

Curriculum Vitae Eskil Elmér

Date of birth April 29, 1970

Present position Associate Professor (Docent)
Department of Clinical Sciences
Laboratory for Experimental Brain Research
Lund University

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Doctoral degree (date, discipline/subject area, title, supervisor)

- Date: 1997-05-07
- Subject area: Neurobiology
- Title: Mechanisms of hyperexcitability in the kindling model of epilepsy
- Supervisor: Prof. Olle Lindvall
- Institution: Medical Faculty, Lund University

Relevant postdoctoral work (year and place)

- Year: 1997-1998 (one year)
- Place: Center for the Study of Neurological Disease Queen´s Medical Center Honolulu, Hawaii, USA
- Laboratory head: Prof. (emeritus) Bo. K. Siesjö

Qualification as Associate Professor (year)

- Year: 2003
- Subject: Experimental Neurology
- Institution: Medical Faculty, Lund University

Current position, period of appointment

- Junior Physician (leg. läk), Neurophysiology, Lund University Hospital, Lund
- 2008-01-01 -
- 50% research time for 2008-2010 funded by ALF-grant (Yngre Forskare)

Previous positions and periods of appointment

- Research assistant position (funded by the Medical Faculty, Lund University)
- Appointment: 2003-01-01 until 2007-12-14 (interrupted by periods of internship (allmäntjänstgöring för läkare), see below)
- Duties: Research 80% / 20% teaching obligation (see teaching below)

Parental leave etc, and research time deducted for this purpose

- 2002-2005 Internship periods (total 1 year and 9 months) for medical license
- 1999-2001 Medical studies (3 years full time), Medical Faculty, Lund University
See below for clinical proficiency

People awarded doctorates for whom the applicant has been the main supervisor (name, year of doctorate)

Magnus Hansson, 2007.

Postdoctoral researchers who are or have been engaged in collaboration with the applicant in the research group (name and years of collaboration)

International established collaborations exist with i) Assistant professor Hiroyuki Uchino and his group at the Department of Anesthesiology, Hachioji Medical Center, Tokyo Medical University, Tokyo, Japan (1993-) and ii) Richard Bauman, Walter Reed Army Institute of Research, Division of Military Casualty Research, Silver Spring, MD, USA (2004-). In addition, collaboration is ongoing with post-doctoral fellows within the Laboratory of Experimental Brain Research: Maria Teilum (2004-2007), Karsten Ruscher (2006-), Gustav Mattiasson (2000-). A female Japanese postdoctoral fellow has joined the group 20 March 2008 and has external funding (Uehara foundation) for 1 year.

Teaching qualifications (at Lund University if not otherwise stated)

Course leadership

- Biomedical program, course BIM081 - Molecular and Experimental Neuroscience, held in English, 10p (15 ECTS), once yearly 2004-2007

Tutor

- Medical program, Problem-Based Learning (PBL), introductory course (T1 LÄK), 10p, autumn 2003-2005, full year 2006 and spring 2007. (>25h per course)
- Biomedical program, BIM081, Journal Club, spring 2006 and 2007. (8h per course)
- Medical program, PBL, Organ Biology III, 10p, autumn 1998 and 2002. (>25h per course)

Lectures

- Biomedical program, "Pharmacological intervention and neural protection in the CNS", BIM081, spring 2004-2007. (2h lecture time)
- Course for psychologists (in specialty training) "Skademekanismer vid cerebral ischemi", 2005-02-10. (2h lecture time)

Supervision (as independent supervisor)

- Registered Ph.D. students
 - **Roland Månsson**, M.D., Neurology Resident
 - **Fredrik Sjövall**, M.D. Intensivist

- Scientific project, 10p, within the Medical program, Johannes Ehinger, spring 2006
- Master thesis (examensarbete), 20p, Lund Institute of Technology (Biotechnology, campus Helsingborg), Lina Ivarsson, spring 2006
- Master thesis, 20p, Lund Institute of Technology (Biotechnology, campus Helsingborg), Nina Holmgren, spring 2006
- Scientific project, 10p, within the Biomedical program, Sofia Andersson, spring 2006
- Master thesis, 20p, Natural Sciences program (Molecular Biology), Lina Jansson, autumn 2005
- Scientific project, 10p, within the Medical program, Sara Alson, spring 2002
- Scientific project, 10p, within the Medical program, Tanja Persson, autumn 2001
- Scientific project, 10p, within the Medical program, Jonas Ohlsson, autumn 2001
- Scientific project, 10p, within the Medical program, Magnus Hansson, spring 2001

Examination (of Master thesis)

- Rebeqa Gunnarsson, Biomedical program, 2004-01-23
- Mattias Rickhag, Biomedical program, 2002-06-05
- Josefin Andersson, Biomedical program, 2001-01-17

External examiner (doctoral degree half-time seminar)

