horizon 2020 Research and Innovation action
**Grant agreement ID:** 874721
**Value:** €10,708,285
**Dates of project:** 1 January 2020 to 31 December 2025
**Scientific goals:** To deliver to the clinic a regenerative therapy to reduce the emotional, health and economic implications of neurodevelopmental injury caused by encephalopathy of prematurity (EoP) – brain damage associated with preterm birth (i.e. before 37 of 40 weeks of gestation). We are validating umbilical cord derived human mesenchymal stem cells (H-MSCs) as a potential therapy for EoP to improve the quality of life for preterm infants and their caregivers. We have also developed novel imaging tools to enable clinicians to be able to identify and stratify patients with EoP at the cot-side.

## PREMSTEM consortium partners

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# TUESDAY 13 MAY 2025

| Time | Location | Agenda |
|---|---|---|
| 12-1pm | Restaurant | **Lunch** |
| 1-1.45pm | Foyer | **Registration desk open** |
| 1.45-2pm | South America Room | **Opening address**<br>Speakers: Pierre Gressens and Lívia Nagy Bonnard |
| 2-3.30pm | South America Room | **Novel and innovative approaches to screening**<br>Chair: Bobbi Fleiss<br>Speakers: András Lakatos*, Sidhartha Tan and Stefanie Obst<br><br>* Please note that this talk cannot be live streamed due to the need to protect intellectual property arising from the current project |
| 3.30-4pm | North America Room | **Break** |
| 4-5pm | South America Room | **Keynote address**<br>Chair: Pierre Gressens<br>Speaker: Atul Malhotra |
| 5-6pm | North America Room | **Networking and refreshments** |

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# WEDNESDAY 14 MAY 2025

| Time | Location | Agenda |
|---|---|---|
| 8-9am | Foyer | **Registration desk open** |
| 8.30-10am | South America Room | **Using large animal translational models and how to do it better**<br>Chair: Tim Wolfs<br>Speakers: Suzie Miller, Tamara Yawno-Fegan, Courtney McDonald and Sanne Claassen |
| 10-10.30am | North America Room | **Break** |
| 10.30am-12pm | South America Room | **From pre-clinical work to an approved therapy**<br>Chairs: Nicola Pelizzi and Francesca Ricci<br>Speakers: Máximo Vento, Sara De Palma, Cindy Bokobza and Manon Benders |
| 12-1.30pm | Restaurant | **Lunch** (buffet served 12.15-1.15pm) |
| 1.30-3pm | South America Room | **Cell based therapies in animal studies**<br>Chairs: Ivo Bendix and Ursula Felderhoff-Müser<br>Speakers: Bernard Thébaud, Meray Serdar, Nicole Labusek and Md Munnaf Hossen |
| 3-3.30pm | North America Room | **Break** |
| 3.30-5pm | South America Room | **Alternatives and adjuncts to stem cells (EVs)**<br>Chairs: Claudia Verderio and Henrik Hagberg<br>Speakers: António Salgado, Roosmarijn Vandenbroucke, Silvia Coco and Caroline de Theije |

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# THURSDAY 15 MAY 2025

| Time | Location | Agenda |
|---|---|---|
| 8.30-10am | South America Room | **Learnings from co-creation: involving external stakeholders in research**<br>Chairs: Hannah Tribe and Teresa Primavesi-Poggio<br>Speakers: Alishia Balintine, Enrique Conches, Hannah Tribe, Teresa Primavesi-Poggio and William Dawes<br>Panel members: Manon Benders, Elisabet Farga Carrera, Daan Ophelders, Nicola Pelizzi and Gert van Steenbrugge |
| 10-10.30am | Foyer | **Break** |
| 10.30am-12pm | South America Room | **In vitro studies of stem cell activities**<br>Chair: Cora Nijboer<br>Speakers: Richard Schäfer, Sandrine Thuret, Gaurav Verma and Martina Gabrielli |
| 12-12.30pm | Foyer | **Break** |
| 12.30-2pm | South America Room | **Imaging modalities**<br>Chairs: Mickael Tanter and Yohan van de Looij<br>Speakers: James Boardman, Jessica Dubois, Valéry van Bruggen and Nicolas Zucker |
| 2-2.15pm | South America Room | **Closing remarks**<br>Speaker: Bobbi Fleiss |

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# ABSTRACTS

**Tuesday 13 May 2025**
**2-3.30pm**

**Novel and innovative approaches to screening**
Chair: Bobbi Fleiss, RMIT University (Australia)

**Comparing Neuroprotection by nNOS inhibitors on Neurobehavior Outcomes in a Rabbit Model of Cerebral Palsy**

**Sidhartha Tan**, Department of Pediatrics, Wayne State University, Detroit, MI (USA)

We created the first rabbit model of cerebral palsy caused by acute placental insufficiency during preterm pregnancy. Reactive nitrogen species play a critical role in reperfusion-reoxygenation injury following hypoxia-ischemia (HI). To replicate clinical conditions, we developed a partial+full HI model. We selected the most selective inhibitors for neuronal nitric oxide synthase (nNOS) over endothelial nitric oxide synthase, with selectivity of 1000 and 2179. Two nNOS inhibitors, HJ619 and ZL22, were evaluated, with inhibition constants (Ki) of 85 nM and 29 nM.

In the partial+full HI model of uterine ischemia at 79% gestation, New Zealand White pregnant rabbits received either HJ619, ZL22, or saline immediately after fetal bradycardia. The dams then delivered spontaneously at term (31.5 days).

A neurobehavioral test battery conducted on the first postnatal day revealed the following: ZL22 at 0.03 and 0.15 mg/kg performed worse than saline, and at 0.3 mg/kg single dose no different from saline.

ZL22 at 0.6 mg/kg performed significantly better, with outcomes of 54% normal, 27% mild, 9% severe, and 11% dead, compared to 23% normal, 23% mild, 16% severe, and 39% dead in the saline group ($p < 0.0002$, Fisher's exact test with Bonferroni correction).

Both doses of HJ619 (0.18 and 1.8 mg/kg) were significantly better than saline ($p < 0.0001$ and $p < 0.004$, respectively). However, the higher dose of 1.8 showed a worse trend than the lower dose of 0.18 mg/kg with outcomes of 26% normal, 48% mild, 22% severe, and 4% dead, compared to 58% normal, 26% mild, 15% severe, and 0% dead (non-significant, Bonferroni).

Low doses of nNOS inhibitors provide strong neuroprotection at the onset of fetal bradycardia against motor deficits caused by perinatal hypoxia-ischemia (HI). Despite ZL22 having a smaller inhibition constant (Ki), a higher dose was required to achieve the same level of neuroprotection as HJ619.

# ABSTRACTS

**Tuesday 13 May 2025**
**2-3.30pm**

**Novel and innovative approaches to screening**
Chair: Bobbi Fleiss, RMIT University (Australia)

**A novel model for simultaneous evaluation of hyperoxia-mediated brain and lung injury in neonatal rats**

**Stefanie Obst**, Department of Paediatrics I, Neonatology and Experimental perinatal Neurosciences, Centre for Translational Neuro- and Behavioural Sciences (C-TNBS), University Hospital Essen, University Duisburg-Essen, 45147 Essen (Germany)

Background: Preterm infants suffering from bronchopulmonary dysplasia (BPD) are at high risk for the development of encephalopathy of prematurity (EoP) and poor neurodevelopmental outcome. However, the link between the injured organs remains unclear. Therefore, we established a combined model of hyperoxia-mediated brain and lung injury to assess disturbed organ development simultaneously.

Method: To establish a clinically relevant model, suitable for the assessment of both affected organs, postnatal day 2 (P2) Wistar rats were exposed to 80% oxygen or room air for 7 days (n = 13/group). Brain and lung tissues were analysed via histomorphometry, immunohistochemistry, real time PCR and western blot analyses at term born equivalent age P11.

Results: Seven days of hyperoxia induced an increased septal thickness, reduced microvascular density and increased macrophage infiltration in the lungs. BPD-like symptoms were accompanied by disturbed brain development revealed by a reduction of myelin-associated proteins, decreased number of oligodendrocytes and expression of CD68 on microglial cells. Interestingly, in contrast to the lung, vascular density was elevated in the brain, shown by a significantly enlarged vWF positive area. Importantly, hypomyelination in the brain correlates with arrested alveolarization and reduced vessel density.

Conclusions: Seven days of hyperoxia, initiated at P2 resulted in typical characteristics of BPD and EoP in neonatal rats linking impaired lung and brain development. The identified correlations facilitate focused analyses of mechanisms, which potentially connects both organ injuries. In addition, future analyses will focus on evaluation of motor-cognitive functions in young and adult rats.

Significance: This newly developed model opens opportunities to unravel the complexity of the lung-brain-axis. Furthermore, this model can be used to evaluate novel therapeutic approaches, to treat both preterm birth related complications.

# ABSTRACTS

**Wednesday 14 May 2025**
**8.30-10am**

**Using large animal translational models and how to do it better**
Chair: Tim Wolfs, Maastricht University (The Netherlands)

**Therapeutic Efficacy of Human Amniotic Epithelial Cell-Derived Extracellular Vesicles in an Ovine Model of Antenatal Inflammatory Brain Injury**

**Tamara Yawno**, Department of Paediatrics, Monash University, Melbourne (Australia)

Background: Chorioamnionitis impairs brain development, causes inflammatory brain injury, and is linked to long-term neurodegenerative disorders like cerebral palsy. Extracellular vesicles (EVs) derived from human amniotic epithelial cells (hAECs) exhibit anti-inflammatory and regenerative properties, suggesting therapeutic potential for perinatal brain injuries. This study aimed to investigate the therapeutic efficacy of hAEC-derived EVs (hAEC-EVs) in an ovine model of antenatal inflammatory brain injury.

Method: Fetal sheep were exteriorised at 100 days gestational age (dGA), and catheters were implanted into the femoral artery for blood gas collection and jugular vein for treatment delivery. Intrauterine inflammation was induced via intravenous lipopolysaccharide (LPS; 200 ng) on days 103, 104, and 105 dGA. Treatment animals received hAEC-EV intravenously (1.8 mg per dose) at 105 and 106 dGA. Daily blood gases and continuous physiological recordings were collected. Brain histopathology was assessed 10 days after LPS administration.

