The Department of Neurosurgery, University Medical Center of Pécs is advertising a **doctoral candidate position** for 4 years, starting at the end of 2006.

The **position is sponsored** by the European Commission 6th Framework Programme on Research, Technological Development and Demonstration's „Marie Curie Actions: Research Training Networks (RTN) within the context of „AQUA(GLYCERO)PORINS" program proposal.

The position is advertised **not for Hungarian citizens**!
Applications are expected from the Hungarian minorities living outside Hungary or from students graduated at the English or German programs of Hungarian universities.

Research topic

The discovery of the aquaporins was awarded with the Chemistry Nobel Prize 2003 to P. Agre. Eleven aquaporins and aquaglyceroporins (combined referred to as aqua(glycero)porins) have been described in mammals. Aqua(glycero)porins are represented in all classes of organisms, suggesting universal importance. Aquaporins transport water and aquaglyceroporins transport glycerol with high velocity and specificity. Mammalian AQP1, 2, 4, 5, and 8 are aquaporins, AQP3, 7, 9 and 10 are aquaglyceroporins. AQP6 is an intracellular aquaporin able to conduct ions. The physiological roles of aquaporins are known to different degrees of detail.
AQP1 is required for production of cerebrospinal fluid in the human brain. AQP4 is an aquaporin of the brain-blood barrier and involved in brain swelling. Central to the understanding of the role and importance of aqua(glycero)porins is their regulation at the level of gene expression (e.g. AQP9), trafficking (AQP2), gating (AQP6), or combinations thereof.
Aquaporins are targets for drugs. For instance, blockers of brain AQP4 would diminish fatal brain swelling upon stroke! Integrated knowledge of the physiological roles of all aquaporins will elucidate further targets for treatments. Specific aquaporin blockers are presently not available.

Project objectives

The mechanisms that control aqua(glycero)porin function are crucial for our understanding of the physiological role of aqua(glycero)porins and for drug target identification and drug development. This study stresses in particular the physiological roles, molecular and physiological control mechanisms and atomic structures of aquaporins AQP1 and AQP4.

Research method

Regulation of AQP4 using clinical samples and rodent models: Clinical investigation of head trauma and stroke patients using clinical MR scanners, measuring brain water content in vivo by T1 map, localized proton spectroscopy and diffusion weighted imaging (DWI) for monitoring brain edema in patients. Use of rodent brain edema models and applying the MRI methodology mentioned above, using a 9.4T experimental MR spectroscope and scanner. Cellular localisation of aquaporin-1 and -4 and other proteins on human pathological and experimental specimens by immunocytochemistry. Semiquantitative analysis of mRNA and protein expression by Northern and Western blotting, etc.

For detailed information, please, turn to Professor T. Dóczi, tamas.doczi@aok.pte.hu or to Dr. Z. Vajda, vajdus@t-online.hu