- David Nilsson, Department of Clinical Sciences, Experimental Vascular Research, 2007-01-30
- Sara Bonde, Department of Clinical Sciences, Section of Restorative Neurology, 2007-01-09
- Irene Schlifke, Department of Clinical Sciences, Section of Restorative Neurology, 2006-06-07
- Petter Vikman, Department of Clinical Sciences, Experimental Vascular Research, 2005-03-09
- Angelica Wackenfors, Department of Clinical Sciences, Experimental Vascular Research, 2004-03-18

Marks committee (for doctoral degree)

- Yi Liu, Department of Clinical Sciences, Experimental Vascular Research, 2007-04-26
- Andreas Lindqvist, Department of Experimental Medicine, Division of Diabetes, Metabolism and Endocrinology, 2006-12-01
- Emelie Stenman, Department of Clinical Sciences, Experimental Vascular Research, 2005-12-10
- Lennart Gisselsson, Department of Clinical Sciences, Lab for Experimental Brain Research, 2005-11-29
- Tomas Olsson (Deierborg), Department of Clinical Sciences, Lab for Experimental Brain Research, 2004-02-28

External examiner (for doctoral degree)

- Lothar Wiese, Copenhagen University, 2007-11-23
- Christina von Gertten, Department of Clinical Neuroscience, Section of Clinical CNS Research, Karolinska Institute, 2006-09-22
- Georg Müller, Molecular Neuropathology Group, University of Copenhagen, 2006-02-02

Other circumstances of relevance

Clinical proficiency

- 2002 (January) University Medical Degree, M.D. (Läkarexamen)
- 2005 (September) License to practice medicine (Läkarlegitimation)

Membership in learned societies

- Society for Neuroscience (since 1997)
- The Swedish Society of Medicine (since 1998)
- The Swedish Medical Association (since 2002)
- American Society for Neural Therapy and Repair (since 1998)

Research abroad (for post-doctoral period, see above)

- 2003, 2005, 2006, 2007 Department of Anesthesiology, Hachioji Medical Center, Tokyo Medical University, Tokyo, Japan. Laboratory Head Dr. Hiroyuki Uchino. Shorter visits (weeks) to maintain ongoing collaboration
- 1996 Brain Research Institute, Niigata University, Japan. Laboratory Head Prof. Hiroyuki Nawa. (3 weeks), research collaboration

Refereeing

- Nature Protocols
- Journal of Neuroscience
- Brain Research
- Experimental Neurology
- European Journal of Neuroscience
- Pediatric Research
- Neuroscience Research

Reviewing of applications for academic position (sakkunniguppdrag)

Copenhagen University, Associate professor in neuroanatomy at the Panum institute, 2004

Grants

Approximately 1.8 MSEK has been raised between 2003-2007 in external funds (excluding salary costs which are covered by Lund University and the ALF system). The most prestigious grant is a contract from the US-Army DTRA (Defense Threat Reduction Agency) under the 2007 Chemical & Biological Defense Medical (CBM) Science & Technology (S&T) Extramural Program.

Industrial and other external collaborations

- DebioPharm S.A. (Lausanne) (since 2003)
- WRAIR - Walter Reed Army Institute of Research. Division of Military Casualty Research (since 2002)
- Ivax/Galena C.R a.s. (Prague) (intermittent since 2002)
- NeuroPharma AB (since 2000)
- CicloMulsion AG (Germany) (since 2000)
- Maas BiolAB, LLC (USA) (since 1997)

List of publications (complete)

Original articles (published)

1. Morota S, Hansson MJ, Ishii N, Kudo Y, **Elmér E**, Uchino H. Spinal cord mitochondria display lower calcium retention capacity compared with brain mitochondria without inherent differences in sensitivity to cyclophilin D inhibition. J Neurochem. 2007 Dec;103(5):2066-76. Epub 2007 Sep 13.

