

# Winnipeg Group SFN 2002

## Sunday, Nov. 3 AM – Poster Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Sunday, Nov. 3, 8:00 AM – 9:00 AM	65.13	Poster	K-18	<u>M. Lafreniere-Roula</u> *; L.M. Jordan; D.A. McCrea	Department of Physiology, Faculty of Medicine, University of Manitoba	<b>LACK OF DISCHARGE SYNCHRONY BETWEEN MOTONEURON ACTIVITY DURING FICTIVE LOCOMOTION AND SCRATCH IN THE CAT</b>
Sunday, Nov. 3, 9:00 AM – 10:00 AM	26.14	Poster	B-20	<u>T.N. Le</u> <sup>1,2</sup> ; Q.P. Zhou <sup>2,4</sup> ; X. Qiu <sup>2,4</sup> ; M. Fonseca <sup>2,4</sup> ; J. Sun <sup>2</sup> ; J. Davie <sup>1,2</sup> ; D.D. Eisenstat <sup>2,3,4*</sup>	Biochemistry & Medical Genetics, University of Manitoba	<b>REGULATION OF DLX5 AND DLX6 TRANSCRIPTION IS MEDIATED BY DIRECT INTERACTION OF DLX HOMEOPROTEINS WITH THE DLX5/DLX6 INTERGENIC ENHANCER IN VIVO</b>
Sunday, Nov. 3, 11:00 AM – 12:00 PM	65.8	Poster	K-13	<u>R.M. Brownstone</u> <sup>1*</sup> ; M. Di Mauro <sup>1</sup> ; Z. Li <sup>1</sup> ; D.G. McMahon <sup>2</sup> ; L.M. Jordan <sup>3</sup>	Div Neurosurg, Dalhousie Univ	<b>WHOLE CELL PATCH CLAMP RECORDINGS FROM LOCOMOTOR ACTIVITY-LABELLED SPINAL CORD NEURONES IN CFOS-EGFP MICE</b>

## Sunday, Nov. 3 PM – Poster Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Sunday, Nov. 3, 1:00 PM – 2:00 PM	143.9	Poster	D-21	<u>G.W. Glazner</u> <sup>1</sup> ; T. Purves <sup>2</sup> ; L. Freeman <sup>2</sup> ; A. Kontos <sup>2</sup> ; J. Schapansky <sup>1</sup> ; P. Fernyhough <sup>2*</sup>	Pharmacology, University of Manitoba	<b>NF-KAPPAB ACTIVATION IS REQUIRED FOR SURVIVAL OF AXOTOMIZED ADULT SENSORY NEURONS</b>
Sunday, Nov. 3, 3:00 PM – 4:00 PM	142.3	Poster	D-1	<u>J.A. Fotheringham</u> *; M.B. Mayne; J.D. Geiger	Department of Pharmacology & Therapeutics, University of Manitoba	<b>ADENOSINE A2A RECEPTOR ACTIVATION DECREASES P38 ACTIVITY AND INHIBITS TNF-PRODUCTION POST-TRANSCRIPTIONALLY.</b>
Sunday, Nov. 3, 3:00 PM – 4:00 PM	143.11	Poster	D-23	<u>J. Schapansky</u> ; G.W. Glazner*	Pharmacology and Therapeutics, University of Manitoba	<b>CRITICAL ROLE OF GADD153 IN MUTANT PRESENILIN SENSITIVITY TO STRESS-INDUCED DEATH</b>
Sunday, Nov. 3, 3:00 PM – 4:00 PM	207.7	Poster	AA-4	<u>M.R. Del Bigio</u> *; J. Balasubramaniam; M. Xue	Pathology, University of Manitoba	<b>AGE-DEPENDENT GENE EXPRESSION PROFILE OF RAT BRAIN FOLLOWING INTRACEREBRAL HEMORRHAGE</b>

## Monday, Nov. 4 AM – Poster Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Monday, Nov. 4, 10:00 AM – 11:00 AM	236.3	Poster	B-72	<u>J. De Melo</u> <sup>1,2*</sup> ; G. Du <sup>2,3</sup> ; X. Qiu <sup>2,3</sup> ; M.	Anatomy, University of Manitoba	<b>THE ROLE OF DLX HOMEBOX GENES IN RETINAL DEVELOPMENT – INSIGHTS FROM THE DLX-1/DLX-2 DOUBLE KNOCKOUT MOUSE</b>

Fonseca<sup>2,3</sup>;  
J.L.R.  
Rubenstein<sup>5</sup>;  
D.D.  
Eisenstat<sup>1,2,3</sup>

## Monday, Nov. 4 PM – Poster Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Monday, Nov. 4, 1:00 PM – 2:00 PM	404.5	Poster	Z-42	<u>S. Meng</u> <sup>1</sup> ; M. Qiao <sup>1</sup> ; P. Latta <sup>1</sup> ; M.R. Del Bigio <sup>2</sup> ; B. Tomanek <sup>1*</sup> ; U. Tuor <sup>1</sup>	Inst. Biodiagnostics (West), NRC	<b>HISTOLOGICAL CORRELATES OF HYPOXIC-ISCHEMIC CHANGES IN THE APPARENT DIFFUSION COEFFICIENT (ADC) OF WATER AND T2 IN DEVELOPING RAT BRAIN</b>
Monday, Nov. 4, 3:00 PM – 4:00 PM	404.3	Poster	Z-40	<u>M. Xue</u> <sup>1,2*</sup> ; R. Buist <sup>3</sup> ; M.R. Del Bigio <sup>1,2</sup>	Pathology, University of Manitoba	<b>INTRAVENTRICULAR HEMORRHAGE: MRI AND HISTOLOGICAL STUDY IN THE NEONATAL MOUSE CEREBRUM.</b>

## Tuesday, Nov. 5 AM – Poster Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Tuesday, Nov. 5, 9:00 AM – 10:00 AM	505.18	Poster	AA-40	<u>J.I. Nagy</u> <sup>1*</sup> ; T. Yasumura <sup>2</sup> ; K.G.V. Davidson <sup>2</sup> ; C.S. Furman <sup>2</sup> ; J.E. Rash <sup>2</sup>	Physiology, University of Manitoba	<b>CONNEXIN29 (Cx29) IN OLIGODENDROCYTE GAP JUNCTIONS: AT LEAST FIVE CONNEXINS AT OLIGODENDROCYTE-TO-ASTROCYTE (O/A) JUNCTIONS.</b>
Tuesday, Nov. 5, 10:00 AM – 11:00 AM	446.15	Poster	E-79	<u>J. Gilmore</u> ; B. Fedirchuk*	Physiol, University of Manitoba	<b>DESCENDING FACILITATION OF SPINAL MOTONEURON ACTIVITY IN THE ISOLATED BRAINSTEM AND SPINAL CORD OF THE NEONATAL RAT.</b>

## Tuesday, Nov. 5 PM – Platform Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Tuesday, Nov. 5, 2:00 PM – 2:15 PM	523.5	Slide	Room 315A	<u>C.G. Carlson</u> <sup>1*</sup> ; A. Gueorguiev <sup>1</sup> ; R. Ashmore <sup>1</sup> ; D.M. Roshek <sup>1</sup> ; J.E. Anderson <sup>2</sup>	Dept. of Physiol, Kirksville College Of	<b>NONDYSTROPHIC AND SEVERELY DYSTROPHIC ADULT MDX SKELETAL MUSCLE FIBERS EXHIBIT ROUGHLY EQUIVALENT RATES OF RESTING CALCIUM INFLUX IN EXTRAJUNCTIONAL REGIONS.</b>