Results: LPS caused mild hypoxia and partial tachycardia, which returned to normal by the end of the experiment. LPS also significantly increased brain microbleeds. Animals receiving hAEC-EVs following LPS showed normalised heart rate patterns and no hypoxia. EVs significantly reduced the number of microbleeds in LPS animals. Further investigation of other brain injury indices is ongoing.

Conclusions: The administration of two doses of 1.8 mg hAEC-EVs significantly reduced fetal neurovascular instability and improved physiological outcomes.

Significance: These findings highlight the potential for hAEC-EVs as a therapeutic option for diseases linked to vascular injury and warrant further exploration in models with confirmed brain injury to validate treatment efficacy.

# ABSTRACTS

**Wednesday 14 May 2025**
**8.30-10am**

**Using large animal translational models and how to do it better**
Chair: Tim Wolfs, Maastricht University (The Netherlands)

**Persistent Inflammation and White Matter Damage in the Preterm Brain: Insights from a Novel Ovine Model of Chronic Inflammation**

**Courtney McDonald,** The Ritchie Centre, Hudson Institute of Medical Research, Melbourne (Australia)

Background: Preterm brain injury, a leading cause of neurodisability, including cerebral palsy, involves persistent inflammation beyond the neonatal period, presenting a potential therapeutic target. Current large animal models focus on short-term outcomes, limiting understanding of longer term effects.

Method: Fetal sheep were instrumented at gestational age 90-91 days (term gestation- 148d) and divided into two groups: one group received lipopolysaccharide (LPS 200ng; n=9) on days 96, 97, and 98 (0.65 gestation, equivalent to 25-26 weeks human brain development), and a control group received normal saline (n=8). Birth was induced (mifepristone, intramuscular) on day 138, and ewes and lambs were euthanized within 24 hours of birth. Brains were collected for examination of white matter injury, microglial activation and astrogliosis.

Results: LPS administration was associated with an increase in persistent microglial activation observed in the periventricular white matter (PVWM; P=0.04), subcortical white matter (SCWM; P=0.01), and cortical white matter (CWM; P=0.006). There were also significantly more rod microglia in the PVWM (P<0.0001) of LPS-exposed lambs compared to controls. Oligodendrocyte cell number was reduced in the PVWM (P=0.02), SCWM (P=0.001), and CWM (P=0.0001) and myelination was significantly reduced in both the CWM (CNPase, P<0.0001 and MBP, P=0.04) and the SVZ (MBP, P=0.05) in LPS-exposed lambs compared to controls. No difference in astrogliosis or microhaemorrhages was observed.

Conclusions: We have demonstrated in a large animal model of inflammation-induced preterm brain injury that long term persistent inflammation occurs, along with significant white matter injury, including loss of oligodendrocytes and reduced myelination in multiple white matter regions.

Significance: This model paves the way to assess the effects of late stage tertiary inflammation and behavioural assessment in a large animal model. As well as the evaluation of promising therapeutics that align with clinically relevant timepoints when cerebral palsy can be detected with high certainty in humans.

# ABSTRACTS

**Wednesday 14 May 2025**
**8.30-10am**

**Using large animal translational models and how to do it better**
Chair: Tim Wolfs, Maastricht University (The Netherlands)

**Exploring the Therapeutic Potential of Stem Cells in Inflammatory Neonatal Brain Injury: from a short-term to a long-term ovine model**

**Sanne JCM Claassen**, Department of Pediatrics, Maastricht University Medical Center, MosaKids Children's Hospital, Maastricht (The Netherlands)

Background: Inflammatory neonatal brain injury, associated with preterm birth and systemic inflammation, results in long-term neurological deficits. Fetal systemic inflammation is a key driver of neonatal brain injury. A systemic inflammatory response initiates neuroinflammation and disrupted neuronal development. Mesenchymal stem cells (MSCs) show great promise as neurotherapeutics due to their immunomodulatory and regenerative potential. Here, we investigated the neurological consequences of prenatal inflammation and the therapeutic potential of MCS in an ovine multiple-hit model for inflammatory neonatal brain injury.

Methods: Instrumented ovine fetuses were subjected to multiple perinatal hits, including intrauterine lipopolysaccharide (LPS) exposure, preterm birth and mechanical ventilation. Animals were either sacrificed after 72 hours of mechanical ventilation or follow-up for 1 year. Non-ventilated, gestational age-matched animals and term-born animals were used as reference groups for short-term and long-term models, respectively. Human umbilical cord-derived mesenchymal stem cells (hMSCs; Chiesi Farmaceutici S.p.A.) were administered intravenously shortly after birth and/or intranasally at 6 weeks of age. At 72 hours or 1 year, brains were collected for analyses, including histology for microglia and interneurons, and efferocytosis of isolated microglia.

Results: Mechanical ventilation increased microglia cell counts, increased Calbindin+ and decreased SST+ interneuron numbers, and enhanced microglia efferocytosis capacity. Prenatal inflammation resulted in an increased number of amoeboid microglia with reduced efferocytosis capacity. hMSC therapy led to an increased microglial count, a reduction in amoeboid microglia, and changes in Calbindin+ and SST+ interneurons.

# ABSTRACTS

**Wednesday 14 May 2025**
**8.30-10am**

**Using large animal translational models and how to do it better**
Chair: Tim Wolfs, Maastricht University (The Netherlands)

Conclusions: Multiple perinatal insults led to subtype-specific changes in interneuron populations. Moreover, microglial numbers increased, predominantly exhibiting an amoeboid morphology, which was associated with functional impairments. hMSC therapy increased microglial numbers, reduced amoeboid microglia, and modulated interneuron subpopulations. Long-term consequences of these changes will be explored in 1 year follow-up animals.

Significance: These findings deepen our understanding of neonatal brain injury and contribute to the development of potential therapeutic strategies.

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# ABSTRACTS

**Wednesday 14 May 2025**
**10.30am-12pm**

**From pre-clinical work to an approved therapy**
Chairs: Nicola Pelizzi and Francesca Ricci, Chiesi Farmaceutici (Italy)

**Intranasally applied mesenchymal stem cells are efficiently delivered to the brain of newborn non-human primates after hypoxia-ischemia**

**Sara De Palma**, Department for Developmental Origins of Disease, University Medical Center Utrecht Brain Center and Wilhelmina Children's Hospital, Utrecht University, Utrecht (The Netherlands)

Background: Neonatal hypoxic-ischemic (HI) brain injury is a leading cause of long-term neurological morbidity with limited treatment options. Intranasal mesenchymal stem cell (MSC) therapy, offers promising results with studies in neonatal HI mouse models demonstrating safe and effective MSC migration to the injured brain. Differences in olfactory anatomy between rodents and humans however hinder direct translation. This study aimed to validate effective intranasal MSC delivery in a non-human primate neonatal HI model to ensure successful clinical application. The requisite to pretreat the nasal cavity with hyaluronidase was assessed as well.

Method: In term baboons, HI was induced on postnatal day 5-7 by bilateral carotid artery occlusion and systemic hypoxia. At 24h post-HI, baboons received 30x10^6 PKH-labeled human umbilical cord-derived MSCs intranasally, with or without hyaluronidase pretreatment of the nose. MSC migration was assessed 18h later by PKH signal and HLA-G staining.

Results: PKH+ and HLA-G+ signal was detected in cortical and hippocampal areas in 6 out of 6 MSC-treated baboons, indicating rapid and effective MSC migration to the injured newborn baboon brain. Importantly, HLA-G+ cells, indicating human MSCs, were detected throughout the brain parenchyma, i.e. in the forebrain, midbrain and hindbrain, in animals pretreated with hyaluronidase, as well as in animals in which pretreatment was omitted, indicating that hyaluronidase pretreatment is not required for efficient MSC migration.

Conclusions: This study shows that intranasally administered MSCs migrate within 18h to injured brain regions of animals closely resembling the human neonatal patient, in agreement with previous rodent studies. Our data further indicate that hyaluronidase pretreatment of the nasal cavity prior to MSCs application, as was regularly performed in rodent models, is not required for efficient MSC delivery to lesioned brain areas.

Significance: Intranasal MSC therapy is a non-invasive, effective treatment strategy that can improve neurodevelopmental outcome of infants with HI brain injury.

# ABSTRACTS

**Wednesday 14 May 2025**
**10.30am-12pm**

**From pre-clinical work to an approved therapy**
Chairs: Nicola Pelizzi and Francesca Ricci, Chiesi Farmaceutici (Italy)

**Towards Effective Neurotherapies for Preterm Brain Injury: A Data-Driven Approach to Treatment Optimization**

**Cindy Bokobza**, Université Paris Cité, NeuroDiderot, Inserm, F-75019 Paris, France

Introduction: Preterm birth, defined as delivery before 37 weeks of gestation, remains a major challenge due to the lack of effective therapies to protect or repair brain damage. Among the more than 15 million preterm infants born each year, up to 60% develop neurological disorders. Current treatment options are limited in both availability and efficacy. Integrating a detailed understanding of pathophysiology with computational biology approaches represents a promising strategy for optimizing therapeutic screening.

Objective and Methods: This study evaluates the potential of this approach by systematically assessing dose, timing, and route of administration in a preclinical model of perinatal brain injury (postnatal IL-1β administration). The goal is to determine the most effective treatment regimen for our well-characterized cord-derived mesenchymal stem cell product (HuMSC). We applied a combined computational biology analysis of the microglial transcriptome and myelin protein expression to quantify the therapeutic efficacy of HuMSC treatment.

Results: Our findings demonstrate the superiority of tertiary (significantly delayed) treatment over acute or subacute interventions. Furthermore, intranasal administration of HuMSC proved more effective than intravenous delivery, with higher efficacy observed at increased doses. The optimized treatment regimen led to significant improvements in myelination, MRI connectivity, and behavioral deficits associated with perinatal brain injury.

Conclusion: This study establishes a robust scoring protocol that accelerates the identification of optimal dose, timing, and administration routes, thereby enhancing the translational potential of HuMSC therapy. These findings provide a critical foundation for the design of large animal studies and clinical trials, maximizing the likelihood of successful therapeutic outcomes.

