ACCADEMIA NAZIONALE DEI LINCEI

EBRI
European Brain Research Institute
Rita Levi-Montalcini

CONFERENCE

FROM GOLGI TO MODERN NEUROSCIENCE
CELEBRATION

21 GENNAIO 2026

A B S T R A C T

Scientific Organizing Committee: Maurizio BRUNORI (Linceo, Sapienza Università di Roma, coordinatore Linceo, Antonino CATTANEO (Presidente dell'EBRI 'Rita Levi-Montalcini', Roma; Scuola Normale Superiore, Pisa) Lamberto MAFFEI (Linceo, Presidente Emerito Accademia Nazionale dei Lincei, Scuola Normale Superiore di Pisa)

PROGRAMME

Camillo Golgi is famous because he developed a new staining technique known as "reazione nera", which allowed to highlight individual brain cells. The use of Golgi's staining method allowed Ramón y Cajal to demonstrate that nervous cells are discrete units, called neurons. In 1890 Golgi was elected Fellow of the Accademia Nazionale dei Lincei; and in 1906 he shared the Nobel Prize in Physiology or Medicine with Ramón y Cajal "in recognition of their work on the structure of the nervous system". In 1898 he identified an intracellular structure now called the Golgi apparatus, a discovery which represents a cornerstone of cell biology. This conference celebrates the 100th anniversary of Golgi's death.

Mercoledì 21 gennaio

9.30 Welcome addresses
Roberto ANTONELLI (Presidente dell'Accademia Nazionale dei Lincei)
Carlo DOGLIONI (Vice Presidente dell'Accademia Nazionale dei Lincei)
Andrea LENZI (Presidente del Consiglio Nazionale delle Ricerche - CNR)

10.00 Jean-Pierre CHANGEUX (Linceo, Institut Pasteur, Paris): *On the paths of Golgi: synaptic transmission with allosteric receptors*

10.40 Coffee break

Chair: Ernesto CARAFOLI (Linceo, Università di Padova)

11.00 Giacomo RIZZOLATTI (Linceo, Università di Parma): *The Parmesan branch of Golgi's legacy: from Pensa to mirror neurons*

11.40 Randy SCHEKMAN (Linceo, Università della California, Berkeley, CA (USA): *The legacy of Golgi: Vesicle traffic in health and disease*

12.20 Elena CATTANEO (Lincea, Università di Milano): *Seeing the developing brain one cell at a time - a single-cell view of developmental vulnerability in Huntington's Disease*

13.10 Break

Chair: Martino BOLOGNESI (Linceo, Università di Milano)

14.30 Kurt WÜTHRICH (Institut f. Molekularbiol.u.Biophysik, ETH, Zurich): *Solution NMR spectroscopy in molecular biology.* (Pending)

15.20 Paolo MAZZARELLO (Università di Pavia): *Golgi's morphological path to the secrets of life*

16.00 Maurizio CORBETTA (Linceo, Università di Padova): *Neural networks, the dark energy of the brain, and behavior*

16.40 Coffee break

Chair: Maria Concetta MORRONE (Lincea, Università di Pisa)

17.00 Michela MATTEOLI (Lincea, IIN-CNR and Neuro Center Humanitas Research Hospital, Milano): *Revisiting Golgi's Network: Microglia Shaping Synaptic Connectivity*

17.40 Giorgio PARISI (Linceo, Sapienza Università di Roma): *From neural networks to artificial intelligence*

ROMA – PALAZZO CORSINI- VIA DELLA LUNGARA, 10
Segreteria del convegno: convegni@lincei.it – http://www.lincei.it

Tutte le informazioni per partecipare al convegno sono disponibili su:
All information for attending the conference is available at:
https://www.lincei.it/it/manifestazioni/golgi-modern-neuroscience

Per partecipare al convegno è necessaria l'iscrizione online
Fino alle ore 10 è possibile l'accesso anche da Lungotevere della Farnesina, 10
I lavori potranno essere seguiti dal pubblico anche in streaming
Online registration is required to attend the conference.
Until 10 a.m. access is also possible from Lungotevere della Farnesina 10.
The conference can also be followed by streaming.

L'attestato di partecipazione al convegno viene rilasciato esclusivamente a seguito di partecipazione in presenza fisica e deve essere richiesto al personale preposto in anticamera nello stesso giorno di svolgimento del convegno
The certificate of participation in the conference will be issued only following on attendance in presence and must be requested to the staff in charge on the same day of the conference.