## Tuesday, Nov. 5 PM – Poster Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Tuesday, Nov. 5, 1:00 PM –	583.9	Poster	R-23	<u>R.C.N.</u>	Natl Res Council	<b>NEURAL INTERACTIONS BETWEEN SEMANTIC PROCESSING AND</b>

2:00 PM				<u>D'Arcy</u> <sup>1*</sup> ; L. Ryner <sup>1</sup> ; W. Richter <sup>2</sup>	Canada, Inst Biodiagnostics	<b>WORKING MEMORY: A FUNCTIONAL MAGNETIC RESONANCE IMAGING STUDY</b>
Tuesday, Nov. 5, 3:00 PM – 4:00 PM	581.11	Poster	Q-20	<u>J. Kong</u> <sup>*</sup> ; R. Pattarini; J.D. Geiger	DNND, St Boniface Hosp Res Ctr	<b>DOMINANT LOCALIZATION OF BRAIN GLYCOGEN TO GFAP-POSITIVE ASTROCYTES IN THE WHITE MATTER</b>

### Wednesday, Nov. 6 AM – Poster Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Wednesday, Nov. 6, 11:00 AM – 12:00 PM	649.12	Poster	E-43	<u>W.E.I. Li</u> <sup>1*</sup> ; J.I. Nagy <sup>2</sup> ; E.L. Hertzberg <sup>1</sup> ; E. Scemes <sup>1</sup> ; D.C. Spray <sup>1</sup>	Dept of Neurosci, Albert Einstein Coll of Med	<b>DEPHOSPHORYLATION OF CONNEXIN43 IN ASTROCYTES SUBJECTED TO METABOLIC INHIBITION</b>

### Wednesday, Nov. 6 PM – Platform Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Wednesday, Nov. 6, 6:00 PM – 7:00 PM	0	Special Lecture	Plaza International Ballroom C	<u>K.M. Sale</u> <sup>*</sup>	Society for Neuroscience	<b>SFN BUSINESS/MEMBERS MEETING</b>

### Wednesday, Nov. 6 PM – Poster Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Wednesday, Nov. 6, 3:00 PM – 4:00 PM	749.11	Poster	E-16	<u>J.E. Rash</u> <sup>1*</sup> ; T. Yasumura <sup>1</sup> ; K.G.V. Davidson <sup>1</sup> ; C.S. Furman <sup>1</sup> ; J.I. Nagy <sup>2</sup> ; F.E. Dudek <sup>1</sup>	Biomedical Sciences, Colorado State Univ.	<b>FREEZE-FRACTURE REPLICA IMMUNOGOLD LABELING (FRIL) REVEALS CONNEXIN-36 (CX36) BUT NOT CX26, CX30, CX32, OR CX43 IN NEURONAL GAP JUNCTIONS OF ADULT RAT SUPRACHIASMATIC NUCLEUS (SCN)</b>

### Thursday, Nov. 7 AM – Poster Presentations

Day / Time	Prog #	Presentation Type	Location	Authors	1st Author 1st Affiliation	Title
Thursday, Nov. 7, 10:00 AM – 11:00 AM	836.7	Poster	D-28	<u>A. Pereda</u> <sup>1*</sup> ; T. Yasumura <sup>4</sup> ; J. O'Brien <sup>2</sup> ; F. Bukauskas <sup>1</sup> ; J.I. Nagy <sup>3</sup> ; J.R. Rash <sup>4</sup>	Albert Einstein College of Medicine	<b>CONNEXIN 35(36) MEDIATES ELECTRICAL TRANSMISSION AT MIXED SYNAPSES ON THE MAUTHNER CELL</b>
Thursday, Nov. 7, 10:00 AM – 11:00 AM	851.15	Poster	F-57	<u>A. Prochazka</u> <sup>1</sup>	Physiology, University of Alberta	<b>BLADDER CONTROL WITH INTRASPINAL MICROSTIMULATION</b>

V.K.  
Mushahwar<sup>1</sup>;  
S.J.  
Shefchyk<sup>2\*</sup>;  
J.W. Downie<sup>3</sup>

**Program Number:** 65.13

**Day / time:** Sunday, Nov. 3, 8:00 AM – 9:00 AM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 K–18

**LACK OF DISCHARGE SYNCHRONY BETWEEN MOTONEURON ACTIVITY DURING FICTIVE LOCOMOTION AND SCRATCH IN THE CAT**

M.Lafreniere–Roula<sup>\*</sup>; L.M.Jordan; D.A.McCrea

*Department of Physiology, Faculty of Medicine, University of Manitoba, Winnipeg, MB, Canada*

The onset and termination of activity of synergists are coincident during fictive locomotion and scratch in the cat. However, it is unclear whether the spike trains occurring in individual motoneurons within these pools are synchronized to each other. To investigate this possibility, fictive locomotion was induced in decerebrate cats by electrical stimulation of the brainstem while fictive scratch was induced by curare application on the first cervical dorsal root and mechanical manipulation of the pinna. Simultaneous intracellular recordings of pairs of lumbar motoneurons belonging to the same or to synergistic muscles at either a single or different joints were made. Peristimulus time histograms were computed to detect the presence of synchronized firing of the two motoneurons during rhythmic activity. Preliminary results from paired motoneuron recordings of agonists at different joints do not indicate significant correlation between their firing. This suggests that the individual action potentials occurring in motoneurons during locomotion and scratch do not result from a highly synchronized premotoneuronal excitation that is distributed to each motor pool.

*Supported by: CIHR*

Citation:

M.Lafreniere–Roula, L.M.Jordan, D.A.McCrea. LACK OF DISCHARGE SYNCHRONY BETWEEN MOTONEURON ACTIVITY DURING FICTIVE LOCOMOTION AND SCRATCH IN THE CAT Program No. 65.13. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 26.14

**Day / time:** Sunday, Nov. 3, 9:00 AM – 10:00 AM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 B–20

**REGULATION OF DLX5 AND DLX6 TRANSCRIPTION IS MEDIATED BY DIRECT INTERACTION OF DLX HOMEOPROTEINS WITH THE DLX5/DLX6 INTERGENIC ENHANCER IN VIVO**

T.N.Le<sup>1,2</sup>; Q.P.Zhou<sup>2,4</sup>; X.Qiu<sup>2,4</sup>; M.Fonseca<sup>2,4</sup>; J.Sun<sup>2</sup>; J.Davie<sup>1,2</sup>; D.D.Eisenstat<sup>2,3,4\*</sup>

*1. Biochemistry & Medical Genetics, Manitoba Institute of Cell Biology, University of Manitoba, Winnipeg, MB, Canada; 2. Anatomy, University of Manitoba, Winnipeg, MB, Canada; 3. Pediatrics, University of Manitoba, Winnipeg, MB, Canada*

Few transcriptional targets of homeobox genes have been identified during vertebrate development, hampering our understanding of how these regulatory genes mediate their specific functions. Dlx family members are expressed in the ganglionic eminences (GE) of the developing forebrain. Dlx1/Dlx2 double knockout mice die at birth with abnormal striatal development, including decreased Dlx5 & Dlx6 expression. We have applied chromatin immunoaffinity precipitation (ChIP) to identify direct transcriptional targets of DLX homeoproteins derived from embryonic day 13.5 (E13.5) GE. GE nucleoproteins were cross-linked and immunoprecipitated with DLX-1 or DLX-2 antibodies then immunoenriched genomic DNA (gDNA) pools, including putative DLX1/2 transcriptional targets, were further characterized. PCR for regions of the Dlx5/Dlx6 intergenic enhancer (Dlx5/6ie) demonstrated that both DLX1 and DLX2 bind to this regulatory region in situ. PCR products were subcloned and sequence verified. Electromobility shift assays (EMSA) provided confirmation of direct binding of DLX1 & DLX2 to the Dlx5/6ie in vitro. Reporter gene assays demonstrated the functional significance of DLX protein binding to this enhancer element. ChIP provides the best direct evidence for isolating direct Dlx homeodomain targets from embryonic forebrain tissue in situ and will facilitate our understanding of Dlx gene function in vivo.