# ABSTRACTS

**Wednesday 14 May 2025**
**10.30am-12pm**

**From pre-clinical work to an approved therapy**
Chairs: Nicola Pelizzi and Francesca Ricci, Chiesi Farmaceutici (Italy)

**Perinatal Arterial Stroke treated with Stromal cells IntraNasally (PASSIoN) trial: two-year safety and neurodevelopmental outcome**

**Manon Benders**, Department of Neonatology, University Medical Center Utrecht Brain Center and Wilhelmina Children's Hospital, Utrecht University, Utrecht (The Netherlands)

Background: The PASSIoN study demonstrated the feasibility and short-term safety of single-dose allogeneic mesenchymal stromal cells (MSCs) administered intranasally to neonates with perinatal arterial ischemic stroke (PAIS)1. In the current study, we assessed long-term safety and neurodevelopmental outcomes, and explored outcome differences between the PASSIoN cohort and a registry cohort.

Methodology: We evaluated safety of intranasal bone marrow-derived MSC administration by evaluating brain tissue loss on MRI at three months, and adverse events and neurodevelopmental outcomes at two years of age. The tissue loss ratio (TLR) was calculated using semi-automatic segmentation from neonatal and three-month MRI. At age two, we assessed the occurrence of cerebral palsy (CP), motor and cognitive delays (Z-score < -1SD), behavioral problems, language delays, visual field defects, and epilepsy. We selected a non-treated cohort (n=39) from our stroke registry who met the PASSIoN trial inclusion criteria but were born outside the study period, and compared corticospinal tract involvement on MRI and two-year outcomes between both cohorts.

Results: At three months the TLR was 89±21%, indicating less tissue loss than expected based on initial stroke volume. At two years of age, no related adverse events were reported among the ten PASSIoN participants. Two children (20%) developed CP. Cognitive, behavioral, and language problems affected 10-20%, none had epilepsy. Compared to the registry cohort, PASSIoN participants significantly less often showed asymmetry in the posterior limb of the internal capsule (40% vs. 81%) and cerebral peduncle (10% vs. 61%) on three-month MRI, and had significantly better motor performance at age two (median(IQR) Z-score 0.3(0.8) vs. -0.4(1.5)), and started walking sooner (14(3) vs. 17(8) months).

Conclusion: This study demonstrates long-term safety of intranasal MSC therapy in ten infants with PAIS, and suggests better motor outcomes compared to a registry cohort and rates in literature. Randomized controlled.

# ABSTRACTS

**Wednesday 14 May 2025**
**1.30-3pm**

**Cell based therapies in animal studies**
Chairs: Ivo Bendix and Ursula Felderhoff-Müser, University Hospital Essen (Germany)

**Evaluating the Therapeutic Effect of Stem Cells on Neonatal Brain Injury Induced by Fetal Inflammation Combined with Postnatal Hyperoxia**

**Meray Serdar**, University Hospital Essen, University Duisburg-Essen, Department of Paediatrics I, Neonatology and Experimental perinatal Neurosciences; Centre for Translational Neuro- and Behavioural Sciences (C-TNBS), Essen (Germany)

Background: Premature born infants represent the largest patient cohort in pediatrics. Despite increasing survival rates due to improved neonatal intensive care, the risk of long-term damage, such as encephalopathy of prematurity (EoP), remains high. Inflammation as well as high oxygen concentrations (hyperoxia) are one of the main risk factors for premature birth. Hyperoxia and inflammation induce perinatal brain injury affecting white and gray matter structures differently. Up to now, effective therapies are missing. Mesenchymal stem cells (MSCs) appear promising because of their described neuro-regenerative effects.

Method: 100 µg/kg LPS (lipopolysaccharide) or sodium chloride were administered intraperitoneally (i.p.) at E20 to pregnant rats. At postnatal day 3 (P3), pups were exposed to 48 h normoxia (21% O2) or hyperoxia (80% O2). 50x106 human MSCs/kg were administered intranasally to P5 pups directly after hyperoxia. Myelination and inflammatory processes are examined immunohistologically and by western blot at term-equivalent time point P11.

Results: Preliminary analyses show reduced brain volume induced by the double-hit was normalised after MSC application. Structural examinations suggest that the significantly reduced brain volume may be related to hypomyelination induced by the double-hit. These changes, particularly the reduction in fibre length and branching points of the basic myelin protein (MBP) caused by the double-hit, were improved by MSC treatment. Additionally, we detect changes in neuroinflammatory responses as indicated by increased expression of Iba1/ CD68 increased activation of microglia, i.e. microglia activation, less pronounced after hMSC administration.

Conclusions and significance: Preliminary results in the brains of term-equivalent animals (P11) show that the intranasal administration of MSCs has a therapeutic effect on neonatal brain injury induced by the combined double-hit of fetal inflammation and postnatal hyperoxia. How far these effects lead to long-term functional and structural improvements will be investigated in future experiments.

# ABSTRACTS

**Wednesday 14 May 2025**
**1.30-3pm**

**Cell based therapies in animal studies**
Chairs: Ivo Bendix and Ursula Felderhoff-Müser, University Hospital Essen (Germany)

**Extracellular vesicles from immortalized and clonally expanded mesenchymal stromal cells as adjunct therapy to therapeutic hypothermia for neonatal hypoxic-ischemic brain injury**

**Nicole Labusek**, Department of Pediatrics I, Neonatology & Experimental Perinatal Neurosciences, Centre for Translational and Behavioral Sciences (C-TNBS), University Hospital Essen, University Duisburg-Essen, Essen (Germany)

Background: Neonatal encephalopathy caused by hypoxia-ischemia (HI) is a leading cause for childhood morbidity and mortality. The only available therapy is hypothermia (HT), which is, limited due to a short therapeutic window. Despite tremendous research, an adjuvant therapy overcoming limitations of HT is still missing. Extracellular-vesicles (EVs) from mesenchymal stromal cells (MSCs) showed promising effects in different neonatal and adult brain injury models. According to issues associated with MSC heterogeneity, we recently demonstrated a high therapeutic efficiency of EVs from immortalized and clonally expanded MSCs (ciMSC). In the present study we investigated, whether an intranasal ciMSC-EV therapy overcomes limitations of HT.

Methods: Nine-day-old mice were exposed to HI through ligation of the right common carotid artery and 1 hour hypoxia (10% oxygen) followed by 4 hours hypothermia or normothermia. ciMSC-EVs were administered intranasally at day 1, 3 and 5 after HI. Analyses of brain tissues were performed via immunohistochemistry, western blot and rt-PCR at day 7 post HI. Long-term functional outcome was assessed by neurobehavioral testing 35 days after HI.

Results: Therapeutic effects of HT were limited with regard to protection in the striatum and improvement of myelination deficits. Long-term functional outcome was only partially improved. Compared to a HT alone, the combined treatment with ciMSC-EVs resulted in an increased protection from HI-induced neuronal loss, astro- and microgliosis and myelination deficits, accompanied by an increased neurotrophic growth factor expression. These short-term effects translated into long-term improvement of cognitive deficits and amelioration of HI-induced alterations in risk assessment behavior.

Conclusion and significance: The availability of ciMSCs provides new avenues for the standardized and scaled manufacturing of clinical grade EV products. The present findings demonstrate that intranasal administration of ciMSC-EVs improve the outcome of HT therapy. Therefore, ciMSC-EV application appears a promising adjuvant therapy for the treatment of NE caused by HI.

# ABSTRACTS

**Wednesday 14 May 2025**
**1.30-3pm**

**Cell based therapies in animal studies**
Chairs: Ivo Bendix and Ursula Felderhoff-Müser, University Hospital Essen (Germany)

## Possible Impacts on Neutrophils and Endothelial Cells of a Common Environmental Contaminant Nitrate

This talk is pre-recorded

**Hossen MM**, School of Health and Biomedical Sciences, STEM College, RMIT University, Bundoora, Vic (Australia)

Background: High nitrate levels in drinking water are linked to premature delivery and low birth weight, which are associated with poor brain outcomes. Our preclinical data indicate that consuming bore-well water with high total dissolved salts, including nitrates, from Berambini, India, causes early-life brain gliosis (PMID:34418854). This research fills the evidence gap regarding the impacts of high nitrate exposure alone.

Methods: For 6 weeks before mating, during pregnancy, and weaning, female mice and pups were exposed to tap water or tap water supplemented with 320 mg/L nitrates (equimolar $NaNO_3$, $MgNO_3$, and $KNO_3$), matching Berambini levels.

Results: Pups born to nitrate-exposed dams had significantly ($p<0.05$) increased body and brain weights at postnatal (P) day 1 (n=23-34 pups/n=6 litters) and increased body weights at P60 (n=10-11 mice/n=6 litters). At P0 and P30, we performed RNA sequencing on total cortical homogenate or isolated CD11b-positive microglia (N=4/sex, litter as the independent replicate). At P0 in CD11b-positive microglia, one gene was FDR $P<0.05$; 9.1 logFC, Gm21378, associated with double-strand DNA repair. In the P0 cortex, no genes survived FDR adjustment. In P30 CD11b-positive microglia, 10 genes were FDR $P<0.05$, related to integrin signalling (Lypd10) and pro-inflammatory responses such as oxidative stress (Trpm2, Mpeg1), chemotaxis (Retnlg), MHC signalling (H2-T24), and auto-immunity (B3gnt2). In P30 cortex, 13 genes were FDR $P<0.05$; related to cell adhesion/cell-cell interactions (Pcdha9, Myl9, Cuzd1), transcription (Cwc22rt3, Churc1), and neurogenesis (Gvin2, Prss56). An exploratory analysis (non-FDR corrected $P<0.05$) of DEGs associated with CD11b-positive microglia and cortical homogenate using 'PanglaoDB - A Single Cell Sequencing Resource' via Enrichr revealed effects on neutrophil and endothelial-linked gene expression, respectively. Ongoing work is to analyse the number and distribution of neurotrophils and endothelial cells using immunohistochemistry.

Conclusion: Sex-specific analysis, immunohistology (for endothelial and neutrophil dysfunction) and further biostatistics will likely confirm that nitrate alone is not a substantial driver of brain injury.