The Parmesan branch of Golgi's legacy: from Pensa to mirror neurons

Giacomo RIZZOLATTI (Linceo, Università di Parma)

I will start with a short historical introduction linking Camillo Golgi to the Parmesan neuroscience via Antonio Pensa and Giuseppe Moruzzi. My main speech will deal with the mirror mechanism. Mirror mechanism is a basic neural mechanism that transforms sensory representations of others' actions into motor representations of the same actions in the brain of the observer. I will start describing the functions of the mirror mechanism located in the parieto-fontal network of monkeys and humans. I will show that this mechanism enables one to understand others in an immediate, phenomenological way, without recourse to cognitive inferential processing. In the second part of my talk I will discuss the role of the mirror mechanism in understanding vitality forms and basic emotions. The data on emotions will lead me to the last part of my talk where I will present stereo-EEG data on action and emotion recognition. I will conclude discussing the clinical application of the mirror mechanism (action observation therapy, AOT).

The legacy of Golgi: Vesicle traffic in health and disease

Randy SCHEKMAN (Linceo, Università della California, Berkeley, CA (USA)

Camillo Golgi discovered the "internal reticular apparatus" in nerve cells in 1898 using his innovative silver staining method (the "black reaction"). For this and his visualization of nerve cells in the brain, he shared the Nobel Prize with his contemporary and rival, Ramon y Cahal in 1906. For many decades after Golgi's discovery, the Golgi membrane was considered an artefact of the silver staining procedure even though the organelle was seen ubiquitously in plant and animal tissues. It was not until the pioneering work of George Palade and his colleagues at Rockefeller University and his demonstration of the Golgi apparatus as a temporal station in the path of secretion in the exocrine pancreas that a true appreciation of Golgi's discovery was uniformly accepted. More recent application of the tools of genetics and biochemistry have placed the Golgi apparatus at stage center of a membrane traffic hub in growth and function of all eukaryotic cells.
The work in my lab has focused on the mechanism of vesicular traffic in Baker's yeast and more recently in the secretion of extracellular vesicles (EVs) by cultured human cells. Our current interest has focused on the role of a plasma membrane repair pathway in the export of both exosomes and microvesicles shed from the cell surface in response to cell damage. I will present our hypothesis that the normal forces of shear and stress on tissues *in vivo* produce EVs as a byproduct of a cellular homeostatic process. EVs may function as membrane ligands for cell surface signaling but the absence of a proper membrane fusogen is inconsistent with a role for EVs in the efficient transfer of cargo molecules into target cells.

Seeing the developing brain one cell at a time - a single-cell view of developmental vulnerability in Huntington's Disease

Elena CATTANEO (Lincea, Università di Milano)

More than a century ago, Camillo Golgi showed that understanding the brain requires resolving its individual cellular components. Today, single-cell transcriptomics extend this vision into human neurodevelopment, enabling the study of how cellular identity and developmental context shape molecular programs in the developing brain. Applying this framework to disease-relevant settings offers a unique opportunity to investigate how genetic variation interfaces with early developmental processes. In this context, Huntington's disease (HD), an adult-onset brain disease caused by a CAG expansion in the

HTT gene, provides a paradigmatic model to explore how a single mutation may affect specific cell populations over developmental time. In this talk, we present an integrated transcriptomic approach combining human fetal brain tissue with complementary mouse models and stem cell–derived systems to dissect cell type diversity and early molecular features associated with HD-related vulnerability.

Solution NMR spectroscopy in molecular biology

Kurt WÜTHRICH (Institut f. Molekularbiol.u.Biophysik, ETH, Zurich)

The presentation covers current and historical research by the Wüthrich laboratories that relates to modern neuroscience. This includes ongoing work on the neurokinin 1 receptor (NK1R) and investigations on prion proteins and prion diseases.

Revisiting Golgi's Network: Microglia Shaping Synaptic Connectivity

Michela MATTEOLI (Lincea, IIN-CNR and Neuro Center Humanitas Research Hospital, Milano)

The network described by Camillo Golgi remains a fundamental reference for understanding the functional organization of the brain. In recent years, microglia have emerged as key players in dynamically shaping this network, extending well beyond their traditional role in immune surveillance. Growing evidence indicates that microglia actively participate in the shaping of cerebral circuits by regulating synapse formation, maintenance, and elimination. During development and throughout adulthood, microglia–neuron interactions contribute to the refinement of synaptic connectivity and neuronal plasticity. In parallel, microglia play a crucial role in controlling neuronal metabolism by modulating energy availability and metabolic balance in response to synaptic activity. Through the release of trophic factors and metabolic signals, microglia coordinate neuronal functional demands with the state of the brain microenvironment. Dysregulation of these microglial functions gives rise to a spectrum of conditions collectively referred to as microgliopathies, which are increasingly recognized as contributing factors to neurodevelopmental, neuropsychiatric, and neurodegenerative disorders. Understanding how microglia integrate structural and metabolic cues is therefore essential to decipher both normal brain function and the mechanisms underlying disease.