*Supported by: CancerCare Manitoba*

Citation:

T.N.Le, Q.P.Zhou, X.Qiu, M.Fonseca, J.Sun, J.Davie, D.D.Eisenstat. REGULATION OF DLX5 AND DLX6 TRANSCRIPTION IS MEDIATED BY DIRECT INTERACTION OF DLX HOMEOPROTEINS WITH THE DLX5/DLX6 INTERGENIC ENHANCER IN VIVO Program No. 26.14. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 65.8

**Day / time:** Sunday, Nov. 3, 11:00 AM – 12:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 K–13

**WHOLE CELL PATCH CLAMP RECORDINGS FROM LOCOMOTOR ACTIVITY – LABELLED SPINAL CORD NEURONES IN *cfos* – EGFP MICE**

**R.M.Brownstone<sup>1\*</sup>; M.Di Mauro<sup>1</sup>; Z.Li<sup>1</sup>; D.G.McMahon<sup>2</sup>; L.M.Jordan<sup>3</sup>**

*1. Div Neurosurg, Dalhousie Univ, Halifax, NS, Canada; 2. Dept Physiol & Biophysics, Univ Kentucky, Lexington, KY, USA; 3. Physiology, Univ Manitoba, Winnipeg, MB, Canada*

In order to understand the generation of locomotion, it is necessary to understand the electrophysiological properties and the modulation of these properties in the involved spinal cord neurones. It is difficult at best to identify these neurones. To this end, we have used *cfos*–EGFP mice to identify spinal neurones involved in locomotion and study these neurones in slice. A 700 base pair EcoRI/HindIII–BamHI fragment that encompasses the mouse *c*–*fos* promoter was ligated into pd2EGFP–1 vector creating a *c*–*fos* promoter–driven short half–life GFP reporter. Transgenic B6CF1 mice were then made, screened both by dot–blot analysis and PCR of genomic DNA and a transgenic line homozygous for the reporter gene was then bred. Following an overground locomotor task, mice were anaesthetised, and spinal cord slices prepared. Neurones in regions important for the generation of locomotor activity, in particular in the lower thoracic, upper lumbar lamina X and medial lamina VII, were targeted for study. The live IR–DIC image could be compared with the stored fluorescent image to ensure patch clamp recordings were from the EGFP+ neurone. Few neurones fluoresced in control animals. In the locomotor animals, neurones could be readily identified and repetitive firing and bursting properties studied for approximately six hours from the end of the locomotor task. This study demonstrates the feasibility of using transgenic animals which express EGFP for the study of electrophysiological properties of identified spinal cord neurones.

*Supported by: NIH R01 NS40903–02*

Citation:

R.M.Brownstone, M.Di Mauro, Z.Li, D.G.McMahon, L.M.Jordan. WHOLE CELL PATCH CLAMP RECORDINGS FROM LOCOMOTOR ACTIVITY – LABELLED SPINAL CORD NEURONES IN *cfos* – EGFP MICE Program No. 65.8. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 143.9

**Day / time:** Sunday, Nov. 3, 1:00 PM – 2:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 D–21

**NF – KAPPAB ACTIVATION IS REQUIRED FOR SURVIVAL OF AXOTOMIZED ADULT SENSORY NEURONS**

G.W.Glazner<sup>1</sup>; T.Purves<sup>2</sup>; L.Freeman<sup>2</sup>; A.Kontos<sup>2</sup>; J.Schapansky<sup>1</sup>; P.Fernyhough<sup>2\*</sup>

*1. Pharmacology, University of Manitoba, Winnipeg, MB, Canada; 2. Biological Sciences, University of Manchester, Manchester, United Kingdom*

Successful peripheral nerve regeneration is dependent on efficient axonal re-growth, which must be coupled with maintenance of sensory neuron survival. Brain –derived neurotrophic factor (BDNF) and cytokines such as tumor necrosis factor–alpha (TNF–alpha), can maintain survival of sensory neurons through an unspecified autocrine/paracrine mechanism. We tested the hypothesis that activation of NF–kappaB was required for maintenance of survival of regenerating adult sensory neurons. Adult sensory ganglia were cultured as single cells in serum–free medium in the absence of growth factors. Under control conditions cell survival was maintained at a stable level for 3 to 4 days. From the time of DRG removal to 4 days in culture, NF–kappaB binding activity rose approximately 20–fold. Treatment with inhibitors of NF–kappaB (10 microM parthenolide, 100 microg/ml SN50 or 20 microM kappaB decoy DNA) resulted in significant cell death within 12hrs (70%, 80%, and 60% respectively) based on morphological criteria. We tested the role of endogenous TNF–alpha in the maintenance of sensory neuron survival by treating cultures with function–blocking antibody to TNF–alpha. Exposure to anti–TNF–alpha antibody reduced neuronal survival by 50% in 1 day. Blockade of the p38 and ERK MAP kinase pathways using the inhibitors SB202190 and U0126, respectively, had no effect on sensory neuron survival. The results show for the first time that cytokine–mediated activation of NF–kappaB is a component of the signaling pathway responsible for maintenance of adult sensory neuron survival.

*Supported by: MHRC, CIHR and Wellcome Trust*

Citation:

G.W.Glazner, T.Purves, L.Freeman, A.Kontos, J.Schapansky, P.Fernyhough. NF – KAPPAB ACTIVATION IS REQUIRED FOR SURVIVAL OF AXOTOMIZED ADULT SENSORY NEURONS Program No. 143.9. 2002 *Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 142.3

**Day / time:** Sunday, Nov. 3, 3:00 PM – 4:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 D–1

**ADENOSINE A2A RECEPTOR ACTIVATION DECREASES P38 ACTIVITY AND INHIBITS TNF –  
α PRODUCTION POST – TRANSCRIPTIONALLY.**

**J.A.Fotheringham\***; M.B.Mayne; J.D.Geiger

*Department of Pharmacology & Therapeutics, University of Manitoba, Winnipeg, MB, Canada*

Chronic inflammation contributes to the pathology of many CNS disorders including multiple sclerosis, Alzheimers Disease, stroke, and traumatic brain injury. Activated macrophages can traffic into the brain, enhance inflammatory responses and contribute to tissue damage. Adenosine A2A receptor agonists have anti-inflammatory properties including an ability to block pro-inflammatory cytokine production by macrophages. Here, we investigated mechanisms by which adenosine A2A receptors block phorbol ester-induced TNF-α production in human pro-monocytic U937 cells. Treatment of U937 cells for 4 hours with 10 ng/ml phorbol-12-myristate-13-acetate (PMA) and 5 μg/ml phytohemagglutinin (PHA) increased TNF-α protein production and the transcription inhibitor actinomycin D and the protein synthesis inhibitor cycloheximide blocked the production of TNF-α. Adenosine A2A receptor activation inhibited TNF-α protein production but had no effect on PMA/PHA-induced increases in TNF-α mRNA levels. SB 202190, an inhibitor of the mitogen-activated protein kinase p38, blocked PMA/PHA-induced TNF-α protein production but increased PMA/PHA-induced TNF-α mRNA levels. Activation of adenosine A2A receptors with CGS 21680 decreased phospho-p38 levels detected by western blot. These data suggest that adenosine A2A receptor activation decreased PMA/PHA-induced TNF-α production post-transcriptionally by inhibiting p38 activity.