2. Månsson R, Hansson MJ, Morota S, Uchino H, Ekdahl CT, **Elmér E**. 2007. Re-evaluation of mitochondrial permeability transition as a primary neuroprotective target of minocycline. *Neurobiol Dis* 25(1):198-205.
3. Teilum M, Hansson MJ, Dainiak MB, Månsson R, Surve S, **Elmér E**, Önnarfjord P, Mattiasson G. 2006. Binding mitochondria to cryogel monoliths allows detection of proteins specifically released following permeability transition. *Anal Biochem* 348(2):209-221.
4. Rickhag M, Wieloch T, Gidö G, **Elmér E**, Krogh M, Murray J, Lohr S, Bitter H, Chin DJ, von Schack D, Shamloo M, Nikolich K. 2006. Comprehensive regional and temporal gene expression profiling of the rat brain during the first 24 h after experimental stroke identifies dynamic ischemia-induced gene expression patterns, and reveals a biphasic activation of genes in surviving tissue. *J Neurochem* 96(1):14-29.
5. Rytter A, Cardoso CM, Johansson P, Cronberg T, Hansson MJ, Mattiasson G, **Elmér E**, Wieloch T. 2005. The temperature dependence and involvement of mitochondria permeability transition and caspase activation in damage to organotypic hippocampal slices following in vitro ischemia. *J Neurochem* 95(4):1108-1117.
6. Karlsson J, Fong KS, Hansson MJ, **Elmér E**, Csiszar K, Keep MF. 2004. Life span extension and reduced neuronal death after weekly intraventricular cyclosporin injections in the G93A transgenic mouse model of amyotrophic lateral sclerosis. *J Neurosurg* 101(1):128-137.
7. Hansson MJ, Mattiasson G, Månsson R, Karlsson J, Keep MF, Waldmeier P, Ruegg UT, Dumont JM, Besseghir K, **Elmér E**. 2004. The nonimmunosuppressive cyclosporin analogs NIM811 and UNIL025 display nanomolar potencies on permeability transition in brain-derived mitochondria. *J Bioenerg Biomembr* 36(4):407-413.
8. Hansson MJ, Månsson R, Mattiasson G, Ohlsson J, Karlsson J, Keep MF, **Elmér E**. 2004. Brain-derived respiring mitochondria exhibit homogeneous, complete and cyclosporin-sensitive permeability transition. *J Neurochem* 89(3):715-729.
9. Mattiasson G, Friberg H, Hansson M, **Elmér E**, Wieloch T. 2003. Flow cytometric analysis of mitochondria from CA1 and CA3 regions of rat hippocampus reveals differences in permeability transition pore activation. *J Neurochem* 87(2):532-544.
10. Liu D, Slevin JR, Lu C, Chan SL, Hansson M, **Elmér E**, Mattson MP. 2003. Involvement of mitochondrial K⁺ release and cellular efflux in ischemic and apoptotic neuronal death. *J Neurochem* 86(4):966-979.
11. Hansson MJ, Persson T, Friberg H, Keep MF, Rees A, Wieloch T, **Elmér E**. 2003. Powerful cyclosporin inhibition of calcium-induced permeability transition in brain mitochondria. *Brain Res* 960(1-2):99-111.
12. Keep M, **Elmér E**, Fong KS, Csiszar K. 2001. Intrathecal cyclosporin prolongs survival of late-stage ALS mice. *Brain Res* 894(2):327-331.

13. Ekdahl CT, Mohapel P, **Elmér E**, Lindvall O. 2001. Caspase inhibitors increase short-term survival of progenitor-cell progeny in the adult rat dentate gyrus following status epilepticus. *Eur J Neurosci* 14(6):937-945.
14. Magnusson S, Ekström TJ, **Elmér E**, Kanje M, Ny L, Alm P. 2000. Heme oxygenase-1, heme oxygenase-2 and biliverdin reductase in peripheral ganglia from rat, expression and plasticity. *Neuroscience* 95(3):821-829.
15. Borlongan CV, Stahl CE, Keep MF, **Elmér E**, Watanabe S. 2000. Cyclosporine-A enhances choline acetyltransferase immunoreactivity in the septal region of adult rats. *Neurosci Lett* 279(2):73-76.
16. Uchino H, **Elmér E**, Uchino K, Li PA, He QP, Smith ML, Siesjö BK. 1998. Amelioration by cyclosporin A of brain damage in transient forebrain ischemia in the rat. *Brain Res* 812(1-2):216-226.
17. Ferencz I, Kokaia M, **Elmér E**, Keep M, Kokaia Z, Lindvall O. 1998. Suppression of kindling epileptogenesis in rats by intrahippocampal cholinergic grafts. *Eur J Neurosci* 10(1):213-220.
18. **Elmér E**, Kokaia Z, Kokaia M, Carnahan J, Nawa H, Lindvall O. 1998. Dynamic changes of brain-derived neurotrophic factor protein levels in the rat forebrain after single and recurring kindling-induced seizures. *Neuroscience* 83(2):351-362.
19. **Elmér E**, Kokaia M, Kokaia Z, McIntyre DC, Lindvall O. 1998. Epileptogenesis induced by rapidly recurring seizures in genetically fast- but not slow-kindling rats. *Brain Res* 789(1):111-117.
20. Li PA, Uchino H, **Elmér E**, Siesjö BK. 1997. Amelioration by cyclosporin A of brain damage following 5 or 10 min of ischemia in rats subjected to preischemic hyperglycemia. *Brain Res* 753(1):133-140.
21. Ferencz I, Kokaia M, Keep M, **Elmér E**, Metsis M, Kokaia Z, Lindvall O. 1997. Effects of cholinergic denervation on seizure development and neurotrophin messenger RNA regulation in rapid hippocampal kindling. *Neuroscience* 80(2):389-399.
22. **Elmér E**, Kokaia Z, Kokaia M, Lindvall O, McIntyre DC. 1997. Mossy fibre sprouting: evidence against a facilitatory role in epileptogenesis. *Neuroreport* 8(5):1193-1196.
23. **Elmér E**, Kokaia M, Ernfors P, Ferencz I, Kokaia Z, Lindvall O. 1997. Suppressed kindling epileptogenesis and perturbed BDNF and TrkB gene regulation in NT-3 mutant mice. *Exp Neurol* 145(1):93-103.
24. Bengzon J, Kokaia Z, **Elmér E**, Nanobashvili A, Kokaia M, Lindvall O. 1997. Apoptosis and proliferation of dentate gyrus neurons after single and intermittent limbic seizures. *Proc Natl Acad Sci U S A* 94(19):10432-10437.
25. Kokaia Z, Nawa H, Uchino H, **Elmér E**, Kokaia M, Carnahan J, Smith ML, Siesjö BK, Lindvall O. 1996. Regional brain-derived neurotrophic factor mRNA and protein levels following transient forebrain ischemia in the rat. *Brain Res Mol Brain Res* 38(1):139-144.

