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## BERZELIUS SYMPOSIUM 109

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# The Mind from Cradle to Grave

*Consciousness from fetal life to old age*

**22–23 May 2024 in Stockholm**

*Berzelius Symposium 109 is organized by the Swedish Society of Medicine  
in cooperation with Acta Paediatrica and the Journal of Internal Medicine.*



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# *The Mind from Cradle to Grave*

**T**he nature of human consciousness is a fundamental question often discussed by philosophers and neuroscientists. With the recent advancements in artificial intelligence, this question has become even more relevant. It is also an important topic for clinicians, particularly for those working at the beginning and end of patients' lives. Even anesthetists are often concerned with the state of consciousness. However, less attention has been devoted to the content of consciousness.

The aim of this Berzelius symposium is mainly to discuss the clinical aspects of the emergence of consciousness in the fetus and the neonate and the weakening of consciousness in old age. This is of major importance with regard to setting the limit for legal abortion and determining how to manage extremely preterm infants. Regarding old age, the question of consciousness pertains to intensive care and surgery of patients with conditions such as severe stroke, dementia, and locked-in-syndrome.

Berzelius symposia are regarded as the most distinguished conferences organized by the Swedish Society of Medicine. Jöns Jacob Berzelius (1749–1848) was a famous chemist and one of the founders of the Karolinska Institutet. This meeting is sponsored by Acta Paediatrica and the Journal of Internal Medicine. Some of the speakers will be invited to write review articles based on their lectures. The articles on the fetus and the child will be published in Acta Paediatrica and those on elderly patients in the Journal of Internal Medicine.

***Organizing Committee:*** Hugo Lagercrantz, Claes Frostell, Bo Angelin

***Secretariat:*** Nina Forsberg, Anna Käll, Elin Alvehag.

# PROGRAM

*Wednesday, May 22*

**9.00 Registration**

*Chair: Hugo Lagercrantz, Stockholm*

**9.45 Welcome and Introduction**

**10.00 Conscious processing down to the molecular level**

*Jean-Pierre Changeux, Paris*

**10.30 Invited Discussants**

*Göran Wendin, Göteborg and Hans Liljenström, Uppsala*

**11.00 Coffee**

**11.20 Fetal brain imaging**

*Hubert Preissl and Joel Frohlich, Tuebingen*

**12.00 Fetal consciousness**

*Nadja Reissland, Durham UK*

**12.30 Discussion**

**12.45 Lunch**

*Chair: Annika Janson, Stockholm*

**13.45 The newborn mind**

*Hugo Lagercrantz*

**14.00 The preterm mind**

*Ulrika Ådén, Stockholm and Nelly Padilla, Barcelona*

**14.45 Discussion**

**15.15 Coffee**

**15.45 The joy of being conscious**

*Morten Kringelbach, Oxford*

**16.15 General Discussion**

**16:45 End of meeting**



## ***Thursday, May 23***

***Chair: Bo Angelin, Stockholm***

**9.30 Evolution of consciousness**

*Bjorn Grinde, Oslo*

**10.00 Consciousness (out) of the body**

*Henrik Ehrsson, Stockholm*

**10.30 Discussion**

**10.50 Coffee**

**11.10 Disorders of consciousness: from diagnosis to therapy**

*Olivia Gosseries, Liège*

**11.50 Intensive care of the unconscious patient**

*Michael Broomé, Stockholm*

**12.20 Discussion**

**12.45 Lunch**

***Chair: Claes Frostell, Stockholm***

**13:45 Growing old and dying**

*Johan Frostegård, Stockholm*

**14.15 The notion and value of consciousness in two ethical issues**

*Göran Hermerén, Lund*

**14.45 Coffee**

**15.05 End-of-life Care**

*Invited Discussants: Helena Almén, Stockholm, Ulrik Kihlbom, Stockholm,  
Anna Lindblad, Stockholm, Niels Lynøe, Stockholm*

**16.30 General Discussion**

**17.00 End of meeting**

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# CHAIR

## **Annika Janson**

*Annika Janson is an associate professor in paediatrics at Karolinska Institutet. She is a clinically active paediatrician and paediatric endocrinologist in the department of paediatric endocrinology at Karolinska University Hospital in Solna, and at the National Childhood Obesity Centre. She also has a keen interest in global health, especially maternal and child health, and has worked in several low-income countries. Annika Janson is the deputy Editor-in-Chief of Acta Paediatrica.*