*Supported by: Canadian Institutes of Health Research and the Alzheimer Society of Canada*

Citation:

J.A.Fotheringham, M.B.Mayne, J.D.Geiger. ADENOSINE A2A RECEPTOR ACTIVATION DECREASES P38 ACTIVITY AND INHIBITS TNF – α PRODUCTION POST – TRANSCRIPTIONALLY. Program No. 142.3. 2002 *Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 143.11

**Day / time:** Sunday, Nov. 3, 3:00 PM – 4:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 D–23

**CRITICAL ROLE OF GADD153 IN MUTANT PRESENILIN SENSITIVITY TO STRESS – INDUCED DEATH**

J.Schapansky; G.W.Glazner\*

*Pharmacology and Therapeutics, University of Manitoba, Winnipeg, MB, Canada*

Familial Alzheimer's Disease can be caused by mutations in presenilin genes, which are concentrated on the endoplasmic reticulum (ER) membrane. Neurons from knock-in mice containing the FAD-linked human mutant PS1 gene (mPS1-KI) are more susceptible to amyloid beta peptide (A $\beta$ )-induced death, and exhibit decreased ER-mediated activation of the anti-apoptotic transcription factor NF- $\kappa$ B. ER stress and excessive ER calcium release also induces production of a pro-apoptotic factor called GADD153, which inhibits anti-apoptotic proteins such as bcl-2. In breast cancer cells, NF- $\kappa$ B binds to and inhibits the promoter of GADD153 gene. Here we test the hypothesis that decreased stress-induced NF- $\kappa$ B activation in mPS1-KI cells leads to elevated GADD 153 levels under conditions of A $\beta$ -mediated stress. Cultured embryonic cortical neurons from either mPS1-KI or WT mice were exposed to Ab peptide 25–35 (A $\beta$ 25–35). As reported, A $\beta$  25–35 exposure did not induce a significant NF- $\kappa$ B response in PS1-KI neurons. In contrast, GADD153 protein accumulated to much higher levels in mPS1-KI neurons than WT following A $\beta$  25–35 exposure, while bcl-2 protein levels exhibited an opposite pattern to that of GADD153. Exposure to GADD153 antisense inhibited both the rise in GADD 153 and the decrease in bcl-2 protein levels, and spared mPS1-KI neurons from A $\beta$ -induced cell death. Activation of NF- $\kappa$ B by exposure to IB antisense also resulted in decreased GADD 153 levels and reversed the inhibition of bcl-2 by A $\beta$ . These data indicate that the loss of stress-dependent NFB activation due to mutant PS1 leads to disinhibition of GADD153, which plays a role in A $\beta$ -mediated death.

*Supported by: Alzheimer's Society of Canada*

Citation:

J.Schapansky, G.W.Glazner. CRITICAL ROLE OF GADD153 IN MUTANT PRESENILIN SENSITIVITY TO STRESS – INDUCED DEATH Program No. 143.11. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 207.7

**Day / time:** Sunday, Nov. 3, 3:00 PM – 4:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 AA–4

**AGE – DEPENDENT GENE EXPRESSION PROFILE OF RAT BRAIN FOLLOWING INTRACEREBRAL HEMORRHAGE**

**M.R.Del Bigio** \*; J.Balasubramaniam; M.Xue

*Pathology, University of Manitoba, Winnipeg, MB, Canada*

**INTRODUCTION:** In premature infants intracerebral hemorrhage (ICH) is a common occurrence. Lesions of this type can be associated with poor developmental outcome including hemiplegic cerebral palsy and mental retardation.

Using DNA microarray technique, we have screened for changes in gene expression of the immature brain following ICH. We hypothesize that at the level of gene expression, the newborn rat brain reacts differently from young and adult brains in response to ICH. **METHODS:** Newborn (24 hour), young (7 day) and adult (9–10 week) male Sprague–Dawley rats were injected with autologous blood into the periventricular striatum. At 24 and 48h post injury brains were removed, RNA was extracted, and subjected to DNA microarray analysis (Research Genetics).

**RESULTS:** Newborn brains overexpressed an array (>400) of critical genes that were not altered in the young and adult brains. These overexpressed genes are important players in brain development, inflammation, proteolytic enzyme activity, and extracellular matrix dynamics. The corresponding genes do not show comparable overexpression in the young and adult brains. Young and adult ICH brains overexpressed 20 genes and underexpressed 462 genes in common. Newborn and young ICH brains, however, overexpressed 10 genes and underexpressed only 35 genes in common. **CONCLUSION:** Using microarray analysis, we have shown that the newborn rodent brain reacts very differently than young and adult brains following hemorrhage. This demonstrates that findings cannot be extrapolated across age groups.

*Supported by: MHRC, H&SFC, MICH*

Citation:

M.R.Del Bigio, J.Balasubramaniam, M.Xue. AGE – DEPENDENT GENE EXPRESSION PROFILE OF RAT BRAIN FOLLOWING INTRACEREBRAL HEMORRHAGE Program No. 207.7. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 236.3

**Day / time:** Monday, Nov. 4, 10:00 AM – 11:00 AM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 B–72

**THE ROLE OF DLX HOMEODOMAIN GENES IN RETINAL DEVELOPMENT – INSIGHTS FROM THE DLX – 1/DLX – 2 DOUBLE KNOCKOUT MOUSE**

**J.De Melo**<sup>1,2\*</sup>; G.Du<sup>2,3</sup>; X.Qiu<sup>2,3</sup>; M.Fonseca<sup>2,3</sup>; J.L.R.Rubenstein<sup>5</sup>; D.D.Eisenstat<sup>1,2,3</sup>

*1. Anatomy, Manitoba Institute of Cell Biology, University of Manitoba, Winnipeg, MB, Canada; 2. Pediatrics, University of Manitoba, Winnipeg, MB, Canada; 3. Ophthalmology, University of Manitoba, Winnipeg, MB, Canada; 4. Psychiatry, UCSF, San Francisco, CA, USA*

The Dlx-1/Dlx-2 double knockout mouse dies at birth with abnormalities in craniofacial and forebrain development. The retinal phenotype of this mutant has not been assessed. Dlx-1 and Dlx-2 are first detected in neural retinal progenitors by embryonic day 12.5 (E12.5). By P0, DLX-2 is expressed in the neuroblastic layer (NBL) and the retinal ganglion cell layer (RGL). In the adult, DLX-2 is localized to ganglion, amacrine, horizontal and bipolar cells as determined by co-expression with cell-specific markers. There is coincident expression of DLX-2 with GABA and GAD-67 in some cells of the NBL, inner nuclear layer (INL) and RGL. DLX-2 is co-expressed with Brn3b in the RGL, Pax-6 in amacrine, horizontal and ganglion cells, and Chx-10 in bipolar cells. In the Dlx-1/-2 double mutant at P0, there is decreased RGL cellularity but relative sparing of GABA and GAD expression. Amacrine cell differentiation appears to be intact apart from loss of tyrosine hydroxylase (TH) expression in some INL subpopulations. Bipolar cell differentiation is affected with loss of protein kinase C (PKC) with persistent Chx-10 expression. Concomitant increased expression of horizontal cell markers in the NBL is evident in the mutant retina. These results suggest a Dlx-1 and Dlx-2-dependent role in retinal development with a reduced RGL, diminished bipolar cell differentiation and a compensatory increase in horizontal cell differentiation.