26. Kokaia Z, Kelly ME, **Elmér E**, Kokaia M, McIntyre DC, Lindvall O. 1996. Seizure-induced differential expression of messenger RNAs for neurotrophins and their receptors in genetically fast and slow kindling rats. *Neuroscience* 75(1):197-207.
27. Kokaia M, Ferencz I, Leanza G, **Elmér E**, Metsis M, Kokaia Z, Wiley RG, Lindvall O. 1996. Immunolesioning of basal forebrain cholinergic neurons facilitates hippocampal kindling and perturbs neurotrophin messenger RNA regulation. *Neuroscience* 70(2):313-327.
28. **Elmér E**, Kokaia M, Kokaia Z, Ferencz I, Lindvall O. 1996. Delayed kindling development after rapidly recurring seizures: relation to mossy fiber sprouting and neurotrophin, GAP-43 and dynorphin gene expression. *Brain Res* 712(1):19-34.
29. **Elmér E**, Alm P, Kokaia Z, Kokaia M, Larsson B, Keep M, Andersson KE, Lindvall O. 1996. Regulation of neuronal nitric oxide synthase mRNA levels in rat brain by seizure activity. *Neuroreport* 7(7):1335-1339.
30. Uchino H, **Elmér E**, Uchino K, Lindvall O, Siesjö BK. 1995. Cyclosporin A dramatically ameliorates CA1 hippocampal damage following transient forebrain ischaemia in the rat. *Acta Physiol Scand* 155(4):469-471.
31. Kokaia Z, Zhao Q, Kokaia M, **Elmér E**, Metsis M, Smith ML, Siesjö BK, Lindvall O. 1995. Regulation of brain-derived neurotrophic factor gene expression after transient middle cerebral artery occlusion with and without brain damage. *Exp Neurol* 136(1):73-88.
32. Kokaia Z, Metsis M, Kokaia M, **Elmér E**, Lindvall O. 1995. Co-expression of TrkB and TrkC receptors in CNS neurones suggests regulation by multiple neurotrophins. *Neuroreport* 6(5):769-772.
33. Kokaia M, Ernfors P, Kokaia Z, **Elmér E**, Jaenisch R, Lindvall O. 1995. Suppressed epileptogenesis in BDNF mutant mice. *Exp Neurol* 133(2):215-224.
34. Kokaia Z, Metsis M, Kokaia M, Bengzon J, **Elmér E**, Smith ML, Timmusk T, Siesjö BK, Persson H, Lindvall O. 1994. Brain insults in rats induce increased expression of the BDNF gene through differential use of multiple promoters. *Eur J Neurosci* 6(4):587-596.
35. Kokaia M, Pratt GD, **Elmér E**, Bengzon J, Fritschy JM, Kokaia Z, Lindvall O, Möhler H. 1994. Biphasic differential changes of GABAA receptor subunit mRNA levels in dentate gyrus granule cells following recurrent kindling-induced seizures. *Brain Res Mol Brain Res* 23(4):323-332.
36. Kokaia M, Cenci MA, **Elmér E**, Nilsson OG, Kokaia Z, Bengzon J, Björklund A, Lindvall O. 1994. Seizure development and noradrenaline release in kindling epilepsy after noradrenergic reinnervation of the subcortically deafferented hippocampus by superior cervical ganglion or fetal locus coeruleus grafts. *Exp Neurol* 130(2):351-361.
37. Kokaia M, Aebischer P, **Elmér E**, Bengzon J, Kalen P, Kokaia Z, Lindvall O. 1994. Seizure suppression in kindling epilepsy by intracerebral implants of GABA- but not by noradrenaline-releasing polymer matrices. *Exp Brain Res* 100(3):385-394.

Original articles (in press)

Hansson MJ, Månsson R, Morota S, Uchino H, Kallur T, Sumi T, Ishii N, Motohide Shimazu M f, Keep MF, Jegorov A, **Elmér E**. Calcium-induced generation of reactive oxygen species in brain mitochondria is mediated by permeability transition. *Free Radic Biol Med*. 2008 (in press).