## **Bo Angelin**

*Bo Angelin, MD, PhD, is senior professor of Clinical Metabolic Research at the Karolinska Institute. He has served as head of the Clinical Department of Endocrinology, Director of Research and Education at the Karolinska University Hospital, and Director of the Karolinska Institutet/AstraZeneca Integrated CardioMetabolic Center. His research involves genetic and hormonal regulation of human lipid metabolism in relation to cardiovascular disease. He has been chairman of the Nobel Committee and Assembly, president of the European Atherosclerosis Society, and is currently member of the Swedish Royal Academy of Science and Editor-in-Chief of the Journal of Internal Medicine.*



## **Claes Frostell**

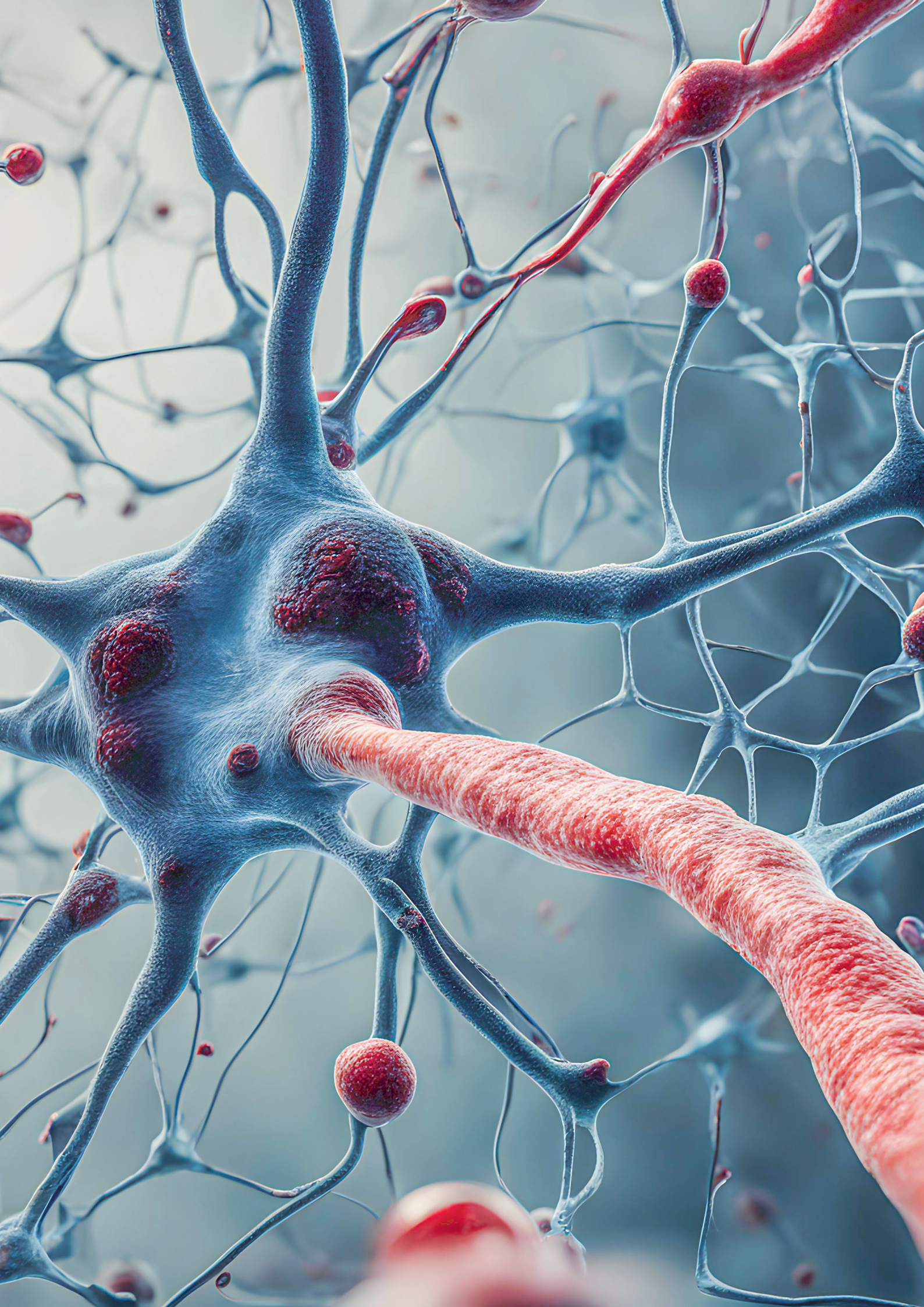
*Claes Frostell, MD, PhD, is senior professor of Anaesthesiology at the Karolinska Institute (KI). He has served as head of the Dept of Anaesthesia and Intensive Care at Karolinska University Hospital, as well as head (prefect) of the Dept of Clinical Sciences KI at Danderyd Hospital. He has been involved in experimental and clinical research on acute respiratory failure and sepsis. A main focus of study has also been the use of inhaled nitric oxide in pulmonary hypertension. He is Chair of the Ethics Council and Scientific Representative of KI since 2019.*