*Supported by: March of Dimes Birth Defects Foundation*

Citation:

J.De Melo, G.Du, X.Qiu, M.Fonseca, J.L.R.Rubenstein, D.D.Eisenstat. THE ROLE OF DLX HOMEODOMAIN GENES IN RETINAL DEVELOPMENT – INSIGHTS FROM THE DLX – 1/DLX – 2 DOUBLE KNOCKOUT MOUSE Program No. 236.3. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 404.5

**Day / time:** Monday, Nov. 4, 1:00 PM – 2:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 Z–42

**HISTOLOGICAL CORRELATES OF HYPOXIC – ISCHEMIC CHANGES IN THE APPARENT DIFFUSION COEFFICIENT ( ADC ) OF WATER AND T2 IN DEVELOPING RAT BRAIN**

**S.Meng<sup>1</sup>; M.Qiao<sup>1</sup>; P.Latta<sup>1</sup>; M.R.Del Bigio<sup>2</sup>; B.Tomanek<sup>1\*</sup>; U.Tuor<sup>1</sup>**

*1. Inst. Biodiagnostics (West), NRC, Calgary, AB, Canada; 2. Pathology, Univ. of Manitoba, Winnipeg, MB, Canada*  
ADC of water and T2 weighted imaging have been widely used delineating cerebral ischemic changes without a clear understanding of the cellular correlates involved. We investigate the correlation of magnetic resonance imaging changes with histological markers of cell injury and a water channel protein. ADC and T2 maps were acquired using a 9.4T system before, during and for 1 and 24 hrs after hypoxia–ischemia (HI) in 1 or 4 week–old rats. Aquaporin4 (AQP4), microtubule–associated protein 2(MAP2) and IgG immunohistochemistry assessed changes in water channel protein expression, cell injury and blood–brain barrier disruption. In both age groups, ADC in the ipsilateral hemisphere decreased during HI, partially recovering at 1 and 24 hours after HI. The decrease and distribution of AQP4 expression corresponded well to the ADC alterations at each time point. In 1–week–old rats, areas of increased T2 were associated with areas of IgG extravasation at each time point during and post–HI. In contrast, in 4–week old rats, there was no increase in T2 or IgG extravasation during HI and at 1 hour after HI. However, areas of increased T2 appeared at 24 hours and these were similar to the areas of IgG extravasation. Areas of decreased MAP2 expression occurred at all time points during and post–IH in both age groups correlating well with the ADC changes. Our results suggest a role for AQP4 in early ischemic cell swelling associated with ADC changes. T2 is sensitive in detecting brain edema accompanied by disruption of the blood brain barrier.

*Supported by: Canadian Institutes for Health Research*

Citation:

S.Meng, M.Qiao, P.Latta, M.R.Del Bigio, B.Tomanek, U.Tuor. HISTOLOGICAL CORRELATES OF HYPOXIC – ISCHEMIC CHANGES IN THE APPARENT DIFFUSION COEFFICIENT ( ADC ) OF WATER AND T2 IN DEVELOPING RAT BRAIN Program No. 404.5. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 404.3

**Day / time:** Monday, Nov. 4, 3:00 PM – 4:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 Z–40

**INTRAVENTRICULAR HEMORRHAGE: MRI AND HISTOLOGICAL STUDY IN THE NEONATAL MOUSE CEREBRUM.**

M.Xue<sup>\*</sup>; R.Buist; M.R.Del Bigio

*Pathology, Human Anatomy, Pharmacology, University of Manitoba, Winnipeg, MB, Canada*

**Introduction:** In the brain of premature infants primary intracerebral hemorrhage (ICH) is a common occurrence. It is usually unilateral and deep in the cerebrum near the ganglionic eminence beside the lateral ventricle. Blood can extend into the ventricles causing hydrocephalus. Even small lesions of this type, are associated with poor developmental outcome including cerebral palsy and mental retardation. The purpose of this study was to obtain magnetic resonance images (MRI) of the mouse brain after ICH and to correlate the images with histological evolution. **Methods:** ICH was induced in one-day-old mice, which are developmentally similar to a 24–26 weeks human fetus, by injection of autologous blood into the striatum. MRI was obtained 15 minutes to 48 hours later. Mice were perfused with 4% paraformaldehyde 8 hours to 28 days later. H&E, immunohistochemical, and TUNEL staining were used to quantify the lesion area, neutrophils, microglia, and cell death at the edge of the hemorrhagic lesion. **Results:** Histological correlation showed that MRI is capable of resolving the hematoma, but the MRI showed larger hematoma area than the H&E stain. This is likely due to susceptibility artifact. H&E stain showed that blood was located in the striatum or germinal tissue and often entered the ventricle. Neutrophils peaked at 2–3 days, microglia reaction appeared at 2 days persisted up to 28 days. **Conclusion:** MRI correlates reasonably well with histological changes in this ICH model. The inflammatory response may contribute to brain injury at the periphery of the hematoma.

*Supported by: CIHR, HSFC, and MHRC*

**Citation:**

M.Xue, R.Buist, M.R.Del Bigio. INTRAVENTRICULAR HEMORRHAGE: MRI AND HISTOLOGICAL STUDY IN THE NEONATAL MOUSE CEREBRUM. Program No. 404.3. 2002 *Abstract Viewer/Itinerary Planner*.

Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 505.18

**Day / time:** Tuesday, Nov. 5, 9:00 AM – 10:00 AM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 AA–40

**CONNEXIN29 ( CX29 ) IN OLIGODENDROCYTE GAP JUNCTIONS: AT LEAST FIVE CONNEXINS AT OLIGODENDROCYTE – TO – ASTROCYTE ( O/A ) JUNCTIONS.**

J.I.Nagy<sup>1\*</sup>; T.Yasumura<sup>2</sup>; K.G.V.Davidson<sup>2</sup>; C.S.Furman<sup>2</sup>; J.E.Rash<sup>2</sup>

*1. Physiology, University of Manitoba, Winnipeg, MB, Canada; 2. Biomedical Sciences, Colorado State University, Fort Collins, CO, USA*

Using freeze–fracture replica immunogold labeling (FRIL), we previously demonstrated that intercellular gap junctions of oligodendrocytes are shared almost exclusively (>97%) with astrocytes, with Cx32 in the oligodendrocyte–side of O/A gap junction plaques and Cx26, Cx30, and Cx43 in the astrocyte–side (Rash et al., 2001, *J. Neurosci.* 21:1983). Cx32 is known not to form functional connexon channels with Cx43, but its astrocyte connexin coupling partner is not yet known, nor are permissive coupling partners established for the remaining connexins. Using a newly–developed rabbit polyclonal anti–Cx29 antibody (Zymed Inc.) in combination with monoclonal antibodies to Cx26, Cx30, Cx32 and Cx43, we now report that Cx29 is co–localized with Cx32 in individual gap junction plaques on oligodendrocyte somata in adult rat CNS. Cx29 was localized by immunofluorescence to oligodendrocyte somata and myelinated fibers. From preliminary FRIL, Cx32 immunogold labeling at gap junctions appeared to be several–fold greater than for Cx29, but this apparent difference may reflect differences in labeling efficiency for the secondary immunogold antibodies. We conclude that there are at least five connexins in heterologous O/A gap junctions. If each connexon hemichannel is composed of a single connexin isoform (not proven), and if each connexin type has a specific permissive coupling partner (also not proven), our data would imply the presence of a sixth connexin at O/A gap junctions.

