

## Research Group on Experimental Forensic Medicine

GROUP LEADER: TORLEIV OLE ROGNUM, MD, PhD, PROFESSOR

### GROUP DESCRIPTION

The group is focusing on the following topics: Epidemiological, genetic and immunological, studies of trigger- and death mechanisms in sudden unexpected deaths in infants and toddlers as well in stillbirths and in sudden adult deaths; studies of mechanics in child abuse and maltreatment with emphasis on shaken baby syndrome, as well as follow up of survivors of child maltreatment; and development of better methods for time of death estimation. Furthermore investigation of cases reported to police for medical maltreatment, and finally immunological and biotechnological investigations of colorectal carcinoma and precancerous lesions.

### RESEARCH SUMMARY 2008

#### **Studies in sudden deaths in infants, toddlers and in stillbirths**

*Long QT syndrome (LQTS) in sudden infant deaths.* Further studies are planned concerning examination of STR's which may give a predisposition for cardiac arrhythmias

*Interleukins and SIDS.* Using multiplex analysis based on Sequenom platform we have analysed SNPs in interleukin genes in SIDS cases and controls.

*Helicobacter pylori in newborn infants and SIDS.* *Helicobacter pylori* antigen has been detected in stool specimen from >50% of all newborns. A follow-up study is performed to investigate the transmission route.

*Serotonergic network and SIDS.* Dysregulation of the serotonergic network may be involved in some cases of SIDS. We investigate several genes in this network. Brain sections from the SIDS cases and controls are investigated for cytokine expression.

*Biomechanical assessment of infant head injuries.* A pilot study of the biomechanics involved in infant head trauma, accidental and non-accidental. Using crash-test dummies equipped with electronic sensors the goal is to estimate the forces acting upon the head and neck in various traumatic events.

*Virtual autopsy.* A developing project where we in the autopsy include radiological methods (CT, MR). The pictures are received via PACS at the autopsy room. The goal is to improve the quality of the forensic investigations.

*Bacterial involvement in sudden infant death.* We investigate the correlation between immune response, such as the level of interleukins in the CSF, and the characteristics of any bacteria in pure culture in body fluids and tissues.

*Immune mechanisms and genetic risk factors for stillbirths.* Samples from stillbirths are gathered for the study of pathogenic mechanisms.

*The role of post-mortem time for microbiological investigations in sudden infant deaths.* In sudden infant deaths, blood- and CSF cultures as well as virus detection in nasopharynx aspirations are performed both at admittance in the pediatric departments and then for a second time at the autopsy. The significance of delay in sampling after death is investigated.

*Aquaporin 4 and sudden infant death.* Aquaporin 4 is investigated by electron microscopy in tissue sections from the brain. In addition are we investigating the gene encoding AQP4 in SIDS cases and controls.

### **Other projects in forensic medicine**

*Genetic studies in Sudden deaths in adults.* We take part in a study on molecular genetic analysis of long QT syndrome in Norway, with samples from sudden unexplained deaths.

*Time of death estimation – TOD-kit.* A handheld instrument for measurement of hypoxanthine - with soft wear - for time of death estimation to be used on scene of crimes, is under construction. The potential is also huge as bed side device for assessing the severity of hypoxia in live patients.

*Medical malpractice.* 900 cases investigated between 1997 and 2005 are studied with regard to type of malpractice, as well as to the outcome of the police investigation and the investigation by the medical control system.

### **Immunological and genetic markers of large bowel carcinoma**

The research group dispose a large (500 cases) and well characterized Biobank with tissue- and blood samples as well as clinicopathological information about the patients operated on. *Colorectal cancer in the large bowel.* Carcinomas and precancerous lesions; adenomas and ulcerative colitis are investigated for genetic and protein changes known to be involved in tumour growth. Results are related to clinicopathological data and patient survival.

### **GROUP MEMBERS 2008**

Torleiv Ole Rognum (Prof., MD, PhD, Group Leader), Åshild Vege (Prof., MD, PhD), Siri Hauge Opdal (PhD), Arne Stray-Pedersen (MD, Postdoc), Ingvild V. K. Lobmaier (MD, PhD Student, co-operation with Prof. Helge Scott), Linda Ferante (PhD Student), Associate member Marianne Arnestad (MD, PhD)

### **COLLABORATIONS 2008**

#### **National:**

Peter Gaustad, Inst. of Microbiology; Ola Didrik Saugstad, Dept. of Pediatric Research; Charlotte de Lange, Dept. of Radiology; Øyvind Melien, Dept. of Med. Biochem.; Trond P. Leren and Knut Erik Berge, Lab. for Med. Genetics; Ragnhild Lothe, Dept. of Cancer Prevention; Helge Scott and Ole Petter F. Clausen, Dept. of Pathology; Mahmood Amiry-Moghaddam, Center for Molecular Biology and Neuroscience; Per Holck, Dept. of Anatomy; Annika M.D. Melinder, Inst. of Psychology; Jens Grøgaard, Mother and Child Clinic; Lillian Nordbø Berge and Annetine Staff, Dept. of Obstetrics; Borghild Roald and Aage Erichsen, Dept. of Pathology; Kent-André Mardal, Simula; Christina Isaksen, Dept. of Pathology; Kirsti Myklestad, Dept. of Obstetrics, St. Olavs Hospital, Trondheim. Anne Bødtker, Dept. of Obstetrics and Tonje Hajem, Dept. of Pathology, Buskerud Hospital, Drammen. Randi Reinertsen and Frode Strisland, SINTEF, NTNU. Jørg Mørland, Norw. Inst. of Public Health, Forensic Toxicology and Drug Abuse; Solveig Norheim Andersen, Dept. of Pathology; Gunn Iren Meling, Dept. of Surgery, Akershus University Hospital; Lars A. Akslen, Dept. of Pathology, Gades Institutt, UiB; Frode Strisland, The research foundation SINTEF ICT.

#### **International:**

Peter J. Schwartz, Dept. of Cardiology, Policlinico San Matteo IRCCS, Pavia, Italy. Alfred L George, Dept. of Pharmacology and Medicine, Vanderbilt Univ, Nashville; Hannah Kinney, Dept. of Pediatric Neuropathology, Childrens Hospital, Harvard Medical School, USA. Uffe Holmskov, Inst. of Med Biology, University of Southern Denmark. Svein Kleiven, Kungliga Tekniska Högskolan, Stockholm