the 53 European countries with more than 200 million children aged less than 18 years and with more than 200.000 paediatricians. Paediatrics respects the rules on child development which state that an adolescent is not a young adult, a school child is not a small adolescent, an infant is not a small child, a neonate is not a small infant and a premature newborn is not a small neonate. Paediatricians care for both healthy and sick children. Health care management differs according to where it is offered such as inpatient care in hospitals, outpatient care in hospitals or in private practices, homecare and rehabilitative care in special rehabilitation units. Paediatric health care focuses on the patient and not on diseases; however children with acute diseases need a completely different case management than children with chronic diseases. Special care is given to underprivileged and marginalised children such as children with chronic diseases and disabilities, children with a migrant background and poor children. Children have no voice in society and their caregivers do not speak with one voice, which has led to considerable inequity of health care in many European countries.

There is currently no European wide "bank" of data to enable comparative studies of service outcomes to encourage health service research relating to infants, children and young people. The aim of our presentation is to improve international cooperation in child health care in all European countries in order to improve future services. Understanding how and why services work, relating structure and process to experience and outcomes is essential at a time of economic recession. Paediatricians should not aim at creating a monopoly; instead they must favour the team approach of all caregivers.

Neonatal Brain and Development – Evolving Techniques

IS-008 SHEDDING LIGHT ON THE NEONATAL BRAIN

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Brain injury in the newborn remains a major cause of death and serious lifelong disability, with alterations in cerebral perfusion and oxygenation implicated in the pathophysiology of injury in both preterm and term infants. Near-infrared light shows a strong absorption dependency on oxygenation state and provides a safe, non-invasive means of monitoring cerebral function at the cotside. Improved continuous quantification in newer generation instruments are an important step in developing clinically useful monitors. Multi-channel systems allow images of the haemodynamic response to functional activation to be reconstructed.

A collaborative group, **neoLAB**, has been created between Cambridge and University College London (UCL) with the aim of developing and refining optical systems to study the development of haemodynamic activity in the developing brain.

A frequency multiplexed optical topography system, designed and built at UCL, has been used to study novel haemodynamic events associated with seizures in the newborn. Work is currently being undertaken to look at the development of functional resting state cortical networks.

The UCL group has also developed the first 3D optical imaging system. The optical tomography system uses time-correlated single photon counting (TCSPC) technology to measure the flight times of photons as they are transmitted between points on the surface in order to generate 3D images of regional blood volume and oxygenation.

The latest generation of this system has a significantly improved time resolution designed to capture dynamic changes in regional blood flow associated with functional activation.

IS-009 EVENTFUL WIRING AND MONITORING OF NEONATAL BRAIN

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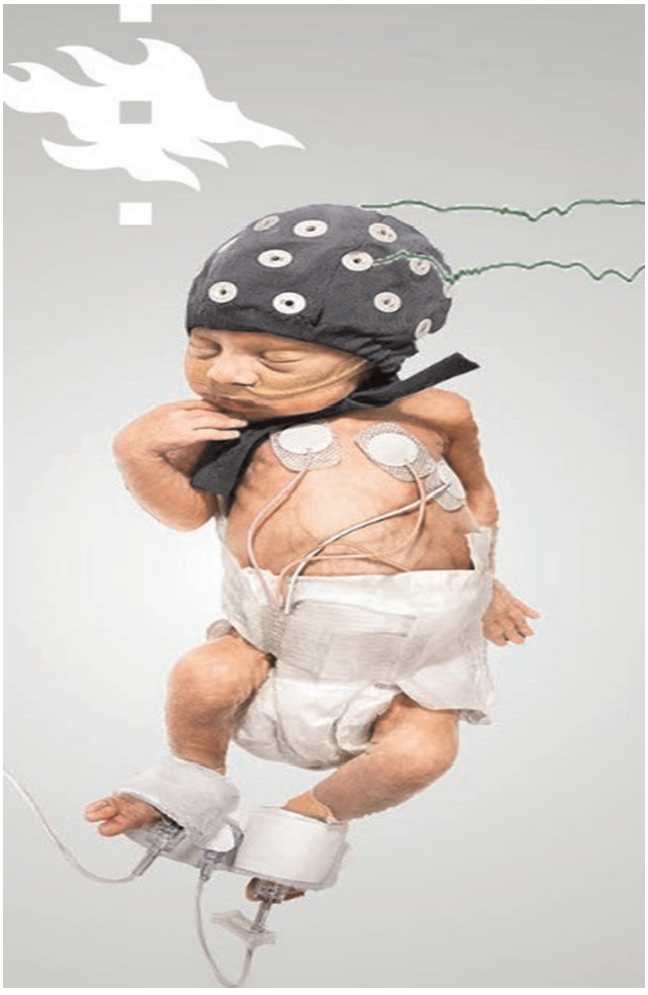
Since the beginning of preterm EEG practise half a century ago, the interpretation of EEG has remained phenomenological, and based on observing clinical correlates of otherwise unexplained waveforms. Recent developments in basic neurobiology, as well as in the EEG recording and analysis techniques, have offered pathways to paradigm shifts at multiple levels.