# ABSTRACTS

**Wednesday 14 May 2025**
**3.30-5pm**

**Alternatives and adjuncts to stem cells (EVs)**
Chairs: Claudia Verderio, IN-CNR (Italy) and Henrik Hagberg, University of Gothenburg (Sweden)

## Modulation of the GABA Switch by Mesenchymal Stem Cell-Derived Extracellular Vesicles: a possible novel therapeutic approach for neurodevelopmental disorders

This talk is pre-recorded

**Silvia Coco**, University of Milano-Bicocca, School of Medicine and Surgery, Monza (MB) (Italy)

Neurodevelopmental disorders (NDDs), including epilepsy, autism, and schizophrenia, are often associated with early disruptions in the GABA switch, a critical process where GABA signaling undergoes the excitatory-to-inhibitory switch during brain maturation. Alterations in this process can lead to persistent neurological deficits associated to severe behavioral abnormalities. Mesenchymal Stem Cells (MSCs) and their byproducts Extracellular Vesicles (EVs) have emerged as promising neuroprotective tools due to their ability to modulate neural circuits, albeit their potential in the modulation of the GABA switch process is completely unknown.

In the present study, MSCs-derived EVs were assessed for their potential effect on the GABA switch. EVs were purified by differential centrifugation and analyzed for size, morphology, and protein markers. Large EVs and small EVs were applied to hippocampal neurons from early stages of development in both transient and chronic treatment paradigms. The GABA switch was assessed through a combination of functional and morphological approaches, based on live imaging and gene/protein expression analyses. In parallel, the effects of EVs in vivo were exploited in an environment-based mouse model of NDDs, known to display higher seizure susceptibility and neuroinflammation.

Results showed that MSC-EV treatment in vitro reduced intracellular chloride concentration in developing neurons, reflecting an acceleration of the GABA switch. Specifically, large EVs upregulated the expression of chloride extruder Kcc2 and neurotrophic factor Bdnf, while small EV treatment downregulated the chloride importer Nkcc1. Functional data based on chloride and calcium imaging confirmed the accelerated GABA switch process. In vivo, the administration of MSC-EVs induced a protective effect by reducing the susceptibility to epileptic seizures.

These findings highlight the potential of MSC-derived EVs to enhance GABAergic system maturation, offering a novel therapeutic approach for correcting developmental GABAergic imbalances in NDDs. Future studies will explore the molecular mechanisms behind these effects and optimize EV-based strategies for clinical application.

# ABSTRACTS

**Wednesday 14 May 2025**
**3.30-5pm**

**Alternatives and adjuncts to stem cells (EVs)**
Chairs: Claudia Verderio, IN-CNR (Italy) and Henrik Hagberg, University of Gothenburg (Sweden)

## Human milk extracellular vesicles modulate neural stem cell proliferation rate and differentiation fate in vitro

This talk is pre-recorded

**Caroline de Theije**, University Medical Center Utrecht, Department for Developmental Origins of Disease (The Netherlands)

Background: Preterm infants are at high risk for long-term neurodevelopmental impairments. Human milk feeding improves neurodevelopmental outcome, although the underlying mechanisms are unclear. Human milk contains extracellular vesicles (mEVs) that carry neuroregenerative cargo. Neural stem cells (NSCs) are interesting therapeutic targets because of their regenerative potential. This study investigated the effect of mEVs on differentiating NSCs in vitro.

Method: mEVs were isolated from healthy donors using a published protocol consisting of differential centrifugation, density-gradient centrifugation and size-exclusion chromatography. A donor-matched EV-depleted control was generated to control for the presence of co-isolated milk components. NSCs were differentiated in co-culture with either mEVs (mEV-NSCs) or EV-depleted controls (mEVdep-NSCs). NSC interaction with fluorescently labelled mEVs was assessed through flow cytometry (FC). Proliferation of differentiating NSCs was tracked by fluorescent dye dilution and flow cytometry. Differentiation fate of NSCs was assessed after 5 days by immunocytochemistry (ICC) and FC using markers for NSCs (Nestin), neurons (βIII-Tubulin), oligodendrocytes (Olig2), and astrocytes (GFAP).

Results: NSCs interacted with mEVs already 4h after co-culture. Exposure to mEVs increased NSC numbers compared to mEV-depleted controls, suggesting that mEVs may stimulate NSC proliferation. FC generation tracking showed that mEV-NSCs divide quicker over the differentiation period compared to mEVdep-NSCs. After 5 days of NSC differentiation, mEV exposure did not affect nestin expression, βIII-tubulin expression and neuronal morphology on ICC. However, both on FC and ICC, mEV exposure increased the generation of GFAP+ cells, which morphologically resembled astrocytes. The effect of mEVs on Olig2 expression is currently investigated.

Conclusions: These results provide the first evidence that mEVs interact with NSCs in vitro, enhancing their proliferation rate compared to mEV-depleted controls and promoting differentiation to astroglial fate.

Significance: These results highlight a potential role for mEVs in shaping neurodevelopment and warrant further investigation into their therapeutic potential for encephalopathy of prematurity.

# ABSTRACTS

**Thursday 15 May 2025**
**10.30am-12pm**

**In vitro studies of stem cell activities**
Chair: Cora Nijboer, UMC Utrecht (The Netherlands)

**Improving neuronal survival by stem cells mitochondria in ischemic brain injury: A bioenergetic rescue**

**Gaurav Verma**, Centre of Perinatal Medicine and Health, Institute of Clinical Sciences & Neuroscience and Physiology, University of Gothenburg (Sweden)

Background: Stem cells are promising for the treatment of perinatal brain injury where dysfunctional mitochondria are detrimental factors. In our in-vitro and in-vivo model of brain damage, co-culturing neurons with human mesenchymal stem cells (hMSCs) and intranasal (IN) delivery of hMSCs in a germinal matrix hemorrhage (GMH) rat model improves neuron cell bioenergetics.

Methods: Pregnant mouse (E-15) pup brains were used to isolate primary cortical neurons. Neurons were exposed to oxygen-glucose deprivation (OGD) for 60 minutes to induce brain hypoxia-ischemia (HI) and were co-cultured with hMSCs (50,000 cells). We used an in-vivo GMH model and delivered 2.4x10^-6 hMSCs/animal for validation using XFe96 seahorse flux analyzer. Confocal microscopy and western blotting were used to measure mitochondrial transfer and complex protein expression.

Results: We successfully isolated >90% pure primary neurons from each brain cortex, yielding ~2x10^-6 cells/ml. (OGD, 60 mins) led to ~50-60% reduction in Oxygen Consumption Rate (OCR) as compared to their respective control (**P≤ 0.01). Oligomycin decreased ATP-linked respiration across all the conditions (**P≤ 0.01). We observed increased maximal respiration with FCCP in hMSC-treated cells as compared to OGD-treated cells (***P≤ 0.001) accompanied by ~60% increase in spare respiratory capacity (**P≤ 0.01). Optimal protection was observed with 50,000 hMSCs co-cultured with OGD-treated neurons (***P≤ 0.001). In our In-vivo model, intranasal hMSC delivery improved OCR in GMH-injured brains compared to untreated controls. hMSCs mediated mitochondria transfer was hypoxia specific in contrast to control (**P≤ 0.01). We also observed that GMH reduces complex III, and V of the mitochondria significantly and were further restored by hMSCs (**P≤ 0.01). Currently, we are investigating the underlying mechanism.

Conclusion: hMSCs will be used to exploit their potential to improve bioenergetics in damaged neurons.

Significance:This work highlights the regenerative potential of hMSCs to enhance neuronal bioenergetics and restore mitochondrial function in brain injury models.

# ABSTRACTS

**Thursday 15 May 2025**
**10.30am-12pm**

**In vitro studies of stem cell activities**
Chair: Cora Nijboer, UMC Utrecht (The Netherlands)

## Microglial extracellular vesicle and synaptic pruning during postnatal development

This talk is pre-recorded

**Martina Gabrielli**, Institute of Neuroscience, National Research Council of Italy, Via Raoul Follereau 3, 20854, Vedano al Lambro (Italy)

Background: The complement factor C1q is released by microglia, localizes on weak synapses and acts as a tag for microglia-mediated synaptic pruning, a fundamental process for proper circuit refinement across early postnatal life, reactivated in neurodegeneration. However, how C1q tags synapses at specific times remains elusive. We explored the possible involvement of extracellular vesicles (EVs) released by microglia in C1q delivery to synapses designated for removal.

Method: We optimized a protocol to extract large and small EVs from the interstitial fluid of mouse brain tissue. By Western Blot, TRPS, single molecules arrays (SioA) and confocal imaging, we measured the amount, cell source and complement cargo of EVs extracted from WT postnatal pups and adult mice brains, and from C9orf72KO adult brains displaying enhanced microglia-mediated pruning. Then, we performed in vitro and ex vivo studies to inquire microglial EVs involvement in C1q deposition to the synapse and synaptic engulfment, using approaches to increase or reduce microglial EVs production by EVs supplementation C9orf72 silencing or pharmacological inhibition (GW4869).

Results: We show that C9orf72KO microglia release more EVs carrying C1q adult mice, providing a link between microglial EVs production and synaptic removal. Moreover, we report that production of C1q carrying microglial EVs peaks during the pruning period in the early postnatal hippocampus (postnatal day P17), confirming a positive correlation between EVs production and synaptic removal in a physiological setting. In neuron-microglia co-cultures, microglial EVs, labelled by the fluorescent dye mCLING, make preferential contacts with synapses, deliver C1q to pre-synapses that externalize phosphatidylserine and promote synaptic removal. Interestingly, C9orf72 KO microglia engulf more synaptic terminals and decrease synaptic density to a greater extent compared to WT microglia whereas inhibition of EVs release by GW4869 restores normal pre-synaptic density, providing mechanistic evidence linking EVs release to synaptic remodeling.

Conclusions: This study identifies microglial EVs as delivery vehicles for C1q to synapses targeted for removal and implicates abnormal EVs production from microglia in both neurodevelopmental and age-related disorders characterized by dysregulated synaptic pruning.

# ABSTRACTS

**Thursday 15 May 2025**
**12.30-2pm**

**Imaging modalities**
Chairs: Mickael Tanter, Physics for Medicine Paris (France) and Yohan van de Looij, University of Geneva (Switzerland)

**Structural brain injury precedes neurocognitive disability in former preterm lambs: insights from a long-term ovine model**

**Valéry van Bruggen**, Department of Pediatrics, GROW – Research Institute for Oncology & Reproduction, Maastricht University, Maastricht (The Netherlands)

Background: Preterm birth is the leading cause of neonatal morbidity and mortality. Advances in perinatal medicine increased survival rate, consequently increasing the number of preterm infants at risk for life-long neurocognitive disabilities. The pathogenesis of preterm brain injury is multi-factorial, with chorioamnionitis and mechanical ventilation as important contributors. To increase mechanistic understanding and to develop novel therapeutic strategies, we established a long-term translational ovine model for preterm brain injury, correlating histological data with longitudinal neuroimaging and neurocognitive outcomes in later life.