Original articles (manuscripts)

R. Månsson, M. J. Hansson, A. Gharibi, J.M. Dubinsky, N. Brustovetsky, S. Andersson Engels and **E. Elmér**. Assaying permeability transition and swelling of mitochondria from the central nervous system – Right angle light scattering versus absorbance

Review articles, book chapters (published)

1. Wieloch T, Mattiasson G, Hansson M, **Elmér E**. Mitochondrial Permeability Transition in the CNS - Composition, Regulation, and Pathophysiological Relevance. In: Gibson GE, Diemel GA, eds. *Handbook of Neurochemistry and Molecular Neurobiology Brain Energetics: Integration of Molecular and Cellular Processes*. 3rd ed. Berlin Heidelberg: Springer-Verlag 2007:667-702.
2. Keep MF, Uchino H, **Elmér E**. 2003. Introduction: Immunosuppressants as neuroprotective agents. In: Borlongan CV, Isacson O, Sanberg PR, editors. *Immunosuppressant analogs in neuroprotection*. Totowa: Humana Press. p 3-32.
3. Keep MF, Fong KSK, Csiszar K, **Elmér E**. 2003. Cyclosporin A prolongs survival of SOD1 mutant mice and implicates mitochondrial permeability transition in amyotrophic lateral sclerosis. In: Borlongan CV, Isacson O, Sanberg PR, editors. *Immunosuppressant analogs in neuroprotection*. Totowa: Humana Press. p 343-359.
4. Siesjö BK, Ouyang YB, Kristian T, **Elmér E**, Li PA, Uchino H. 1999. Role of mitochondria in immediate and delayed reperfusion damage. In: Ito U, Fieschi C, Orzi F, Kuroiwa T, Klatzo I, editors. *Maturation phenomenon in cerebral ischemia III*. Berlin: Springer-Verlag. p 217-225.
5. Siesjö BK, **Elmér E**, Janelidze S, Keep M, Kristian T, Ouyang YB, Uchino H. 1999. Role and mechanisms of secondary mitochondrial failure. *Acta Neurochir Suppl* 73:7-13.
6. Lindvall O, Kokaia Z, **Elmér E**, Ferencz I, Bengzon J, Kokaia M. 1998. Neurotrophins and kindling epileptogenesis. In: Corcoran ME, Moshé SL, editors. *Kindling 5*. New York: Plenum Press. p 299-312.
7. Lindvall O, Kokaia Z, **Elmér E**, Ferencz I, Bengzon J, Kokaia M. 1996. Neurotrophins in kindling epilepsy: neuronal protection or induction of sprouting and epileptogenesis? In: Ibanez C, Fuxe K, Hökfelt T, Jörnvall H, Olson L, Ottoson D, editors. *Life and death in the nervous system Role of neurotrophins and their receptors*. New York: Pergamon Press. p 417-438.
8. Lindvall O, Kokaia Z, Bengzon J, **Elmér E**, Kokaia M. 1996. Expression of neurotrophin mRNAs in the postischemic phase. *Adv Neurol* 71:405-411.
9. Lindvall O, Kokaia Z, Bengzon J, **Elmér E**, Kokaia M. 1994. Neurotrophins and brain insults. *Trends Neurosci* 17(11):490-496.

10. Lindvall O, Bengzon J, **Elmér E**, Kokaia M, Kokaia Z. 1994. Grafts in models of epilepsy. In: Dunnet SB, Björklund A, editors. Functional Neural Transplantation. New York: Raven Press. p 387-413.

Doktoral dissertations for which the applicant has been main supervisor

Magnus Hansson. Mitochondrial permeability transition following calcium overload - its role in neuronal cell death and potential as a pharmacological target. 2007. ISBN 978-91-85897-22-3.

Patents and patent families

1. Treatment of cerebral ischemia and cerebral damage with neuroprotective agents. Inventor: Keep Marcus (US); **Elmér E**. (SE); Merab Kokaia (SE); Hiroyuki Uchino (JP); Zaal Kokaia (SE); Håkan Widner (SE); Qi Zhao (US); Keiko Uchino (JP). Applicant: Maas Biolab LLC (US). Publication info: US5972924 - 1999-10-26. Approved in 32 countries.

2. Compounds, compositions and method for transporting cyclosporin molecules through the blood brain barrier. Inventor: Mouchet Patrick (FR); Rees Anthony R (FR); Keep Marcus (US); **Elmér E**. (SE). Applicant: Synt:em SA (FR); Maas Biolab LLC (US). Publication info: WO03070755 - 2003-08-28.

3. Neuroimmunophilins for selective neuronal radioprotection. Inventor: Keep Marcus (US); **Elmér E**. (SE). Applicant: Maas Biolab LLC (US). Publication info: US2004147433 - 2004-07-29.

4. Cerebrospinal and vascular pharmaceutical composition and process for preparing the same. Inventor: Keep Marcus (US); **Elmér E**. (SE). Applicant: Keep Marcus (US); **Elmér E**. (SE). Publication info: WO0050058 - 2000-08-31.

Any other publications

Thesis dissertation. Lund University. **Eskil Elmér**. Mechanisms of hyperexcitability in the kindling model of epilepsy, ISBN 91-628-2391-4, 176 pages. Publication date: 1997-04-24.