*Supported by: Can. Insts. Health Res. and NIH (NS–38121, NS–39040, and NS–44010 [JER])*

Citation:

J.I.Nagy, T.Yasumura, K.G.V.Davidson, C.S.Furman, J.E.Rash. CONNEXIN29 ( CX29 ) IN OLIGODENDROCYTE GAP JUNCTIONS: AT LEAST FIVE CONNEXINS AT OLIGODENDROCYTE – TO – ASTROCYTE ( O/A ) JUNCTIONS. Program No. 505.18. *2002 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 446.15

**Day / time:** Tuesday, Nov. 5, 10:00 AM – 11:00 AM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 E–79

**DESCENDING FACILITATION OF SPINAL MOTONEURON ACTIVITY IN THE ISOLATED BRAINSTEM AND SPINAL CORD OF THE NEONATAL RAT.**

**J.Gilmore; B.Fedirchuk\***

*Physiol, University of Manitoba, Winnipeg, MB, Canada*

It has been shown that the excitability of cat spinal motoneurons increases during fictive locomotion by lowering the voltage threshold ( $V_{th}$ ) for action potential production (Krawitz et al. 2001, *J Physiol* 532, 271–281). This facilitation of motoneuron recruitment is not directly linked to phasic depolarizations during the step cycle. Rather, it appears to be a "state-dependent" enhancement of motoneuron excitability, presumably due to a neuromodulatory system. We have also shown that exogenously applied serotonin is able to hyperpolarize the  $V_{th}$  of spinal neurons in the neonatal rat in the absence of locomotor-activity (Fedirchuk 2001, *SFN Vol 27*, 714.17). The goals of the present series of experiments are to show that activation of locomotor circuitry can cause a lowering of  $V_{th}$  in spinal motoneurons of the neonatal rat, and determine if serotonin is the endogenous neurotransmitter mediating this phenomenon.

Experiments were conducted on neonatal (P0–P5) rats that were anaesthetized and decerebrated. The brainstem and spinal cord were then removed and perfused with oxygenated aCSF in a recording chamber. Motor output was monitored from recordings of lumbar ventral roots, and initiated by stimulation of the brainstem or spinal white matter. The excitability of lumbar motoneurons was assessed by single cell recordings using a whole-cell blind patch technique. Antagonists to receptors of the descending serotonergic system were selectively applied to the spinal bath, and their ability to block motoneuron  $V_{th}$  changes assessed.

*Supported by: Canadian Institutes of Health Research/Canadian Neurotrauma Research Program.*

Citation:

J.Gilmore, B.Fedirchuk. DESCENDING FACILITATION OF SPINAL MOTONEURON ACTIVITY IN THE ISOLATED BRAINSTEM AND SPINAL CORD OF THE NEONATAL RAT. Program No. 446.15. 2002 *Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 523.5

**Day / time:** Tuesday, Nov. 5, 2:00 PM – 2:15 PM

**Presentation Type:** Slide

**Presentation Location:** Room 315A

**NONDYSTROPHIC AND SEVERELY DYSTROPHIC ADULT MDX SKELETAL MUSCLE FIBERS EXHIBIT ROUGHLY EQUIVALENT RATES OF RESTING CALCIUM INFLUX IN EXTRAJUNCTIONAL REGIONS.**

C.G.Carlson<sup>1\*</sup>; A.Gueorguiev<sup>1</sup>; R.Ashmore<sup>1</sup>; D.M.Roshek<sup>1</sup>; J.E.Anderson<sup>2</sup>

*1. Dept. of Physiol, Kirksville College Of, Kirksville, MO, USA; 2. Dept. of Human Anatomy and Cell Science, University of Manitoba, Winnipeg, MB, Canada*

The triangularis sterni (TS) is a thin expiratory muscle that undergoes a rhythmic pattern of passive muscle stretch and contractile activation during normal breathing at atmospheric pressure. Because the TS is only about 5 fibers thick, it is particularly suitable for fluorimetric and electrophysiological investigations to examine pathogenic mechanisms in muscular dystrophy and other muscle diseases. Our results indicate that the TS is severely affected by the absence of dystrophin and exhibits an approximately 45% loss of muscle fibers in the adult mdx mouse. Adult mdx TS also exhibit substantial fat, connective tissue and macrophage infiltration. At about 2 years, the mdx TS is a thin layer of fibrous connective tissue with only a few severely dystrophic fibers. Injection of Evans Blue produced clear infiltration throughout individual fibers or in particular segments of fibers in freshly isolated adult mdx TS. Mn<sup>2+</sup> quench rates in FURA PE3 loaded fibers were obtained over large areas (32,812 mm<sup>2</sup>) of mostly extrajunctional membrane to assess resting permeability to divalent cations. Nondystrophic and intact adult mdx TS fibers had roughly equivalent quench rates. These results represent the first fluorimetric determination of divalent cation influx in freshly isolated adult dystrophic fibers, and indicate that generalized increases in Ca<sup>2+</sup> influx in resting fibers is not a pathogenic characteristic of severely dystrophic muscle.

*Supported by: Strategic Research Grant from KCOM (CGC)*

Citation:

C.G.Carlson, A.Gueorguiev, R.Ashmore, D.M.Roshek, J.E.Anderson. NONDYSTROPHIC AND SEVERELY DYSTROPHIC ADULT MDX SKELETAL MUSCLE FIBERS EXHIBIT ROUGHLY EQUIVALENT RATES OF RESTING CALCIUM INFLUX IN EXTRAJUNCTIONAL REGIONS. Program No. 523.5. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 583.9

**Day / time:** Tuesday, Nov. 5, 1:00 PM – 2:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 R–23

**NEURAL INTERACTIONS BETWEEN SEMANTIC PROCESSING AND WORKING MEMORY: A FUNCTIONAL MAGNETIC RESONANCE IMAGING STUDY**

**R.C.N.D'Arcy<sup>1\*</sup>; L.Ryner<sup>1</sup>; W.Richter<sup>2</sup>**

*1. Natl Res Council Canada, Inst Biodiagnostics, Winnipeg, MB, Canada; 2. Chemistry, Center for the Study of Brain, Mind, and Behavior, Princeton, NJ, USA*

We studied the effects of working memory (WM) on semantic neural systems using event–related functional magnetic resonance imaging (fMRI). Semantic congruency was manipulated using a series of visual sentence pairs with predictable endings. In each pair, the first sentence primed contextual expectation for the terminal word in the second sentence. The second sentence ended with either a semantically appropriate or a semantically inappropriate ending. WM was manipulated by increasing the memory set size. Level 1 WM load contained a single prime sentence and Level 2 contained two prime sentences. Task related activation occurred predominately in the left hemisphere and increased as a function of WM load. Interactions between semantic processing and WM effects were examined within the inferior parietal, superior temporal, lateral frontal, and cingulate regions. The correspondence between the current fMRI results and prior work on the manner in which WM influences the semantic N400 response was examined. Overall, the hemodynamic and electromagnetic findings revealed a clear spatio–temporal interaction between semantic processing and WM.