Methods: Preterm lambs were exposed to multiple perinatal hits including intra-uterine lipopolysaccharides (LPS) and mechanical ventilation. Animals were either sacrificed directly after preterm birth, after 72h of mechanical ventilation, or followed for 12 months. Human umbilical cord-derived mesenchymal stem cells (hMSCs), provided by Chiesi Farmaceutici S.p.A., were administered intravenously directly after preterm birth and/or intranasal after 6 weeks. During long-term follow-up, neuroimaging and behavioral tests were conducted and combined with post-mortem histology for microglia, myelin and oligodendrocytes.

Results: Microglial numbers were elevated following preterm birth and mechanical ventilation. Moderate histological alterations were observed perinatally. Neuroimaging showed significantly decreased fractional anisotropy (FA)-values in the radial corona and corticospinal tract, 6 weeks after preterm birth with LPS-exposure. Importantly, FA-values correlated with aberrant behavior, assessed around adulthood, and these parameters were improved by hMSC therapy in a subset of animals.

# ABSTRACTS

**Thursday 15 May 2025**
**12.30-2pm**

**Imaging modalities**
Chairs: Mickael Tanter, Physics for Medicine Paris (France) and Yohan van de Looij, University of Geneva (Switzerland)

Conclusions: This translational ovine study shows that moderate cellular alterations around preterm birth are followed by structural white matter injury and neurodevelopmental impairments in later life. Early intervention with hMSCs showed promising long-term effects on white matter structure and neurocognitive functioning.

Significance: Early administration of cell-based therapies can have lifelong effects on clinical outcomes and are therefore crucial for improving quality of life and prospects of children born preterm.

# ABSTRACTS

**Thursday 15 May 2025**
**12.30-2pm**

**Imaging modalities**
Chairs: Mickael Tanter, Physics for Medicine Paris (France) and Yohan van de Looij, University of Geneva (Switzerland)

**Non-invasive characterization of pericyte dysfunction in mouse brain using functional Ultrasound Localization Microscopy**

**Nicolas Zucker**, Institute Physics for Medicine Paris, INSERM U1273, ESPCI Paris-PSL, CNRS UMR8063, Paris (France)

Early pericyte dysfunction at microscopic scale contributes to the initial stages of many neurological diseases and represents strong candidate targets for new treatments. However, a non-invasive imaging modality able to image microvascular alterations induced by pericyte dysfunction is today missing and the development of pericyte-focused therapies remains challenging due to the lack of early biomarkers of disease progression and drug efficiency.

In this work, we performed imaging in adult mice with a depletion of endothelial Endoglin as a model of Hereditary Haemorrhagic Telangiectasia. This led to pericyte detachment in the Arteriole-Capillary Transition (ACT) zone.

We imaged non-invasively whole-brain of mice using functional Ultrasound and functional Ultrasound Localisation Microscopy (fULM). We developed biomarkers as basal speed, tortuosity and diameter of brain cortical vessels and evaluated neurovascular response to whisker stimulus at a microscopic resolution. We detected that arteriolar capillaries have irregular shapes, increased diameters, reduced blood speed and neurovascular uncoupling mainly localised in the ACT zone in diseased groups, confirming invasive confocal and microscopic invasive measures.

We also evaluated the restoration of neurovascular response using Treatment Transforming Growth factor-β signalling activator C381 known to restore pericyte coverage.

Our study underscores the unique potential of fULM in characterizing early microvascular alterations, probing the evolution of the disease, as well as detecting brain hemodynamic recovery following therapeutic treatment. As super-resolution ultrasound transitions to clinic, our data support its future utilisation in monitoring pericyte-focused therapies in humans.

# KEYNOTE ADDRESS

## Atul Malhotra

### Monash University (Australia)

Associate Professor Atul Malhotra is a a senior neonatologist at Monash Children's Hospital, and a research academic in the Department of Paediatrics at Monash University in Melbourne, Australia. He also heads the Early Neurodevelopment Clinic at Monash Children's Hospital, focusing on the early detection of cerebral palsy and developmental delay in high-risk infants. He holds an NHMRC Research Fellowship currently, has published over 180 peer-reviewed journal articles and four book chapters to date. His research has attracted over $20 million in funding. As the co-director of the Newborn Cell Therapies Group, he has played a key role in translating preclinical therapies from the lab to clinical settings, particularly in neonatal regenerative cell therapy. He has led two pioneering stem cells trials – using placental stem cells for chronic lung disease, and autologous cord blood derived cells in extremely premature infants. He is the Principal Investigator of three ongoing umbilical cord blood-derived cell therapy trials.

# SPEAKERS

## Alishia Ballintine

### Patient/parent representative (Australia)

Alishia Ballintine is a passionate patient and consumer advocate committed to advancing patient partnerships in medical development. Her advocacy is deeply personal, driven by her youngest daughter's experience as a late preterm baby who suffered a perinatal stroke, resulting in right hemiplegic cerebral palsy and epilepsy. This experience fuels Alishia's dedication to seeing novel regenerative therapies emerge in the field of neurodevelopmental injury. Professionally, Alishia leads consumer advisor and partnership initiatives within clinical trial research, ensuring that patient perspectives are central to the process. She is also a regulatory lawyer at a world-class clinical trial centre, where she combines her legal expertise with her commitment to see impactful research translation and drug development. Throughout her career, Alishia has gained extensive knowledge of the complex ethics and regulatory processes that shape the clinical trial lifecycle, and she advocates for increased accessibility to clinical research for all.

## Manon Benders

### UMC Utrecht (The Netherlands)

Manon Benders is Professor in Neonatology of the Wilhelmina Children's hospital, UMC Utrecht. She has been Head of the Department since 2015. She obtained her PhD degree in Leiden in 1999. She qualified as a Paediatrician-Neonatologist in 2006 before doing a fellowship in Neonatal Neurology. Manon is currently supervising several PhD students and clinical research fellows/postdocs. She is working on national and international research projects focusing on prediction and perinatal neuro-imaging evaluating brain development and neuro-protective and regenerative strategies.

# SPEAKERS

## James Boardman

### University of Edinburgh (UK)

James Boardman is Professor of Neonatal Medicine and Director of the Jennifer Brown Research Laboratory at the University of Edinburgh. He researches new ways of reducing brain injury and restoring learning potential after adverse early life events. His significant contributions include characterising atypical brain development after preterm birth using quantitative MRI, elucidating how the perinatal stress environment and systemic inflammation interact with brain development, and mapping the effect of socioeconomic gradients on brain growth. His current work seeks to understand which perinatal exposures confer risk and resilience for neurodevelopmental and educational outcomes in children born preterm and to identify the biological axes that embed those exposures in child development. James is a Fellow of the Academy of Medical Sciences, a past president of the Neonatal Society, holds a UKRI MRC programme grant and is the editor of Avery and MacDonald's Neonatology, an internationally leading text on pathophysiology and management of the newborn.

## Cindy Bokobza

### Inserm (France)

Cindy Bokobza is a perinatal neuroscientist and head scientist at May, a mission-driven health tech startup. She has a background in translational research, with experience in France, the USA, and Portugal. Cindy coordinated key projects within the PREMSTEM consortium and has led multiple studies on neonatal brain injury, neuroinflammation, and early neurodevelopment. She has supervised over 15 students and received awards including the Alzheimer Harmonie Mutuelle Prize and the ARAPI Young Researcher Award. Passionate about bridging science and real-world health impact, she now focuses on evaluating and scaling digital health tools to support maternal and infant well-being.

# SPEAKERS

## Sanne Claassen

### Maastricht University Medical Center+ (The Netherlands)

Sanne Claassen is a medical doctor and PhD student in the Pediatric Department at Maastricht University, The Netherlands. The paediatric lab of Tim Wolfs focuses on innovative therapies for children born with a challenging start in life. During her PhD, she will explore the role of the immune system in prenatal brain injury and the therapeutic effects of stem cells in the context of perinatal inflammatory stress.

## Silvia Coco

### University of Milano-Bicocca (Italy)

Silvia Coco is a tenured researcher at the Department of Medicine and Surgery, University of Milano-Bicocca, with a degree in Biological Sciences and expertise in pharmacology and neuroscience. Her research investigates innovative therapeutic strategies for challenging neurological conditions. Specifically, she focuses on the potential of mesenchymal stem cells (MSCs) and their extracellular vesicles (EVs) in neurodevelopmental disorders, aiming to restore altered GABA switch mechanisms crucial for normal brain development. Silvia also investigates the neuroprotective and immunomodulatory potential of MSC-EVs in neurodegenerative diseases such as Alzheimer's. Actively contributing to the academic community through teaching and mentorship, she disseminates her research and fosters collaborations to advance the understanding and treatment of these debilitating conditions.

# SPEAKERS

## Enrique Conches

### Punk Design (Spain)

Enrique Conches is the founder of Punk Design, where he leads projects that ignite Innovation Culture and equips teams to overcome Friction through bold, Human-Centred strategies. An expert in Design Thinking, Enrique served for nearly 7 years as a Course Facilitator at IDEO U, created by IDEO—the originators of the methodology. He is also a graduate of the prestigious Stanford LEAD program in Leadership and Innovation Strategy. For almost 25 years, Enrique has helped start-ups, research consortia, and global organisations turn complexity into clarity— blending creativity, strategy, and play to make innovation not just possible—but inevitable.

## William Dawes

### Oxford University Hospital (UK)

William Dawes is an academic paediatric neurosurgeon from Oxford University Hospital. He was awarded his PhD from Queen Mary University of London in 2017 and became a Fellow of the Royal College of Surgeons in Surgical Neurology in 2018. His PhD thesis focused on role of neural stem cells as potential therapeutic targets following germinal matrix/intraventricular haemorrhage in neonates born prematurely. William is an Honorary Associate Professor at UCL Institute of Child Health and Co-investigator and lead for basic sciences on the NIHR funded ENLIVEN Trial, a UK-based national clinical trial investigating the efficacy of endoscopic intraventricular washout following NIVH. His current research is exploring the role of the ependymal lining of the ventricular system in health and disease.