## **Hugo Lagercrantz**

*Hugo Lagercrantz, MD PhD Drhc is emeritus professor of pediatrics at the Karolinska Institutet. He was director of the neonatal unit at Astrid Lindgrens Children's Hospital. His research interests involve the stress of being born, sudden infant death syndrome and during the last years brain development and emergence of consciousness. He has been European chief editor for Pediatric Research and is presently editor-in-chief for Acta Paediatrica. He has been a member of the Nobel Assembly.*





# ABSTRACTS

## *Conscious processing down to the molecular level*

*Jean-Pierre Changeux*

Jean-Pierre Changeux is honorary Professor at the Collège de France and at the Pasteur Institute, Paris. His PhD work led to the concept of “allostery” to account for interactions taking place, on proteins, between distinct regulatory and biologically active sites. Having identified the nicotinic receptor protein, he demonstrated that it is a bona fide allosteric protein, down to the atomic level, thus paving the way of a new strategy of drug design. Then, in the attempt to integrate the molecular level into higher brain functions, he developed and documented a plausible mechanism of synaptic epigenesis by selective stabilization/elimination of synapses. Last, together with his collaborators, he extended this framework to artificial organisms passing cognitive tasks up to a neurobiological and molecular model of human conscious processing: the “global neuronal workspace”.

He received, the Gairdner, Wolf, Jeantet, Balzan, Einstein Prizes, the Erasmus medal.

### ABSTRACT

Among the recent theories about the neuronal basis of conscious processing, the global neuronal workspace hypothesis offers a simple connectomic scheme based upon the contribution of neurons with long-range axons, which would form a global neuronal workspace, broadcasting signals from the sensory periphery to the whole brain through a non-linear network ignition thus yielding “conscious” experience. Recent technical advances that combine molecular approaches, in vivo recordings, human brain imaging, and genetics support the hypothesis and further underline the importance of the molecular level (in particular of nicotinic receptors) in the modulation of conscious processing with important consequences for neuro-psychiatric diseases.

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*Koukoulis F, Rooy M, Changeux JP, Maskos U. (2016) Nicotinic receptors in mouse prefrontal cortex modulate ultraslow fluctuations related to conscious processing. Proc Natl Acad Sci U S A. 113:14823-14828*

## *Fetal brain imaging*

**Hubert Preissl and Joel Frohlich**

Hubert Preissl is Professor for central nervous processes related to type 2 diabetes at the University of Tübingen and Group leader “Metabolic Neuroimaging” at the Institute for Diabetes Research and Metabolic Diseases of the Helmholtz Center Munich at the University of Tübingen. He is also Scientific Director of the fetal magnetoencephalography Center in Tübingen, one of currently two dedicated fetal magnetoencephalography devices available worldwide. He studied Physics and did his PhD at the Max Planck Institute for biological Cybernetic in Tübingen. His research area ranges from basic science and clinical research in human fetal development to brain-body interactions during the life time with a special focus on insulin action in the brain.