List of publications (complete)

Original articles (published)

1. Morota S, Hansson MJ, Ishii N, Kudo Y, **Elmér E**, Uchino H. Spinal cord mitochondria display lower calcium retention capacity compared with brain mitochondria without inherent differences in sensitivity to cyclophilin D inhibition. *J Neurochem*. 2007 Dec;103(5):2066-76. Epub 2007 Sep 13.
2. Månsson R, Hansson MJ, Morota S, Uchino H, Ekdahl CT, **Elmér E**. 2007. Re-evaluation of mitochondrial permeability transition as a primary neuroprotective target of minocycline. *Neurobiol Dis* 25(1):198-205.
3. Teilum M, Hansson MJ, Dainiak MB, Månsson R, Surve S, **Elmér E**, Önnarfjord P, Mattiasson G. 2006. Binding mitochondria to cryogel monoliths allows detection of proteins specifically released following permeability transition. *Anal Biochem* 348(2):209-221.
4. Rickhag M, Wieloch T, Gidö G, **Elmér E**, Krogh M, Murray J, Lohr S, Bitter H, Chin DJ, von Schack D, Shamloo M, Nikolich K. 2006. Comprehensive regional and temporal gene expression profiling of the rat brain during the first 24 h after experimental stroke identifies dynamic ischemia-induced gene expression patterns, and reveals a biphasic activation of genes in surviving tissue. *J Neurochem* 96(1):14-29.
5. Rytter A, Cardoso CM, Johansson P, Cronberg T, Hansson MJ, Mattiasson G, **Elmér E**, Wieloch T. 2005. The temperature dependence and involvement of mitochondria permeability transition and caspase activation in damage to organotypic hippocampal slices following in vitro ischemia. *J Neurochem* 95(4):1108-1117.
6. Karlsson J, Fong KS, Hansson MJ, **Elmér E**, Csiszar K, Keep MF. 2004. Life span extension and reduced neuronal death after weekly intraventricular cyclosporin injections in the G93A transgenic mouse model of amyotrophic lateral sclerosis. *J Neurosurg* 101(1):128-137.
7. Hansson MJ, Mattiasson G, Månsson R, Karlsson J, Keep MF, Waldmeier P, Ruegg UT, Dumont JM, Besseghir K, **Elmér E**. 2004. The nonimmunosuppressive cyclosporin analogs NIM811 and UNIL025 display nanomolar potencies on permeability transition in brain-derived mitochondria. *J Bioenerg Biomembr* 36(4):407-413.
8. Hansson MJ, Månsson R, Mattiasson G, Ohlsson J, Karlsson J, Keep MF, **Elmér E**. 2004. Brain-derived respiring mitochondria exhibit homogeneous, complete and cyclosporin-sensitive permeability transition. *J Neurochem* 89(3):715-729.
9. Mattiasson G, Friberg H, Hansson M, **Elmér E**, Wieloch T. 2003. Flow cytometric analysis of mitochondria from CA1 and CA3 regions of rat hippocampus reveals differences in permeability transition pore activation. *J Neurochem* 87(2):532-544.
10. Liu D, Slevin JR, Lu C, Chan SL, Hansson M, **Elmér E**, Mattson MP. 2003. Involvement of mitochondrial K⁺ release and cellular efflux in ischemic and apoptotic neuronal death. *J Neurochem* 86(4):966-979.

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12. Keep M, **Elmér E**, Fong KS, Csiszar K. 2001. Intrathecal cyclosporin prolongs survival of late-stage ALS mice. *Brain Res* 894(2):327-331.
13. Ekdahl CT, Mohapel P, **Elmér E**, Lindvall O. 2001. Caspase inhibitors increase short-term survival of progenitor-cell progeny in the adult rat dentate gyrus following status epilepticus. *Eur J Neurosci* 14(6):937-945.
14. Magnusson S, Ekström TJ, **Elmér E**, Kanje M, Ny L, Alm P. 2000. Heme oxygenase-1, heme oxygenase-2 and biliverdin reductase in peripheral ganglia from rat, expression and plasticity. *Neuroscience* 95(3):821-829.
15. Borlongan CV, Stahl CE, Keep MF, **Elmér E**, Watanabe S. 2000. Cyclosporine-A enhances choline acetyltransferase immunoreactivity in the septal region of adult rats. *Neurosci Lett* 279(2):73-76.
16. Uchino H, **Elmér E**, Uchino K, Li PA, He QP, Smith ML, Siesjö BK. 1998. Amelioration by cyclosporin A of brain damage in transient forebrain ischemia in the rat. *Brain Res* 812(1-2):216-226.
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20. Li PA, Uchino H, **Elmér E**, Siesjö BK. 1997. Amelioration by cyclosporin A of brain damage following 5 or 10 min of ischemia in rats subjected to preischemic hyperglycemia. *Brain Res* 753(1):133-140.
21. Ferencz I, Kokaia M, Keep M, **Elmér E**, Metsis M, Kokaia Z, Lindvall O. 1997. Effects of cholinergic denervation on seizure development and neurotrophin messenger RNA regulation in rapid hippocampal kindling. *Neuroscience* 80(2):389-399.
22. **Elmér E**, Kokaia Z, Kokaia M, Lindvall O, McIntyre DC. 1997. Mossy fibre sprouting: evidence against a facilitatory role in epileptogenesis. *Neuroreport* 8(5):1193-1196.
23. **Elmér E**, Kokaia M, Ernfors P, Ferencz I, Kokaia Z, Lindvall O. 1997. Suppressed kindling epileptogenesis and perturbed BDNF and TrkB gene regulation in NT-3 mutant mice. *Exp Neurol* 145(1):93-103.

