



DAVID ATTWELL
DWIGHT BERGLES
PATRIZIA CASACCIA
ANNE BARON-VAN EVERCOOREN
PATRIK ERNFORS
CHARLES FFRENCH-CONSTANT
ROBIN FRANKLIN
JONAS FRISEN
VITTORIO GALLO
STEVEN GOLDMAN
THORA KARADOTTIR

CLAIRE JACOB
QING RICHARD LU
DAVID LYONS
WENDY MACKLIN
KELLY MONK
MICHELLE MONJE
KLAUS ARMIN NAVE
AKIKO NISHIYAMA
ELIOR PELES
WILLIAM RICHARDSON
MIKAEL SIMONS

Illustration: Amagoia Agirre

Nobel Mini-Symposium 55

The Dark Side of the Brain

Myelinating Glia in Central and Peripheral Nervous Systems

9-10 October 2019

Nobel Forum, Karolinska Institutet, Stockholm, Sweden



Nobelförsamlingen

The Nobel Assembly at Karolinska Institutet



**Karolinska
Institutet**

FOREWORD

Since the pioneering work of Santiago Ramon y Cajal and Camillo Golgi in the late 1800's (Nobel prizes in Physiology or Medicine in 1906), neurons have taken a major stage for their role in higher functions in the central and peripheral nervous systems (CNS and PNS). In the 1920's, Pio del Rio-Hortega described for the first time oligodendrocytes, a glial population later found to produce myelin, an ensheathing layer that insulates neuronal axons. He also concluded that oligodendrocytes were homologous to Schwann cells in the PNS. The production of myelin and consequent fine-tuning of the electrical transmission within neuronal networks in the CNS and PNS has been for many decades the main function ascribed to myelinating glia. However, in the last decades, the view of myelinating glial cells as sole neuronal support cells has started to evolve, with the emergence of other roles of these cells in the CNS and PNS circuitry.

This mini-symposium will focus on the emerging roles of myelinating glial cells (oligodendrocytes and Schwann cells) in the CNS and PNS and will gather leading scientists that are making fundamental contributions to and opening new avenues of research in this field. We would like to welcome you and hope you enjoy the mini-symposium.

Gonçalo Castelo-Branco and Roman Chrast

Karolinska Institutet



Karolinska Institutet is one of the world's leading medical universities. Its vision is to advance knowledge about life and strive towards better health for all. Karolinska Institutet accounts for the single largest share of all academic medical research conducted in Sweden and offers the country's broadest range of education in medicine and health sciences. The Nobel Assembly at Karolinska Institutet selects the Nobel laureates in Physiology or Medicine.

ki.se/en

PROGRAM

WEDNESDAY 9TH OCTOBER 2019

08:50 - 09:00 **WELCOME ADDRESS**
Gonçalo Castelo-Branco, Karolinska Institutet, Sweden

SESSION I

09:00 - 09:30 **The saga of oligodendrocyte precursor cells – whence and whither**
AKIKO NISHIYAMA, University of Connecticut, USA

09:30 – 10:00 **Oligodendrocyte precursor cells become heterogeneous with age and region: different functional cell states?**
THORA KARADOTTIR, University of Cambridge, UK

10:00 - 10:30 **Glial progenitor cell-based modeling and treatment of myelin disease**
STEVEN GOLDMAN, University of Copenhagen, Denmark

10.30 - 11.00 **Coffee break**

SESSION II

11.00 - 11.30 **Oligodendroglial progenitors as environmental biosensors**
PATRIZIA CASACCIA, Advanced Science Research Center, City University of New York, USA

11.30 - 12.00 **Epigenetic control of myelination and functional regeneration**
QING RICHARD LU, Cincinnati Children's Hospital Medical Center, USA

12.00 - 12.30 **Increase myelinating cell plasticity to improve regeneration**
CLAIRE JACOB, University of Mainz, Germany

12:30 - 13.00 **Signaling pathways regulating myelination**
WENDY MACKLIN, University of Colorado, USA

13.00 - 14.00 **Lunch**

WEDNESDAY 9TH OCTOBER 2019

SESSION III

- 14.00 - 14.30 **Intrinsic and extrinsic regulation of myelin sheath shape and number in the CNS**
CHARLES FFRENCH-CONSTANT, University of Edinburgh, UK
- 14.30 - 15.00 **Endothelin-1 as a developmental signal in the SVZ**
VITTORIO GALLO, Children's National Health System, Washington, USA
- 15.00 - 15.30 **Role of phagocytes in remyelination of the CNS**
MIKAEL SIMONS, Technical University of Munich, Germany
- 15.30 - 16.00 **Molecular and genetic mechanisms of myelin development and repair**
KELLY MONK, Vollum Institute, Oregon Health & Science University, Portland, USA
- 16.00 - 16.30 **Coffee break**

SESSION IV

- 16.30 - 17.00 **Using zebrafish to study myelinated axons and neural circuit function**
DAVID LYONS, University of Edinburgh, UK
- 17.00 - 17.30 **Oligodendrocyte dynamics in cortical circuits**
DWIGHT BERGLES, Johns Hopkins Medical School, USA
- 17.30 - 18.00 **The node of Ranvier in Health and Disease**
DAVID ATTWELL, University College of London, UK
- 18.00 - 18.30 **Myelinating memories**
WILLIAM RICHARDSON, University College of London, UK

THURSDAY 10TH OCTOBER 2019

SESSION V

- 08:30 - 09:00 **Axoglial adhesion molecules in myelination**
ELIOR PELES, Weizmann Institute of Science, Israel
- 09:00 - 09:30 **Novel functions of myelinating oligodendrocytes in axonal energy metabolism: impact on neurodegenerative disease**
KLAUS ARMIN NAVE, Max Planck Institute, Göttingen, Germany
- 09:30 - 10:00 **Initiation and transduction of somatosensation by peripheral glia**
PATRIK ERNFORS, Karolinska Institutet, Sweden
- 10.00 - 10.30 **Coffee break**

SESSION VI

- 10.30 - 11.00 **Myelin plasticity in cognition and cancer**
MICHELLE MONJE, Stanford University, USA
- 11.00 - 11.30 **Ageing and the biology of adult CNS progenitors**
ROBIN FRANKLIN, University of Cambridge, UK
- 11.30 - 12.00 **Uncovering the intrinsic properties of human oligodendroglia**
ANNE BARON-VAN EVERCOOREN, Institut du Cerveau et de la Moelle épinière, Paris, France
- 12.00 - 12.30 **Cell generation dynamics in the adult human brain**
JONAS FRISEN, Karolinska Institutet, Stockholm, Sweden
- 12.30 - 13.15 **DISCUSSION PANEL: Frontiers in Myelinating Glia**
Chair: LEDA DIMOU, University of Ulm, Germany
- 13.15 - 13.20 **CONCLUDING REMARKS**
Roman Chrast, Karolinska Institutet, Sweden
- 13.20 - 14.20 **Lunch and departure**

This Mini-symposium is sponsored by the Nobel Assembly at the Karolinska Institutet and the Ming Wai Lau Center for Reparative Medicine, Karolinska Institutet

Organizers:

Gonçalo Castelo-Branco & Roman Chrast, Karolinska Institutet, Stockholm, Sweden



**Karolinska
Institutet**



Nobelförsamlingen

The Nobel Assembly at Karolinska Institutet