### ABSTRACT

The human brain development in utero is largely unexplored. High Sensitive biomagnetic sensors are the only non-invasive method to assess neuronal activity in utero. We operate one of two dedicated biomagnetic devices which are able to record fetal magnetoencephalographic signals. This allows the extraction of event related and spontaneous brain activity starting around 24 weeks of gestation. Starting from the development of perceptual processes related to auditory and visual stimuli we will show how higher order cognitive processes, including habituation, discrimination and learning are emerging during the fetal phase. Due to the fast dynamical changes in brain development in utero I will discuss how psychological/psychiatric and metabolic factors affect the developmental trajectory.

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Moser J, Schleger F, Weiss M, Sippel K, Dehaene-Lambertz G, Preissl H. Magnetoencephalographic signatures of hierarchical rule learning in newborns. *Dev Cogn Neurosci*. 2020 Dec;46:100871. doi: 10.1016/j.dcn.2020.100871.

### ***Joel Frohlich***

Joel Frohlich is a postdoc studying fetal development using magnetoencephalography (MEG) at the University of Tuebingen, Germany, through a collaboration between the Institute for Neuromodulation and Neurotechnology and the Tuebingen fMEG Center. He performed his doctoral work and first postdoc at the University of California Los Angeles (UCLA), during which time he began studying consciousness in a developmental context while researching the paradox of Angelman syndrome, a rare genetic disorder in which children display cortical activity resembling slow wave sleep while fully awake and conscious. His recent work on sex differences in prenatal neural complexity, published this year in *Nature Mental Health*, has received media coverage in *New Scientist* and *Der Spiegel*.

### **ABSTRACT**

How does cortical entropy, an indicator of conscious awareness in adults, evolve during the earliest stages of human development? To explore the hypothesis that the entropy of cortical brain signals increases as birth draws near, we examined the relationship between fetal cortical entropy and maturation by obtaining magnetoencephalography (MEG) recordings from a sample of fetuses and newborn infants who had previously exhibited evidence of perceptual consciousness in the context of a local-global paradigm. Analyzing cortical responses to auditory irregularities, we computed several measures of signal entropy. Counterintuitively, our findings reveal that cortical entropy significantly declines with increasing maturation in both the newborn infants and third trimester fetuses, with the most pronounced effect occurring in 4 – 10 Hz permutation entropy; these decreases in permutation entropy were driven by changes in signal amplitude. Even more puzzlingly, we observed large prenatal sex differences which suggest that auditory-evoked entropy changes are unrelated to consciousness during this developmental period.



## *Fetal consciousness*

*Nadja Reissland*

Nadja Reissland BSc,MA, DPhil (Oxon) Professor of Psychology Durham University examines fetal development from the 2nd to 3rd trimester and after birth in terms of taste (bitter-vs non-bitter, vision (face-like versus nonface like light stimulation) touch (laterality of touch and touch in relation to maternal stress and depression), effects of nicotine of fetal and neonatal behaviour as well as effects of the COVID lockdown on fetal behaviour.

### ABSTRACT

Using the definition of consciousness proposed by Lagercrantz and Changeux (2009), current research on fetal reactions to flavours and various configurations of light stimulation will be explored.

1. Fetuses at 32- and 36-weeks' gestation react differently showing what one might call "hedonic" reactions to non-bitter and bitter stimulation.
2. Given that "preparation of the human visuomotor system links visual and motor areas already prior to birth" (Schopf et al., 2014) we examined fetal reactions to light stimuli projected into the womb in the 3rd trimester of pregnancy.

There is no question that fetuses have a sensory awareness of their body. Given the continuity of "hedonic" reactions in terms of taste, and their differential reactions to various configurations of light stimulation, might we argue that consciousness originates prenatally?

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## *The Newborn Mind*

**Hugo Lagercrantz**

Hugo Lagercrantz MD PhD Drhc is emeritus professor of pediatrics at the Karolinska Institutet. He was director of the neonatal unit at Astrid Lindgrens Children's Hospital. His research interests involve the stress of being born, sudden infant death syndrome and during the last years brain development and emergence of consciousness. He has been European chief editor for Pediatric Research and is presently editor-in-chief for Acta Paediatrica. He has been a member of the Nobel Assembly.