24. Bengzon J, Kokaia Z, **Elmér E**, Nanobashvili A, Kokaia M, Lindvall O. 1997. Apoptosis and proliferation of dentate gyrus neurons after single and intermittent limbic seizures. *Proc Natl Acad Sci U S A* 94(19):10432-10437.
25. Kokaia Z, Nawa H, Uchino H, **Elmér E**, Kokaia M, Carnahan J, Smith ML, Siesjö BK, Lindvall O. 1996. Regional brain-derived neurotrophic factor mRNA and protein levels following transient forebrain ischemia in the rat. *Brain Res Mol Brain Res* 38(1):139-144.
26. Kokaia Z, Kelly ME, **Elmér E**, Kokaia M, McIntyre DC, Lindvall O. 1996. Seizure-induced differential expression of messenger RNAs for neurotrophins and their receptors in genetically fast and slow kindling rats. *Neuroscience* 75(1):197-207.
27. Kokaia M, Ferencz I, Leanza G, **Elmér E**, Metsis M, Kokaia Z, Wiley RG, Lindvall O. 1996. Immunolesioning of basal forebrain cholinergic neurons facilitates hippocampal kindling and perturbs neurotrophin messenger RNA regulation. *Neuroscience* 70(2):313-327.
28. **Elmér E**, Kokaia M, Kokaia Z, Ferencz I, Lindvall O. 1996. Delayed kindling development after rapidly recurring seizures: relation to mossy fiber sprouting and neurotrophin, GAP-43 and dynorphin gene expression. *Brain Res* 712(1):19-34.
29. **Elmér E**, Alm P, Kokaia Z, Kokaia M, Larsson B, Keep M, Andersson KE, Lindvall O. 1996. Regulation of neuronal nitric oxide synthase mRNA levels in rat brain by seizure activity. *Neuroreport* 7(7):1335-1339.
30. Uchino H, **Elmér E**, Uchino K, Lindvall O, Siesjö BK. 1995. Cyclosporin A dramatically ameliorates CA1 hippocampal damage following transient forebrain ischaemia in the rat. *Acta Physiol Scand* 155(4):469-471.
31. Kokaia Z, Zhao Q, Kokaia M, **Elmér E**, Metsis M, Smith ML, Siesjö BK, Lindvall O. 1995. Regulation of brain-derived neurotrophic factor gene expression after transient middle cerebral artery occlusion with and without brain damage. *Exp Neurol* 136(1):73-88.
32. Kokaia Z, Metsis M, Kokaia M, **Elmér E**, Lindvall O. 1995. Co-expression of TrkB and TrkC receptors in CNS neurones suggests regulation by multiple neurotrophins. *Neuroreport* 6(5):769-772.
33. Kokaia M, Ernfors P, Kokaia Z, **Elmér E**, Jaenisch R, Lindvall O. 1995. Suppressed epileptogenesis in BDNF mutant mice. *Exp Neurol* 133(2):215-224.
34. Kokaia Z, Metsis M, Kokaia M, Bengzon J, **Elmér E**, Smith ML, Timmusk T, Siesjö BK, Persson H, Lindvall O. 1994. Brain insults in rats induce increased expression of the BDNF gene through differential use of multiple promoters. *Eur J Neurosci* 6(4):587-596.
35. Kokaia M, Pratt GD, **Elmér E**, Bengzon J, Fritschy JM, Kokaia Z, Lindvall O, Möhler H. 1994. Biphasic differential changes of GABAA receptor subunit mRNA levels in dentate gyrus granule cells following recurrent kindling-induced seizures. *Brain Res Mol Brain Res* 23(4):323-332.
36. Kokaia M, Cenci MA, **Elmér E**, Nilsson OG, Kokaia Z, Bengzon J, Björklund A, Lindvall O. 1994. Seizure development and noradrenaline release in kindling epilepsy after noradrenergic

reinnervation of the subcortically deafferented hippocampus by superior cervical ganglion or fetal locus coeruleus grafts. *Exp Neurol* 130(2):351-361.

37. Kokaia M, Aebischer P, **Elmér E**, Bengzon J, Kalen P, Kokaia Z, Lindvall O. 1994. Seizure suppression in kindling epilepsy by intracerebral implants of GABA- but not by noradrenaline-releasing polymer matrices. *Exp Brain Res* 100(3):385-394.

Original articles (in press)

Hansson MJ, Månsson R, Morota S, Uchino H, Kallur T, Sumi T, Ishii N, Motohide Shimazu M f, Keep MF, Jegorov A, **Elmér E**. Calcium-induced generation of reactive oxygen species in brain mitochondria is mediated by permeability transition. *Free Radic Biol Med*. 2008 (in press).