Citation:

R.C.N.D'Arcy, L.Ryner, W.Richter. NEURAL INTERACTIONS BETWEEN SEMANTIC PROCESSING AND WORKING MEMORY: A FUNCTIONAL MAGNETIC RESONANCE IMAGING STUDY Program No. 583.9. *2002 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 581.11

**Day / time:** Tuesday, Nov. 5, 3:00 PM – 4:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 Q–20

**DOMINANT LOCALIZATION OF BRAIN GLYCOGEN TO GFAP – POSITIVE ASTROCYTES IN THE WHITE MATTER**

**J.Kong\*** ; R.Pattarini; J.D.Geiger

*DNND, St Boniface Hosp Res Ctr, Winnipeg, MB, Canada*

Brain glycogen has been implicated recently as a component of the homeostatic drive to sleep [Kong et al., J. Neurosci. 2002]. It is believed to be localized almost exclusively in astrocytes. However, a number of subpopulations of astrocytes have been identified and the localization of brain glycogen to these subgroups has not been examined. Here, we tested the hypothesis that brain glycogen is heterogeneously distributed in brain and among specific subpopulation of astrocytes. Using a modified PAS–dimedone histochemical method, we found that brain glycogen was heterogeneously distributed in the brain with the highest levels in white matter. This enrichment of glycogen in white matter was confirmed biochemically in rats killed with high–energy focused microwave irradiation. To localize glycogen to subpopulations of astrocytes, rat brain sections were immunohistochemically labeled with 3 astrocyte markers; GFAP, S100 and vimentin. Similar to the distribution of glycogen, GFAP–positive astrocytes were found throughout the brain and enriched in white matter. However, high density of GFAP staining was also found in outer cortical layer. Double–immunolabeling with GFAP and glycogen synthase antibodies revealed that only GFAP–positive astrocytes in the white matter contained high levels of glycogen synthase. The GFAP–containing astrocytes in the outer cortical layer, which are known to be around the penetrating arterioles, did not contain glycogen synthase. Both S100– and vimentin– positive astrocytes failed to co–distribute with brain glycogen. Together, these results suggest that brain glycogen is predominantly localized to GFAP–positive astrocytes in the white matter. (Funded by NIH grants HL60287 and AG17628).

Citation:

J.Kong, R.Pattarini, J.D.Geiger. DOMINANT LOCALIZATION OF BRAIN GLYCOGEN TO GFAP – POSITIVE ASTROCYTES IN THE WHITE MATTER Program No. 581.11. *2002 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 649.12

**Day / time:** Wednesday, Nov. 6, 11:00 AM – 12:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 E–43

**DEPHOSPHORYLATION OF CONNEXIN43 IN ASTROCYTES SUBJECTED TO METABOLIC INHIBITION**

W.E.I.Li<sup>1\*</sup>; J.I.Nagy<sup>2</sup>; E.L.Hertzberg<sup>1</sup>; E.Scemes<sup>1</sup>; D.C.Spray<sup>1</sup>

*1. Dept of Neurosci, Albert Einstein Coll of Med, Bronx, NY, USA; 2. Physiology, University of Manitoba, Winnipeg, MB, Canada*

Gap junctions formed by connexin43 (Cx43) are critical in numerous cellular processes, and can be regulated by phosphorylation and dephosphorylation of Cx43. Previously, we showed that dephosphorylation of Cx43 in astrocytes occurs after cerebral ischemia, activation of peripheral nerve or metabolic inhibition (MI). Dephosphorylation of Cx43 induced by MI can be prevented by a combination of inhibitors of type1, 2A and 2B (calcineurin) protein phosphatases (PPs), whereas the calcineurin inhibitor alone only exhibits partial inhibition. We have now found that whereas calcineurin inhibitor attenuated calcium increase during MI, the PP inhibitor combination virtually completely blocked the increase in intracellular calcium. These data suggests that this blockade is upstream of calcineurin activation and that other Ca sensitive PPs might be involved. Interestingly, MKP–1, a dual–specificity mitogen–activated protein kinase phosphatase, was co–immunoprecipitated with Cx43 in lysate from astrocytes subjected to MI but not control astrocytes, suggesting that MKP–1 is also involved in the dephosphorylation of Cx43. This is consistent with reports that the MKP–1 phosphatase activity is dependent on Ca signaling. Surprisingly, Cx43 dephosphorylation is accompanied with an increased association of Cx43 with protein kinases such as c–Src and ERKs. However, application of PD–98059 did not markedly affect phosphorylation state of Cx43 or the association of Cx43 with MKP–1. The contribution of MKP–1 to the regulation of Cx43 phosphorylation state and the significance of c–Src and ERKs association with Cx43 are being investigated.

*Supported by: NS41282*

Citation:

W.E.I.Li, J.I.Nagy, E.L.Hertzberg, E.Scemes, D.C.Spray. DEPHOSPHORYLATION OF CONNEXIN43 IN ASTROCYTES SUBJECTED TO METABOLIC INHIBITION Program No. 649.12. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number: 0**

**Day / time:** Wednesday, Nov. 6, 6:00 PM – 7:00 PM

**Presentation Type:** Special Lecture

**Presentation Location:** Plaza International Ballroom C

**SFN BUSINESS/MEMBERS MEETING**

K.M.Sale\*

*Society for Neuroscience, Washington, DC, USA*

Society members are encouraged to play a more active role in the governance of SFN by attending the Business/Members Meeting in Orlando. The agenda includes a review of important Society initiatives and programs. Members will have the opportunity to express their opinions on matters related to the Society and direct questions to the Society's Officers. Regular and Emeritus Members will also have the opportunity to discuss a proposed update to the Society's Bylaws. In January, a referendum on the new set of Bylaws will be sent to the entire voting membership.

Citation:  
K.M.Sale. SFN BUSINESS/MEMBERS MEETING Program No. 0. *2002 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 749.11

**Day / time:** Wednesday, Nov. 6, 3:00 PM – 4:00 PM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 E–16

**FREEZE – FRACTURE REPLICA IMMUNOGOLD LABELING ( FRIL ) REVEALS CONNEXIN – 36 ( CX36 ) BUT NOT CX26, CX30, CX32, OR CX43 IN NEURONAL GAP JUNCTIONS OF ADULT RAT SUPRACHIASMATIC NUCLEUS ( SCN )**

**J.E.Rash<sup>1\*</sup>**; T.Yasumura<sup>1</sup>; K.G.V.Davidson<sup>1</sup>; C.S.Furman<sup>1</sup>; J.I.Nagy<sup>2</sup>; F.E.Dudek<sup>1</sup>

*1. Biomedical Sciences, Colorado State Univ., Fort Collins, CO, USA; 2. Physiology, University of Manitoba, Winnipeg, MB, Canada*