### ABSTRACT

During birth there is a remarkable rapid transition from an aquatic environment to air, a process which took millions of years during evolution (1). The fetus wakes up due to the stress of being born (2) and becomes more conscious (3). The locus coeruleus – the arousal center of the brain is probably activated (4), as indicated by the opening of the eyes with large pupils. From the first day, the infant can imitate gestures and facial expressions and they seem to recognize that other people are like them. They can also recognize their mother's smell and voice and detect facial expressions of happiness and disgust. The default mode network emerges soon after birth (5) which seems to promote self-reference, social cognition and episodic and language memory.

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2. H. Lagercrantz, T. A. Slotkin, The "stress" of being born. Sci Am 254, 100-107 (1986).
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## *The preterm mind*

*Nelly Padilla and Ulrika Ådén*

**ABOUT NELLY PADILLA :** As a Pediatric Neonatologist specializing in neuroimaging, my expertise centers on unraveling the complexities of brain development in both pre-term and term infants. My work is deeply rooted in the identification of neuroimaging biomarkers, with the aim of developing personalized interventions to support the neuropsychological development of these young patients. I possess a keen interest in the emerging fields of consciousness and cognitive development in early life, with a vision to revolutionize neonatal care practices. My ultimate objective is to contribute to enhanced neonatal care strategies, ensuring better long-term health outcomes for these vulnerable infants.

**ABOUT ULRICA ÅDÉN:** Ulrika Ådén is a neonatologist, professor of neonatology at Karolinska Institutet since 2016 and holds the Cocozza professor ship in Pediatrics at Linköping University since 2022. She was president of the Swedish Paediatrics Society 2022-2024. Dr Ådén's research group studies brain development after critical illness in the neonatal period, especially in the preterm born through neuroimaging, experimental studies and clinical studies. The overall aim to improve neurodevelopmental outcomes through early prediction and early interventions.

### ABSTRACT

Consciousness in fetuses and babies emerges progressively through the integration of various modalities like vision, hearing, sensorimotor, and proprioceptive senses. This development depends on establishing functional thalamo-cortical connections and forming neural networks, essential for neural correlates of consciousness. The networks, initially immature and linked to movements and sensory processing, evolve considerably in the first two years, reflecting advances in self-awareness, salience detection, and memory. Early consciousness in infants doesn't necessitate attention or self-reporting. As they grow, their interactions increase, transforming them from seemingly uncoordinated beings into coordinated, conscious individuals. Self-awareness also progresses from simple perception to complex self-recognition. This development parallels the physical maturation of neural structures that support consciousness.

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## *The joy of being conscious*

**Morten L Kringelbach**

Professor Morten L Kringelbach is the founding director of the interdisciplinary Centre for Eudaimonia and Human Flourishing at Linacre College, University of Oxford, UK. He is also a Principal Investigator at Center for Music in the Brain, University of Aarhus, Denmark. His prizewinning research has helped elucidate the brain systems driven by hedonic and eudaimonic stimuli such as, for example, infants, food, psychedelics and music. He has published fourteen books, and over 400 scientific papers, chapters and other articles and his research features regularly in newspapers, magazines, radio and television.

### ABSTRACT

For Aristotle, the goal of human life was to live well, to flourish, and to ultimately have a good life. He conceptualised this as “eudaimonia”, a concept distinct from “hedonia” or pleasure, coming from ‘hedus’, a Greek word for the sweet taste of honey. Over the last decade, we have been making significant progress in understanding how the brain orchestrates hedonia but here I will focus on neuroimaging studies of the pivotal parent-infant relationship as well as the ‘sweet anticipation’ of music showing not only how both can lead to pleasure, but to meaning making and thriving. Over longer timescales these experiences can give rise to both flourishing and suffering, providing meaning and purpose to life. I will discuss the evidence from whole-brain modelling of neuroimaging data including jazz improvisation for orchestrating eudaimonia, and propose future strategies for exploring the deep remaining questions.