Original articles (manuscripts)

R. Månsson, M. J. Hansson, A. Gharibi, J.M. Dubinsky, N. Brustovetsky, S. Andersson Engels and **E. Elmér**. Assaying permeability transition and swelling of mitochondria from the central nervous system – Right angle light scattering versus absorbance

Review articles, book chapters (published)

1. Wieloch T, Mattiasson G, Hansson M, **Elmér E**. Mitochondrial Permeability Transition in the CNS - Composition, Regulation, and Pathophysiological Relevance. In: Gibson GE, Diener GA, eds. *Handbook of Neurochemistry and Molecular Neurobiology Brain Energetics: Integration of Molecular and Cellular Processes*. 3rd ed. Berlin Heidelberg: Springer-Verlag 2007:667-702.

2. Keep MF, Uchino H, **Elmér E**. 2003. Introduction: Immunosuppressants as neuroprotective agents. In: Borlongan CV, Isacson O, Sanberg PR, editors. *Immunosuppressant analogs in neuroprotection*. Totowa: Humana Press. p 3-32.

3. Keep MF, Fong KSK, Csiszar K, **Elmér E**. 2003. Cyclosporin A prolongs survival of SOD1 mutant mice and implicates mitochondrial permeability transition in amyotrophic lateral sclerosis. In: Borlongan CV, Isacson O, Sanberg PR, editors. *Immunosuppressant analogs in neuroprotection*. Totowa: Humana Press. p 343-359.

4. Siesjö BK, Ouyang YB, Kristian T, **Elmér E**, Li PA, Uchino H. 1999. Role of mitochondria in immediate and delayed reperfusion damage. In: Ito U, Fieschi C, Orzi F, Kuroiwa T, Klatzo I, editors. *Maturation phenomenon in cerebral ischemia III*. Berlin: Springer-Verlag. p 217-225.

5. Siesjö BK, **Elmér E**, Janelidze S, Keep M, Kristian T, Ouyang YB, Uchino H. 1999. Role and mechanisms of secondary mitochondrial failure. *Acta Neurochir Suppl* 73:7-13.

6. Lindvall O, Kokaia Z, **Elmér E**, Ferencz I, Bengzon J, Kokaia M. 1998. Neurotrophins and kindling epileptogenesis. In: Corcoran ME, Moshé SL, editors. *Kindling 5*. New York: Plenum Press. p 299-312.

7. Lindvall O, Kokaia Z, **Elmér E**, Ferencz I, Bengzon J, Kokaia M. 1996. Neurotrophins in kindling epilepsy: neuronal protection or induction of sprouting and epileptogenesis? In: Ibanez C, Fuxe K, Hökfelt T, Jörnvall H, Olson L, Ottoson D, editors. *Life and death in the nervous system Role of neurotrophins and their receptors*. New York: Pergamon Press. p 417-438.

8. Lindvall O, Kokaia Z, Bengzon J, **Elmér E**, Kokaia M. 1996. Expression of neurotrophin mRNAs in the postischemic phase. *Adv Neurol* 71:405-411.
9. Lindvall O, Kokaia Z, Bengzon J, **Elmér E**, Kokaia M. 1994. Neurotrophins and brain insults. *Trends Neurosci* 17(11):490-496.
10. Lindvall O, Bengzon J, **Elmér E**, Kokaia M, Kokaia Z. 1994. Grafts in models of epilepsy. In: Dunnet SB, Björklund A, editors. *Functional Neural Transplantation*. New York: Raven Press. p 387-413.

Doktoral dissertations for which the applicant has been main supervisor

Magnus Hansson. Mitochondrial permeability transition following calcium overload - its role in neuronal cell death and potential as a pharmacological target. 2007. ISBN 978-91-85897-22-3.

Patents and patent families

1. Treatment of cerebral ischemia and cerebral damage with neuroprotective agents. Inventor: Keep Marcus (US); **Elmér E**. (SE); Merab Kokaia (SE); Hiroyuki Uchino (JP); Zaal Kokaia (SE); Håkan Widner (SE); Qi Zhao (US); Keiko Uchino (JP). Applicant: Maas Biolab LLC (US). Publication info: US5972924 - 1999-10-26. Approved in 32 countries.
2. Compounds, compositions and method for transporting cyclosporin molecules through the blood brain barrier. Inventor: Mouchet Patrick (FR); Rees Anthony R (FR); Keep Marcus (US); **Elmér E**. (SE). Applicant: Synt:em SA (FR); Maas Biolab LLC (US). Publication info: WO03070755 - 2003-08-28.
3. Neuroimmunophilins for selective neuronal radioprotection. Inventor: Keep Marcus (US); **Elmér E**. (SE). Applicant: Maas Biolab LLC (US). Publication info: US2004147433 - 2004-07-29.
4. Cerebrospinal and vascular pharmaceutical composition and process for preparing the same. Inventor: Keep Marcus (US); **Elmér E**. (SE). Applicant: Keep Marcus (US); **Elmér E**. (SE). Publication info: WO0050058 - 2000-08-31.

Any other publications

Thesis dissertation. Lund University. **Eskil Elmér**. Mechanisms of hyperexcitability in the kindling model of epilepsy, ISBN 91-628-2391-4, 176 pages. Publication date: 1997-04-24.