# SPEAKERS

## Sara De Palma

### Utrecht University (The Netherlands)

Sara De Palma studied at the Polytechnic University of Turin, completing both a bachelor's and master's degree in biomedical engineering. During the final year of the master's program, she moved to Utrecht for an internship at the Laboratory of Neuroimmunology and Developmental Origins of Disease under the supervision of Caroline de Theije. This experience led to pursuing a Marie Curie PhD in regenerative medicine at University Medical Center Utrecht in the group of Cora Nijboer, focusing on optimising mesenchymal stem cell therapy for neonates with hypoxic-ischemic brain injury. In 2023 Sara received a PhD Research Grant from the Cerebral Palsy Alliance which enabled a research stay at the University of Texas Health Science Center at San Antonio with Dr Blanco and Dr Mustafa to study the migration of intranasally delivered mesenchymal stem cells to the brain of newborn baboons with hypoxic-ischemic brain injury. The results of this study are presented at this conference.

## Caroline de Theije

### UMC Utrecht (The Netherlands)

Caroline de Theije is Assistant Professor at the Department for Developmental Origins of Disease at University Medical Center Utrecht, The Netherlands. She has a background in medical biology. She graduated from the Utrecht University with a PhD in Nutritional Neuroscience and focused her PhD and postdoc research on the effects of cell-based and nutrition-based therapies to enhance postnatal neurodevelopment. Her current research focusses on the potency of cell-derived and milk-derived extracellular vesicles to treat neonatal brain injury and investigates the underlying therapeutic mechanisms.

# SPEAKERS

## Jessica Dubois

### Inserm (France)

Jessica Dubois has been a researcher in neuroscience at Inserm in France since 2009. She heads the inDEV team (Imaging of Neurodevelopmental Phenotypes) at the NeuroDiderot unit, between the Robert-Debré paediatric hospital (Paris) and the NeuroSpin center (Saclay). Her research focuses on the early development of the human brain, studied using neuroimaging and behavioural evaluations in infants. She has an engineering background (Ecole Centrale Paris) and a PhD in Physics (Université Paris Sud). She carried out her postdoctoral research with Professor P.S. Hüppi at the University Hospitals of Geneva, Switzerland, where she studied early cortical folding in premature newborns. Her current projects focus on sensorimotor development, in typical and pathological conditions, particularly in infants at high risk of neurodevelopmental disorders and cerebral palsy. She has made significant contributions to our understanding of asynchronous maturation of brain networks, inter-hemispheric asymmetries and relationships between structural and functional development, with over 5,000 citations.

# SPEAKERS

## Elisabet Farga Carrera

### Som Prematurs (Spain)

Elisabet Farga Carrera is the president and founder of the Premature Babies Association of Catalonia – Som Prematurs – and a mother of premature twins. She is deeply involved in co-creation forums, including the PADEICS Group and the Pediatrics Program: NIDCAP of the ICS (Institut Català de la Salut). She also serves on the Family Council at Hospital Sant Joan de Déu in Barcelona, where she helps evaluate and improve paediatric care. As part of Som Prematurs, she actively participates in committees like RECLIP (Spanish Pediatric Clinical Trials Network) and the Simulation and Teaching Committee at Vall d'Hebron Hospital in Barcelona and PARENTS KIDS part of i4KIDS is a Pediatric Innovation Hub, coordinated by Sant Joan de Déu Barcelona Children's Hospital. Her leadership in the Expert Patient incubator care programme has led to the development of key initiatives in more than 15 hospitals across Catalonia, contributing to the co-creation and helping to improve neonatal care introducing the patient expert in the internal organisation of these units.

## Martina Gabrielli

### CNR Institute of Neuroscience (Italy); Nottingham Trent University (UK)

Martina Gabrielli is currently a Research Fellow at Nottingham Trent University (UK) and recipient of a BBSRC Fellowship (UKRI) for future leaders in research, to study the molecular basis of cognitive decline in brain ageing. After a BSc and MSc in Medical Biotechnology and a PhD in Pharmacological Sciences at the University of Milan, she worked for many years in Claudia Verderio's laboratory at the CNR Institute of Neuroscience, Italy, where she explored the role of extracellular vesicles (EVs) released by glial cells in brain health and disease with a particular focus on their effects on neuronal function and inflammation. She was awarded a FISM fellowship and a Veronesi Foundation Travel Grant Fellowship to spend a brief period at Columbia University in New York, USA. She is a member of the PREMSTEM research team.

# SPEAKERS

## Pierre Gressens

### Inserm (France)

Pierre Gressens received his MD (UCL, Brussels, Belgium) in 1989 and his PhD at UCL in 1995. He specialised in Child Neurology and carried out his post-doctoral research training at NIH (Bethesda, USA). He has been working at Robert Debré Hospital, Paris both as researcher and child neurologist, since 1995. Currently, Pierre is the Director of the INSERM–Université Paris Cité laboratory (U1141). Over the last 30 years, the Gressens laboratory has been involved with the basic and applied aspects of research in the area of neurodevelopmental disorders, with a focus on neuroinflammation. Pierre has published more than 330 original papers.

## Nicole Labusek

### University Hospital Essen (Germany)

Nicole Labusek is a neuroscientist specialising in neonatal brain injury and cell-based therapies. She earned her Master's degree in Translational Neuroscience from Heinrich Heine University Düsseldorf before pursuing her PhD at University Hospital Essen. Under the supervision of Josephine Herz and Ivo Bendix, her research focused on hypoxic-ischemic encephalopathy (HIE) and the effects of mesenchymal stem cell-derived extracellular vesicles (MSC-EVs). Currently, she is a postdoctoral researcher investigating the role of MSC-EVs in modulating inflammatory processes following HIE. Her work aims to advance the understanding of MSC-EV-based therapies and their potential for neuroprotection and regeneration in neonatal brain injury.

# SPEAKERS

## András Lakatos

### University of Cambridge (UK)

András Lakatos is Associate Professor of Neurology and Neurobiology at the University of Cambridge and leads a research laboratory in the Department of Clinical Neurosciences. Over the past 10 years, he and his team have pioneered the development of human 3D neural organoid and other stem cell-based models. This work helped uncover novel cellular and molecular mechanisms relevant to the healthy, injured, and diseased central nervous system, aiming to identify new neurological treatment strategies. He has additional affiliations with the MRC-Wellcome Trust Cambridge Stem Cell Institute and Cambridge University Hospitals, where he conducts his clinical practice as a consultant neurologist. He has received several prestigious awards, including the MRC Clinician Scientist Fellowship Award in 2017, the Alzheimer's Research UK David Hague Young Investigator of the Year Award in 2022, and the MRC Senior Clinical Fellowship Award in 2023.

## Courtney McDonald

### The Ritchie Centre, Hudson Institute of Medical Research (Australia)

Courtney McDonald is an NHMRC EL2 Investigator and leads the Cell Therapies and Neuroinflammation Research Group at The Ritchie Centre, Hudson Institute of Medical Research. Courtney's research has generated new knowledge in how cell therapies work to reduce brain injury. Courtney has shown that different cell therapies, including umbilical cord blood (UCB), mesenchymal stromal cells and amnion epithelial cells (AECs) are effective therapies for brain injury in small and large animal models of perinatal brain injury, multiple sclerosis, and spinal disc repair. Courtney's preclinical research has been the basis for four ongoing clinical trials at Monash Health using umbilical cord blood cells highlighting the translational impact of her research.

# SPEAKERS

## Suzie Miller

### Monash University and Hudson Institute of Medical Research (Australia)

Suzie Miller was appointed Director of The Ritchie Centre in 2022 and she holds a National Health and Medical Research Council of Australia Fellowship. Suzie leads the Neurodevelopment and Neuroprotection Theme in the Ritchie Centre, with her research utilising experimental large animal models of the primary causes of perinatal brain injury – including foetal growth restriction, intrauterine infection, preterm birth, and perinatal asphyxia – to better understand the progression of neuropathology, so that targeted interventions can be implemented. Suzie and her clinical and research colleagues are working towards the translation of neuroprotective therapies before or after birth, so that neonatal brain injury can be reduced, and neurodevelopmental deficits might be prevented. Suzie is also a keen advocate for the role of women in biomedical science, and a founding member of the NHMRC Women in Health Science Committee.

## Md Munnaf Hossen

### RMIT University (Australia)

Md Munnaf Hossen is a PhD candidate at RMIT University, Australia, working with Rosita Zakaria and Bobbi Fleiss. He is investigating the effects of perinatal brain injury on glial cell responses and kynurenine pathway metabolites. His multidisciplinary approach integrates immunohistochemistry, LC-MS/MS, and RNA sequencing to elucidate the molecular and cellular pathways underlying neuroinflammatory responses. Recently, Munnaf was awarded a competitive research grant by the Australian Institute of Medical Scientists (AIMS) to support the development of a novel LC-MS/MS approach for analysing multiple kynurenine pathway metabolites. His work aims to advance our understanding of early life neuroinflammatory processes and inform future strategies for brain injury prevention and neurodevelopmental health.

# SPEAKERS

## Lívia Nagy Bonnard

### Right(s) Beside You Association – Melletted a helyem Egyesület (Hungary)

Lívia Nagy Bonnard is the Founder and Vice-President of the Melletted a Helyem Egyesület association for preterm babies in Hungary. She is the mother of four, including a preemie boy born at 27 weeks' gestation who is now a young adult living with multiple disabilities. Lívia is a patient expert – EUPATI Fellow who has participated on several national and international research projects. She is a member of the Parent, Patient and Public Advisory Board (PPPAB) for EFCNI's European Standards of Care for Newborn Health and a NIDCAP NFI Family Council member. Lívia coordinates FINE training in Hungary and part of Faculty. She received an EFCNI award for organising the adaptation of FINE for online training in 2022. Lívia is a trained nurse who has worked mostly with babies and children in cardiac departments and a CICU (cardiac intensive care unit).