## *Evolution of consciousness*

**Bjørn Grinde**

Bjørn Grinde received his education in natural sciences, psychology, and anthropology from the University of Oslo, ending with a Dr Scient and a Dr Philos in biology. He is a Professor Emeritus at the University of Oslo and a former Chief Scientist at the Division of Mental and Physical Health, Norwegian Institute of Public Health. A primary focus of his research has been to understand the process of evolution, particularly how it has formed the human brain and our capacity to experience life. In addition to some 160 scientific papers, he authored several books, including *Darwinian Happiness* (2002/2012), *God: A Scientific Update* (2011), *The Biology of Happiness* (2012), *Improving the Human Zoo* (2015), *The Evolution of Consciousness* (2016), and *Sex: The Pleasure and the Pain* (2023). See <https://grinde.one/>

### ABSTRACT

I consider consciousness to be a function of advanced nervous systems. As such, we should apply the adage: “Nothing in biology makes sense except in the light of evolution”. We need to describe the evolutionary trajectory leading to conscious brains, including the selective advantage conferred. An understanding of the neurology would be a significant contribution, but we can explain what hearing and vision are about with a comparable lack of knowledge of the brain processes responsible. I shall present evidence favoring that consciousness first evolved in our shared ancestors with reptiles, birds, and mammals; and that invertebrates are unlikely to have a feature sufficiently similar to warrant the same label.

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## *Consciousness (out) of the body*

**Henrik Ehrsson**

Henrik Ehrsson is a professor of cognitive neuroscience at Karolinska Institutet, where he began his tenure as an assistant professor in 2008 after earning both a PhD and an MD from Karolinska Institutet and completing a postdoctoral fellowship at University College London.

Professor Ehrsson's research focuses on understanding the neural basis of the perception of one's own body. He investigates the cognitive processes and neural mechanisms that enable the brain to distinguish between sensory signals originating from one's own body and those from events and objects in the external environment. This research has significant implications for advancing neuro-prosthetics and avatar embodiment, as well as for research into psychiatric disorders with disturbances in the sense of self.

Henrik Ehrsson has published over 130 peer-reviewed scientific articles, and his work has been influential, with over 13,000 citations and an H-index of 58. Professor Ehrsson has been honored with several awards, including the Distinguished Professor Grant from the Swedish Research Council and the Göran Gustafson Prize in Medicine, awarded by the Royal Swedish Academy of Sciences.

### ABSTRACT

The awareness of one's own body—the sense of body ownership—is a core topic in psychology and neuroscience. Body ownership depends on multisensory integration, where visual, tactile, and proprioceptive data merge to form a coherent perception of the bodily self as a unique object distinct from the external environment. This presentation delves into how the human cerebral cortex constructs a unified bodily self and its impact on higher cognitive functions and consciousness. By employing body illusions such as the "body-swap" and "out-of-body" illusions and using neuroimaging, we have learned that specific brain areas, particularly the premotor and posterior parietal cortices, are crucial in integrating sensory signals to generate a sense of body ownership. This process adheres to strict principles of temporal and spatial congruence and requires holistic integration across body segments to perceive a coherent and complete body.

### REFERENCES

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*Ehrsson, H.H. The experimental induction of out-of-body experiences. Science, 317: 1048, 2007.*



## *Disorders of consciousness: from diagnosis to therapy*

**Olivia Gosseries**

Pr. Olivia Gosseries is co-director of the Coma Science Group at the University of Liege in Belgium, research associate at FNRS-FRS and associate professor. As a neuropsychologist, her main work focused on diagnosis, prognosis and therapeutic options for patients with disorders of consciousness recovering from coma.

To study human consciousness more globally, she also investigates anesthesia, coma memory, lucid dream, meditation, hypnosis, cognitive trance and virtual reality. Her aim is to continue improving the care of patients, contribute to the understanding of human consciousness, and promote education and public awareness.

### ABSTRACT

The exploration of coma and disorders of consciousness remains a significant frontier in neurology, characterized by its complex challenges and the critical need for innovative therapeutic interventions. In this presentation, we will review recent works on diagnosis using behavioral and advanced neuroimaging techniques as well as the treatments options that are currently being investigated. I will also give a short overview of our ongoing studies on non-ordinary state of consciousness (e.g., near-death experience, hypnosis, trance).