Experimental studies have shown that early brain activity consists of events that are crucial for the activity-dependent, experience-independent network growth that takes place during last trimester and/or early prematurity. New recording techniques have made it possible to characterise these events from the human preterm babies, hence opening a window to translational



Abstract IS-009 Figure 1

studies where brain activity in a live preterm baby is studied with understanding the cellular level mechanisms, and basic science findings can be directly linked to clinical studies in a bidirectional manner.

Most importantly, new data has shown that focusing EEG analysis on the early network events will allow objective, quantitative means to follow brain wealth and its reactions to interventions: These events will show specific reactions to drugs, they will allow automated assessment of vigilance states, and the events may even allow very early prediction of short term risks as well as long term outcomes. Taken together, it seems that appreciating the events as the main constituent of early brain activity brings neonatal neurophysiology back to be part of genuine neuroscience, and it likely opens unprecedented vistas to the early clinical brain monitoring of newborn babies.

Neonatal Immunity

IS-010 CELL-BASED IMMUNITY OF THE NEWBORN

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Irrespective of host genetic factors, newborns and infants are characterised by a higher susceptibility to particular infections. Thus, these populations constitute privileged targets and reservoirs for existing and emerging diseases. They carry influenza virus, respiratory syncytial virus or *B. pertussis* leading to severe respiratory diseases in these fragile populations. Vaccination represents a powerful mean to provide protection against many infectious diseases, but with limited efficacy in the first few months of life. One main reason is that vaccine design does not take into account age-specific immune parameters of the populations receiving immunizations, i.e. neonates and infants. Systems biology has initiated the definition of a comprehensive picture to accurately define protection correlates. However age-specific immune parameters are still missing for appropriate signal deconvolution in high throughput immune system analyses. The gaps in the knowledge of the immune system of the newborn and the infant need to be filled to propose appropriate prophylactic and therapeutic treatments to these vulnerable populations.

We established a Human-Mouse experimental platform to study pathogen-neonatal immune host interactions and to design and evaluate age-specific vaccine strategies. Apart from the traditional view of immaturity, we recently evidenced immunological unfitness related to age-specific effector and regulatory mechanisms tuning immune responses in early life. We thus evidenced development of memory T cells and innate antibody responses during fetal life. We also characterised new innate inflammatory pathways in dendritic cells for future adjuvant setting in paediatric vaccination.

Nephrology I

IS-011 EVALUATION OF KIDNEY FUNCTIONS IN NEONATES

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In neonates, renal perfusion, glomerular filtration rate and urine output strongly depend on the vaso-dilative effects of prostaglandins on the afferent glomerular arterioles. Glomerular filtration rate in neonates is very low (2–4 mL/min or 20 ml/min/1.73 m^2) and can only be maintained due to a delicate balance between vasodilatory effects at the afferent and vasoconstrictor effects at the efferent glomerular arterioli. Despite the overall low clearance, interindividual variability is already extensive and can be predicted by covariates like postmenstrual age, postnatal age, co-administration of a non-selective cyclo-oxygenase inhibitor, growth restriction or peripartal asphyxia.

We still commonly used creatinine as a biomarker of renal clearance capacity. However, before creatinaemia values can be used to estimate renal drug elimination capacity, there are some methodological issues that need to be considered. Creatinaemia at birth does not yet reflect neonatal but maternal creatinine clearance and because of passive tubular back leak instead of active secretion, creatinine clearance does not yet fully reflects GFR. Finally, absolute creatinine values also depend on the technique used. The move towards harmonisation through IDMS (isotope dilution mass spectrometry) traceability has helped, but not completely solved this problem. More research is needed to document the potential add on benefit of more advanced biomarkers (e.g. Cystatin C) or renal tubular function markers. In the meanwhile, clinical driven interpretation combined clinical and biochemical indicators seems the most appropriate approach.

Neuropaediatrics – Narcolepsy

IS-012 NARCOLEPSY IN CHILDREN, CLINICAL ASPECTS

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Narcolepsy gives rise to a complex picture of symptoms that range from daytime sleepiness and REM-associated cataplexies, hypnagogic hallucinations and sleep paralysis into severe sleep disturbances, metabolic disturbances and psychological as well as social problems. The compound symptoms influence the well-being of the growing and maturing young person in a way that may impair the development of the personality, self-confidence and esteem. It is of great value if the treatment can be run within a multi-disciplinary team including neuropaediatrician, endocrinologist, dietician, nurse, physiotherapist, social worker and psychologist.

Treatment of narcolepsy is best started with wake-supporting steps. Sleep hygiene and power naps are part of the strategy but central stimulant medication is most often needed. The cataplectic attacks are the symptoms considered most disturbing by the patients. They may improve by reduced daytime sleepiness but specific treatment is needed and is difficult to make efficient. Night sleep disturbances may respond well to sodium oxybate, a drug that also influences daytime wakefulness and cataplexies.

This far no curative therapy has been found. Future development may lead to specific agents that can influence the hypocretine/orexine system and ways to influence the autoimmune mechanism underlying the disease.