## Stefanie Obst

### University Hospital Essen (Germany)

Stefanie Obst completed both her Bachelor's and Master's degrees in Molecular Biology with a focus on experimental research in perinatal neuroscience. During her Master's degree, she studied an experimental hypoxic-ischemic encephalopathy model equivalent to term infants under the supervision of Josephine Herz. For her PhD, she extended her expertise to the preterm stage. She is currently working under the supervision of Ivo Bendix on the establishment of a combined model of hyperoxia-induced developmental brain and lung injury in neonatal rats. This model allows the study of the lung-brain axis and testing therapeutic approaches for both affected organs simultaneously.

# SPEAKERS

## Daan Ophelders

### Maastricht University (The Netherlands)

Daan Ophelders is an Assistant Professor at Maastricht University's Faculty of Health, Medicine and Life Sciences, specialising in translational neonatology. His research focuses on the inflammatory response in foetal and neonatal organs under perinatal stress, including intra-amniotic infections, hypoxia-ischemia, and mechanical ventilation. He has been instrumental in developing advanced large animal models to investigate these mechanisms and to test therapeutic interventions, particularly cell-based therapies.

## Nicola Pelizzi

### Chiesi Farmaceutici (Italy)

- Degree and PhD in Chemical Sciences in 1998.
- From 1998 to 2007, R&D Senior Scientist in Analytical Chemistry Department at Chiesi Farmaceutici.
- From 2008 to 2011, R&D Project Manager at Chiesi Farmaceutici, with PMP® (Project Management Professional) certification granted in 2009.
- From 2012 to today, Global Project Leader of neonatology projects, with responsibility for creating the strategy and the integrated project plan for the development of the assigned projects, leading cross-functional and multicultural teams composed by experts of different areas (preclinical, CMC, clinical, regulatory, commercial, market access, medical affairs, manufacturing, IP, project manager). As Global Project Leader, experience has been gained in leading projects in different therapeutic areas and in different phases of development, as well as in assessing the value of new opportunities through due diligence evaluations.
- Author of 24 scientific publications in international journals.

# SPEAKERS

## António Salgado

### University of Minho (Portugal)

António Salgado is a biologist with a PhD in Tissue Engineering and Hybrid Materials (2005), and a Habilitation (DSc) in Health Sciences, from the University of Minho. Currently he is a Coordinating Investigator at the Life and Health Sciences Research Institute (ICVS) and Vice-Dean for Research at the School of Medicine – University of Minho. His research interests are focused on the development of innovative therapies for CNS repair, namely on Spinal Cord Injury and Parkinson's Disease, using stem cells secretome. His main areas of research are: 1) Development of ECM like hydrogels for the transplantation of Mesenchymal Stem Cells into the injured CNS; 2) Role of the secretome of MSCs in neuroprotection and repair, particularly the establishment of novel therapies based on the sole use of MSCs secretome. He is currently an author of more than 165 papers (over 8,000 citations; h-Index=50), has delivered over 75 invited talks worldwide and is/was the Principal Investigator of more than 25 grants funded by National/International funding agencies. He has previously served as the President of the Portuguese Society for Stem Cells and Cell Therapies. He has received several distinctions for his work including the Gulbenkian Award on Cutting Edge Research in Life Sciences, the Prize Melo e Castro for Spinal Cord Injury Research, the University of Minho Prize for Scientific Merit and the Grünenthal Prize in Basic Research.

## Richard Schäfer

### University of Freiburg (Germany)

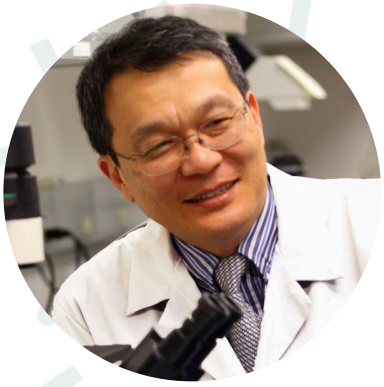
Richard Schäfer is the Medical Director Transfusion Medicine at the Institute of Transfusion Medicine and Gene Therapy at Freiburg University, where he is also leading the iPSC core facility. He was clinically trained in internal medicine and transfusion medicine. His research addresses both fundamental and translational questions. He has been working extensively in the mesenchymal stromal cell and induced pluripotent stem cell fields at Harvard, Stanford, Tübingen, Frankfurt and Freiburg Universities.

# SPEAKERS

## Meray Serdar

### University Hospital Essen (Germany)

Meray Serdar studied biochemistry and completed a master's degree in electrophysiology. In 2012, she began her PhD at the Department of Pediatrics I/Neonatology & Experimental Perinatal Neurosciences at University Hospital Essen, under the supervision of Ivo Bendix and Ursula Felderhoff-Müser. Their research investigated hyperoxia-induced preterm brain injury and the effects of fingolimod in vivo and in vitro. Since 2017, Meray has been a postdoctoral researcher in the same lab, focusing on developing a clinically relevant experimental model for preterm brain injury, incorporating prenatal inflammation and postnatal hyperoxia. Their current research examines the potential of intranasal mesenchymal stem cell (MSC) therapy as a treatment.



## Sidhartha Tan

### Wayne State University (USA)

Sidhartha Tan is presently Leslie Helppie Endowed Professor in Urban Health, Department of Pediatrics, Wayne State University School of Medicine. His research focuses on Big Data analytics in neonatal intensive care, advanced neonatal nursing, olfactory memory testing, neuroimaging, neuroprotective drugs, and neonatology education. His basic science research explores mechanisms of brain injury in newborns, with his lab continuously funded since 1992, currently holding three NIH R01 grants. Using rabbit models of cerebral palsy, his work investigates hypoxia-ischemia at various gestational ages, mimicking acute placental insufficiency. His studies examine free radicals, reactive oxygen and nitrogen species, grey and white matter injury, oligodendroglial damage, brain cell death, and epigenetics. He has also pioneered MRI biomarkers to predict motor deficits in foetuses and developed the first transgenic knockout and knock-in rabbit models to study brain injury. He has authored over 75 publications and currently serves on the editorial board of Developmental Neuroscience.

# SPEAKERS

## Bernard Thébaud

### Ottawa Hospital Research Institute (Canada)

Bernard Thébaud is a clinician-scientist with a focus on the clinical translation of stem cell-based and gene therapies for lung diseases. He is a senior scientist with the Ottawa Hospital Research Institute and a neonatologist with the Children's Hospital of Eastern Ontario, providing care to critically ill newborns. He is a Professor of Pediatrics at the University of Ottawa, uOttawa Partnership Research Chair in Regenerative Medicine and holds a Tier 1 Canada Research Chair in Lung Stem Cell Biology and Regeneration. Bernard has participated on numerous peer review committees and scientific advisory boards at the international, national and provincial level, including CIHR and NIH. He studies the mechanisms of lung development, injury and repair to design new treatments for incurable lung diseases. His focus is on answering clinically relevant questions for translation into real-life applications. He is now translating innovative cell and gene therapies from the lab into patients to improve outcomes.

## Sandrine Thuret

### King's College London (UK)

Sandrine Thuret is Head of the Neurogenesis and Mental Health Laboratory and co-Head of the Basic & Clinical Neuroscience Department at King's College London, UK. She has a background in bioengineering, molecular, cellular, behavioural and ageing biology. She graduated from the University of Heidelberg, Germany with a PhD in Neuroscience and did her postdoctoral research at the Salk Institute with Prof. F.H. Gage, CA, USA, where she investigated the role of stem cells in the mammalian central nervous system. Sandrine's lab is investigating environmental and molecular regulatory mechanisms controlling the production of new neurons in the postnatal brain and how these impact mood and memory, in health and disease. Overall, she has made novel contributions to our understanding of neural stem cell biology in the context of regeneration, neurodegeneration, mental health and neurogenesis with over 10,000 citations. She is a TED speaker with 15 million views and currently leading two international research consortia on cognition and brain plasticity.

# SPEAKERS

## Valéry van Bruggen

### Maastricht University Medical Center+ (The Netherlands)

Valéry van Bruggen studied Biomedical Sciences at the Rijksuniversiteit Groningen followed by the research master physician-clinical investigator. Since 2020 she has been working with the department of paediatrics, exploring new therapeutic strategies for children born preterm and focusing on functional outcomes over time. As a medical doctor and PhD student she aims to bridge the gap between bench and bedside for vulnerable neonates.

## Gert van Steenbrugge

### Care4Neo (The Netherlands)

Gert van Steenbrugge is father of two preterm children, born respectively at 34 and 26 weeks of pregnancy. He is former director of the Dutch parent organisation VOC (currently known as Care4Neo) and is presently member of the scientific committee of Care4Neo. Gert has been involved in the European Foundation for the Care of Newborn Infants (EFCNI) since the first parents' meeting in 2008. He was member of the Parent Advisory Board and was involved in the development of EFCNI's Standards of Care. By education Gert is biochemist and worked for many years in biomedical research. Having this background his special interests are medical and care-associated research in neonatology. Together with parents and professionals he was founder of the 'Neokeurmerk', a quality mark for the neonatology departments of Dutch hospitals, based on the parent perspective. His often used motto is "vulnerable children, strong parents and dedicated professionals, together we stay strong".

# SPEAKERS

## Roosmarijn Vandenbroucke

### Ghent University (Belgium)

Roosmarijn Vandenbroucke is head of the Barriers in Inflammation at the VIB-UGent Center for Inflammation Research in Ghent, Belgium. She has a background in biotechnology and molecular cell biology. She obtained a PhD in Pharmaceutical Sciences at Ghent University where she focused on gene therapy. During her postdoctoral research, she became interested in peripheral and central inflammation and brain barriers. She founded her independent research lab at Ghent University in 2015 and at VIB in 2018. Her team is internationally recognised for its expertise in brain barriers, (neuro)inflammation, the gut-brain axis, and extracellular vesicles.

## Máximo Vento

### Instituto de Investigación Sanitaria La Fe (IISLAFE) (Spain)

- MD, PhD.
- Professor of Pediatrics.
- Division of Neonatology, Univ and Polytech Hospital La Fe, Valencia.
- 475 publications; h-index 73.
- Oxygen metabolism and redox regulation in neonatology: experimental model, clinical and biomarker approach (mass spectrometry).