### REFERENCES

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<https://pubmed.ncbi.nlm.nih.gov/34236624/> (general review on therapy)

<https://pubmed.ncbi.nlm.nih.gov/33938027/> (diagnosis using brain imaging)

## *Intensive care of the unconscious patient*

**Michael Broomé**

Michael Broomé, born 1961 in Stockholm. Studied Engineering Physics 1981-1983 at KTH, Stockholm and Medical School 1983-1989 at the Karolinska Institute, Stockholm, Sweden. Specialized in Anesthesia and Intensive Care since 1994. 10 years' experience with cardiac anesthesia and 20 years with ECMO intensive care in neonatal, pediatric and adult patients. Experimental research concerning Angiotensin. PhD 2001. Associate Professor in Anesthesia and Intensive Care, Karolinska Institutet, 2015 and Associate Professor Biomedical Engineering, KTH, 2015. Working with real-time cardiovascular simulation models including pathophysiology in neonatal, pediatric and adult patients. Clinical and theoretical interest in theories of consciousness.

### ABSTRACT

Induction of anesthesia, as well as emergence from anesthesia, sedation in intensive care and brain injuries can be clinically evaluated and handled in a safe manner without referring to a specific theory of consciousness. Consciousness in a clinical context is usually simply considered equivalent with motor and autonomic responsiveness - as long as the patient is not paralyzed pharmacologically or suffer from a rare locked in syndrome due to brain stem damage. Pharmacological agents used for anesthesia and sedation have variable known and unknown biochemical targets in the brain. The variable target structures makes it unlikely that consciousness and/or anesthesia are related to a single transmitter system or type of synaptic receptor. The author proposes that consciousness is an emergent property of the complexity in the central nervous system and that loss of consciousness in anesthesia can be seen as a breakdown of information processing in cortical structures.

## *Growing old and dying*

**Johan Frostegård**

Johan Frostegård MD PHD is professor of medicine at Karolinska Institutet since 2003. He is also specialist in rheumatology and in internal medicine. In addition, he is a writer who published several books and essays, and also an inventor.

### ABSTRACT

While there is more general agreement about human early years, and underlying mechanism for development in childhood and youth, aging is more uncertain. Why do we even age? In different media, social and other, we read about spectacular ideas and projects from multibillionaires about the bright very long lives we will look forward too, when science better understands (and treats) aging per se. This is not a novel discussion. In the Bible, Metusaleh is the oldest person mentioned, with his 967 years and he became father at the impressing age of 187. Abraham himself, a central person in three world religions, begat Isak at 100.

One hypothesis about aging is discredited today, namely that we age for the benefit of the species, or group. This reasoning works for cells (until they revolt as cancer cells), which undergo programmed cell death. However, evolution in humans is believed to work at the individual level and not so much as group level (even though there is some debate). Variants who live longer with fertility would then have an evolutionary advantage and the variant would spread. There thus appear to be no genes for general aging – a notion which of course may change, with new knowledge. Why then do we age? even the mighty Thor was wrestled down by Elle, a personification of old age. Humans have a rather long life, which may be related to the grandmother hypothesis, with menopause, which would be beneficial for grandmother's genes.

According to pleiotropic antagonism, genetic variants with advantages early in life would be beneficial even if disadvantageous later in life; there are several known examples of this. DNA damage accumulates during life and more of reproduction is done the older we get, so nature's interest in keeping us healthy decreases, it costs. Instead of prolonging life I think it is better to focus on chronic inflammation which is what kills us today, cardiovascular disease and atherosclerosis being examples. Also dementia and many types of cancer have chronic inflammatory aspects. Rheumatology illustrates the possibilities with the spectacular new medications available. We should hope more for healthy long lives than prolongation of life per se! He who lives gets to see how aging will develop.



## *The notion and value of consciousness in two ethical issues*

**Göran Hermerén**

Göran Hermerén is professor emeritus, medical ethics, Lund University, Sweden. He has published books and papers on research ethics, ethics of stem cell research, the goals of medicine and priority setting in health care. Previous international and national tasks: chair of the EGE, The European Group on Ethics, Brussels; chair of ALLEAs permanent working group on science and ethics, Berlin; external examiner in bioethics at the National University of Ireland; member for many years of the national council of medical ethics in Stockholm; serving on governmental commissions in Sweden. (For details: see [www.hermeren.nu](http://www.hermeren.nu))

### ABSTRACT

The notion of consciousness is difficult and contested. There are many theories about the nature, location and origin of consciousness. But since (a) persons have moral status and thus interests that we are obliged to take into account in our ethical deliberations, and (b) persons have consciousness, assumptions about aspects of this notion are relevant to consider in the analysis of ethical controversies. But the notion and value of consciousness need to be clarified. Consciousness can be graded, specified and temporal, related to time.