# SPEAKERS

## Gaurav Verma

### University of Gothenburg (Sweden)

Gaurav Verma is a passionate researcher specialising in mitochondrial biology and bioenergetics, with a focus on mitochondrial function in neurological disorders. Gaurav's current work explores mitochondrial transplantation in brain injury models, investigating how transplanted mitochondria can restore cellular respiration and support neuronal recovery. By analysing oxygen consumption rates (OCR) in isolated mitochondria using Seahorse Flux Analyser, his aim is to unravel new insights into mitochondrial metabolism and neuroprotection, paving the way for potential therapeutic strategies. Beyond his research, Gaurav has contributed to the scientific community through a recently published book chapter with IntechOpen, titled Fundamentals of Stem Cells and Application in Complex Disorders. His interdisciplinary interests extend to forensic science and clinical trials, reflecting a deep curiosity for scientific discovery. Driven by a commitment to advancing mitochondrial research, Gaurav strives to develop innovative approaches to cure mitochondrial dysfunction and improve therapeutic interventions.

# SPEAKERS

## Tamara Yawno-Fegan

### Hudson Institute of Medical Research and Monash University (Australia)

Tamara Yawno-Fegan is a renowned developmental neuroscientist with over 17 years of experience investigating neurodevelopment in large animal models of cerebral palsy. Her exceptional translational research includes ground-breaking work on ganaxolone for neonatal seizures, which is now part of a multi-centre collaboration to trial ganaxolone against standard therapy in newborns with hypoxic ischemic encephalopathy. Tamara's recent research focuses on the role of placental stem cells in brain development and their neuroprotective actions in compromised pregnancies. A key aspect of her work involves extracellular vesicles (EVs), bioactive particles secreted by placental stem cells. Containing proteins, lipids, and RNA, EVs show potential as therapeutic agents. Tamara's studies suggest that EVs may promote neuroprotection in the developing brain, offering a promising avenue for treating brain injury and neurodevelopmental disorders like cerebral palsy. By exploring EV-mediated cellular communication, she hopes to uncover new insights that could lead to novel regenerative therapies.

## Nicolas Zucker

### Physics for Medicine Paris (France)

Nicolas Zucker is a PhD student in physics working on ultrasound neuroimaging. During his PhD he is exploring how functional ultrasound localisation microscopy can detect and quantify hemodynamic response at the microscopic scale. From preclinical to clinical imaging, this research is paving the way for a better understanding and monitoring of cerebral small vessel diseases.

# PRACTICAL INFORMATION

**Venue**
Hotel SB Diagonal Zero
Plaça de Llevant, s/n, Sant Martí
08019 Barcelona
Spain

Phone: +34 935 078 000
Website: https://www.hoteldiagonalzero.com/

**Reaching the venue**

- **Metro**

El Maresme | Fòrum is the nearest metro stop to the venue (210m). It is on metro line L4 (the yellow line). The city centre (metro stop Passeig de Gràcia) can be reached in around 20 minutes using the metro.

- **Tram**

The nearest tram stop is called Fòrum and is around 23m from the venue. It is on Línea T4.

- **Car**

Exit 24 on Ronda Litoral. The hotel has a paying car park for its guests (subject to availability of spaces).

- **Plane**

The Aerobús runs regularly between both terminals of Barcelona-El Prat Airport and stops in the city (Plaça Espanya, Plaça Catalunya). Plaça Catalunya is a short walk from the Passeig de Gràcia metro stop which provides easy access to the venue by metro.

**Internet access**
The Wi-Fi name is SB Diagonal Zero. No password is required.

**Presenters**
If you're presenting at the conference, please come to the South America Room 30 minutes before your session begins to ensure your presentation is loaded onto the conference laptop. Presenters should bring their presentation on a USB.

**Photography and videography**
All sessions will be recorded and live streamed*. There will be a professional photographer taking photos during the event for promotional and reporting purposes. A member of the RMIT Europe communications team will also be taking photos and short videos for social media during the week. * Please note that the talk by András Lakatos cannot be live streamed or recorded due to the need to protect intellectual property arising from the current project.

PREMSTEM 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.

# CONFERENCE ORGANISER

RMIT Europe
Spain

RMIT University
Australia

**RMIT University** is an international university of technology, design and enterprise with over 90,000 students and almost 10,000 staff globally. We empower people and communities to adapt and thrive across generations, with education, research and civic engagement that are applied, inclusive and impactful. Postgraduate, undergraduate, vocational education, foundation studies and online programs offer students a variety of work-relevant pathways.

**RMIT Europe** is RMIT's European Innovation Hub. Located in Barcelona's innovation district, RMIT Europe is the gateway for European research, industry, government and enterprise to innovation and talent in Australia and Asia. Our partnerships include student internships, staff exchange, and research and innovation. We also partner with organisations to design and offer online courses and executive training. Our strategic partnership with Eurecat, one of the leading technology centres in southern Europe, has allowed us to boost research, innovation and industry connections.

**How can you partner with RMIT for research?**

- **RMIT Europe** can be a full partner (beneficiary) in Horizon Europe projects. RMIT Europe is the communications and co-creation lead for PREMSTEM.
- **RMIT University** is a non-profit Australian university. We cannot participate in Horizon Europe projects as a funded beneficiary, but can participate as an Associated Partner (self-funding our contributions) by association with RMIT Europe, RMIT Vietnam or another participating EU entity. RMIT University leads a scientific work package for PREMSTEM.
- **RMIT Vietnam** is a for-profit academic entity located in a 'Horizon Europe eligible developing country'. RMIT Vietnam can be a beneficiary in Horizon Europe projects unless explicitly stated in the call text.

**Get in touch**

research.europe@rmit.edu.au

# PARTNER PROFILES

## Cerebral Palsy Alliance

Australia

**Cerebral Palsy Alliance** (CPA) is a ground-breaking, global centre of expertise for cerebral palsy (CP) research, advocacy, intervention and assistive technology innovation. For over 80 years, we have been guided by our founders' mission that 'nothing is impossible'. The Cerebral Palsy Alliance Research Foundation is the world's largest private funder of CP research. The Cerebral Palsy Alliance Research Institute, funded by the Foundation, has research priorities shaped by consultation with individuals living with CP and their families. Our diverse, multidisciplinary research team includes medical specialists, allied health professionals, engineers and researchers together with people with CP and their families. With a focus on Epidemiology, Regeneration, Technology and Early Detection and Early Intervention, our research is at the heart of our organisation, driving interventions, shaping our initiatives, and uniting communities worldwide for positive change.

The **Cerebral Palsy Alliance Research Foundation** was established in 2005. At this time, approximately 1 in 400 babies each year were diagnosed with CP. Today, that number has decreased significantly to approximately 1 in 700 babies – a remarkable, 40% reduction.
One of the highest priorities for people with CP and their families is stem cell therapies. The Regeneration team at CPA is leading several collaborative studies investigating cell therapies and other advanced therapeutics for the prevention and treatment of CP. They are also focused on information-sharing and progressing access to cell therapies in Australia.

# PARTNER PROFILES

## Global Foundation for the Care of Newborn Infants

Germany

**Partner with GFCNI: Advancing Global Newborn Health Together**

The Global Foundation for the Care of Newborn Infants (GFCNI) is the **first global organisation and network** to unite patients, families, healthcare professionals, medical staff, and scientists across disciplines, sectors, and countries. Together, we work to improve the health and quality of care for newborns and their families. Our vision: **every baby receives the right care, at the right time, in the right place**.

GFCNI advocates for high-quality, accessible, and equitable maternal and newborn care, especially for babies born too soon, too small, or too sick. Representing the patient and parent voice globally, we ensure that care and research remain centred on real-life needs and experiences.

**Collaborate With Us on Research**

We partner with researchers, institutions, and organisations to support impactful studies that enhance neonatal and maternal health. As the global patient representative, we bring valuable insights at every research stage:

- **Agenda Setting**: Define priorities through gap analysis and patient-reported outcomes.
- **Design & Planning**: Support grant writing, study design, and inclusive recruitment.
- **Conduct**: Assist with fieldwork, materials, and informed consent processes.
- **Data Analysis**: Provide patient- and parent-centred input on findings and interpretation.
- **Dissemination**: Amplify results through advocacy and parent networks.

Partnering with GFCNI gives you access to a diverse, international network and unique expertise that can improve research relevance, increase impact, and support funding success.

To get started contact us at research@gfcni.org at least 8 weeks before your grant submission.

**Join Us as a Partner**

In addition to research, we collaborate with corporate and project partners committed to advancing newborn care. These partnerships support critical initiatives while ensuring our work remains independent and mission-driven.

We build customised collaborations and work with partners on a variety of levels to match their interests and expertise with our mission. Together, we drive change that empowers families, strengthens healthcare systems, and improves newborn outcomes.

**Join us. Make a lasting difference.**

Join us in **transforming the future of maternal and neonatal care**. By becoming a GFCNI partner, your organisation can contribute to meaningful, lasting change for newborns and their families worldwide. If you would like to learn more, reach out to Chairwoman Silke Mader at S.MaderOffice@gfcni.org

# CO-CREATION FACILITATOR

## Punk Design

Spain

**Designing the Science of Tomorrow: Co-Creation Meets Human-Centred Impact**

**What if your next breakthrough wasn't just scientifically sound—but emotionally resonant, widely adopted, and built to last?**

Punk Design is a global collective of disruptors helping Science, Research and Healthcare organisations turn complexity into clarity.

*We don't teach innovation. We make it inevitable.* We blend **Human-Centred Design**, **playful research methods**, and **business strategy** to co-create scientific solutions that last and impact the world.

Our work has helped:

- Build trust around **stem cell clinical trials**
- Improve **data collection with autistic children** through play
- Design sustainable strategies in **nanotechnology and energy research**
- Strengthen communication and storytelling in **scientific teams**
- Shape more human, inclusive, and actionable **healthcare innovation**

We've collaborated with tech companies, hospitals, UX teams, educators, and consortia across Europe, bringing a fresh mix of **rigour**, **creativity**, and **business focus**. Our approach treats users and stakeholders as co-designers, not just sources of information—a proven strategy for healthcare and clinical research settings.

Whether you're launching a new research direction, working across silos, or trying to translate science into systems change — we help you **design with people, not only for them**. That's how you build things that last.

**You have the science. We'll help you scale the human impact—and prove its value every step of the way. Let's co-create it!**

Enrique Conches
Creative Innovation Leader | Former IDEOU Design Thinking Coach | Stanford GSB LEAD
econches@punkdesign.barcelona


**premstem.eu**

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#premstemconference

PREMSTEM 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.