In the second part of my talk I will illustrate the complexities and contexts of decision-making in ethical controversies, especially when various assumptions about what the stakeholders involved are aware of. This will be done by commenting on two controversies, one close to the cradle (care of extremely prematurely born children) and the other close to the grave (research on persons who are not conscious, suffering from acute cardiac arrest).

What specific values, and whose values, are involved in these conflicts? How are the value conflicts raised by the care of extremely prematurely born children to be analyzed and dealt with, and how is the value of the research to be estimated and ranked against other values at stake, including the health and well-being of research subjects?

# Jöns Jacob Berzelius

*Jöns Jacob Berzelius, one of the most prominent natural scientists of the 19th century and one of the seven men who founded The Swedish Society of Medicine.*

Jöns Jacob Berzelius, one of the most prominent natural scientists of the 19th century, was born in 1779 in Väversunda, in the county of Östergötland in southern Sweden, a region with rich cultural traditions. Orphaned at an early age, he went to several fosterhomes and received his schooling in nearby Linköping. After graduating in medicine at the University of Uppsala, he moved to Stockholm, where he became assistant master without pay at the so-called »Surgical School«, and worked as a doctor for poor people. At the age of 28 he became professor of medicine and pharmacy.

In 1808 Berzelius was one of the seven men who founded The Swedish Society of Medicine »For the perfection of science through mutual mediation of knowledge and collective experience, for the promotion of friendly confidence between doctors«.

Berzelius have enriched our knowledge of nature of life phenomena, established the atomic weights of most of the known elements, presented his electrochemical theory for the understanding of the nature of chemical compounds and laid the foundation for the sciences of the chemistry of rock types.

He also found that elements combine with each other according to fixed numerical relationships.



In addition to this, in his striving for order and method, with his talent for simplicity and clarity in expression, he created the chemical symbolic language in 1813, which since that time has been an essential instrument of chemistry.

With time he became a practised lecturer but preferred to express himself in writing. Impressive are the great scientific works where he also demonstrated his interest and ability to spread knowledge about the latest advances of natural sciences.

*Parts of this text is found in:  
Berzelius – Creator of the chemical language, by Carl Gustaf Bernhard, the Royal Swedish Academy of Sciences*

# The Swedish Society of Medicine

*The Swedish Society of Medicine (SSM) is the independent scientific and professional organisation of the Swedish medical profession.*

The Swedish Society of Medicine (SSM) is the independent scientific and professional organisation of the Swedish medical profession. We were founded in 1808 and are one of the oldest medical organisations in Europe. Science, education and quality is the SSM motto and the foundation of SSM activities. We contribute with more than SEK 51 million to medical research every year. The SSM represents the medical profession in various inquiries and consultations. We organise scientific meetings, seminars and debates to highlight medical research in important topical fields.

## History of the SSM building

In 1879, the Swedish Society of Medicine moved from what was then the home of Karolinska Institutet at Norr Mälarstrand to its own premises in Jakobsgatan in Stockholm. It soon outgrew this location and a search for new premises was resumed. On Walpurgis night in 1889, six men were inside the Katarina lift at Slussen in Stockholm.

A fault developed in the machinery, causing the lift cage to fall. One of the passengers, Carl Westman, was injured, but a fellow passenger, Johan Rissler, a surgeon and member of the building committee of the Society of Medicine, immediately assisted him.



In 1904, the Society announced an architectural competition for a building on a site it had purchased in Klara Östra Kyrkogata. The winner was Carl Westman, and the building was finished two years later.

The Society's building which dates from 1906, was breakthrough for the architect Carl Westman and the national romantic style architecture he favoured. The building itself is work of art – from its facade of handmade brick and Christian Eriksson's granite reliefs in the entrance to its mosaic floors, carved balustrades, chandeliers, and ventilation grilles – all Westman signatures. The building today is a Swedish, turn of the century architectural treasure.



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