Suprachiasmatic nucleus neurons generate a circadian rhythm of electrical activity, and these independent oscillators may be synchronized via gap junctions. Several indirect lines of evidence suggest electrical coupling between SCN neurons, possibly through gap junctions, which previously have not been detected between neurons by ultrastructural methods. Light–microscopic evidence for Cx32–immunoreactivity has been reported in SCN, and inferred to be present in neuronal gap junctions. We tested this hypothesis by FRIL using monoclonal and polyclonal antibodies to five CNS connexins (Cx26, Cx30, Cx32, Cx36 and Cx43), either singly or in combination. Immunogold labeling for Cx32 was found only in oligodendrocyte gap junctions; Cx26, Cx30 and Cx43 were in astrocyte gap junctions; and Cx43 (but none of the other four connexins tested) was in ependymocyte gap junctions. In contrast, gap junctions on ultrastructurally–identified neurons contained immunogold labeling for Cx36 but for none of the other connexins. These neuronal gap junctions included one unusual reticular gap junction on the soma of a small–diameter neuron and one small but otherwise conventional plaque gap junction linking two unidentified neuronal processes. Ongoing efforts are directed to semi–quantitative analysis of gap junctions between neurons in SCN, mapping their locations, and identifying the neuronal coupling partners.

*Supported by: NIH (NS38121, NS39040, NS44010 [JER], MH59995 [FED]) and Canadian Institutes of Health Research [JIN]*

Citation:

J.E.Rash, T.Yasumura, K.G.V.Davidson, C.S.Furman, J.I.Nagy, F.E.Dudek. FREEZE – FRACTURE REPLICA IMMUNOGOLD LABELING ( FRIL ) REVEALS CONNEXIN – 36 ( CX36 ) BUT NOT CX26, CX30, CX32, OR CX43 IN NEURONAL GAP JUNCTIONS OF ADULT RAT SUPRACHIASMATIC NUCLEUS ( SCN ) Program No. 749.11. *2002 Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 836.7

**Day / time:** Thursday, Nov. 7, 10:00 AM – 11:00 AM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 D–28

**CONNEXIN 35 ( 36 ) MEDIATES ELECTRICAL TRANSMISSION AT MIXED SYNAPSES ON THE MAUTHNER CELL**

A.Pereda<sup>1\*</sup>; T.Yasumura<sup>4</sup>; J.O'Brien<sup>2</sup>; F.Bukauskas<sup>1</sup>; J.I.Nagy<sup>3</sup>; J.R.Rash<sup>4</sup>

1. *Albert Einstein College of Medicine, New York, NY, USA*; 2. *University of Texas Med. Center, Houston, TX, USA*;

3. *University of Manitoba, Winnipeg, MB, Canada*; 4. *Colorado State University, Fort Collins, CO, USA*

Connexin 36 (Cx36) is known to mediate electrical transmission at mammalian cortical, thalamic, retinal, and inferior olive electrical synapses. We report here that its fish ortholog, connexin 35 (Cx35), mediates electrical transmission at the mixed synaptic terminals on the goldfish Mauthner cell known as Large Myelinated Club Endings (LMCEs).

Confocal microscopy and freeze–fracture replica immunogold labeling (FRIL) of the distal portion of the lateral dendrite using anti–Cx36 and Cx35 antibodies showed intense labeling at these terminals, unequivocally identified because of their larger size. As determined by FRIL, this connexin is present at both (presynaptic and postsynaptic) sides of these junctions. The observed labeling was not exclusive for LMCEs as confocal microscopy revealed intense punctate staining in other areas of the Mauthner cells such as the proximal portion of the lateral dendrite, soma, and ventral dendrite. Furthermore, both confocal microscopy and FRIL showed intense labeling for this connexin in other hindbrain neurons suggesting that Cx35–mediated electrical transmission is common in the goldfish brain. In contrast, anti–connexin 43 labeling was restricted to astrocytic gap junctions. Because electrical synapses at LMCEs are highly dynamic and exhibit activity–dependent plasticity (PNAS, 95:13272–7), the present data suggest that such properties could also apply to other Cx35(36)–mediated electrical synapses.

*Supported by: NIH (DC03186 to AP, EY 12857 to JO and NS31027/NS39040 to JER) and the CIHR of Canada to JIN.*

Citation:

A.Pereda, T.Yasumura, J.O'Brien, F.Bukauskas, J.I.Nagy, J.R.Rash. CONNEXIN 35 ( 36 ) MEDIATES ELECTRICAL TRANSMISSION AT MIXED SYNAPSES ON THE MAUTHNER CELL Program No. 836.7. 2002 *Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2002. Online.

**Program Number:** 851.15

**Day / time:** Thursday, Nov. 7, 10:00 AM – 11:00 AM

**Presentation Type:** Poster

**Presentation Location:** Hall A2–B3 F–57

**BLADDER CONTROL WITH INTRASPINAL MICROSTIMULATION**

A.Prochazka<sup>1</sup>; V.K.Mushahwar<sup>1</sup>; S.J.Shefchyk<sup>2\*</sup>; J.W.Downie<sup>3</sup>

*1. Physiology, University of Alberta, Edmonton, AB, Canada; 2. Physiology, University of Manitoba, Winnipeg, MB, Canada; 3. Dalhousie University, Halifax, NS, Canada*

Bladder–sphincter dyssynergia is a major problem after spinal cord injury (SCI). Intermittent catheterization is often required for micturition and this leads to urinary tract infections in about 80% of SCI people every year. Incontinence is another frequent problem. Sacral root stimulators can improve bladder control considerably but deafferentation is usually required to abolish sphincter hyperreflexia. This is only justified in SCI people who have complete transections (~27% of all SCI) leaving the majority without an effective neuroprosthesis. We are exploring intraspinal microstimulation (ISMS) of sphincter inhibitory and bladder excitatory areas as a means of eliciting voiding without the need for dorsal rhizotomies. So far we have confirmed in anesthetized and decerebrate cats that midline ISMS in S1–S2 segments dorsal to the central canal can inhibit sphincter EMG (Fedirchuk & Shefchyk, 1991, *Exp. Brain Res.* 84:635–642). Bladder contractions >20mm Hg were obtained by ISMS through microwires inserted 1 mm lateral to the midline and ~2 mm deep to the dorsal surface of the dura mater. Alternating ISMS between the sphincter and bladder regions produced modest (3–5 ml) voiding. These results indicate that in principle ISMS can elicit coordinated sphincter inhibition and bladder excitation. Whether this also holds true after SCI is the subject of future work.

*Supported by: NIH: RFP NINDS–01–04 and Alberta Heritage Foundation for Medical Research*

Citation:

A.Prochazka, V.K.Mushahwar, S.J.Shefchyk, J.W.Downie. BLADDER CONTROL WITH INTRASPINAL MICROSTIMULATION Program No. 851.15. 2002 *Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2002. Online.

## Author Index

Anderson, J.E.	523.5
Ashmore, R.	523.5
Balasubramaniam, J.	207.7
Brownstone, R.M.	65.8
Buist, R.	404.3
Bukauskas, F.	836.7
Carlson, C.G.	523.5
D'Arcy, R.C.N.	583.9
Davidson, K.G.V.	505.18, 749.11
Davie, J.	26.14
De Melo, J.	236.3
Del Bigio, M.R.	207.7, 404.3, 404.5
Di Mauro, M.	65.8
Downie, J.W.	851.15
Du, G.	236.3
Dudek, F.E.	749.11
Eisenstat, D.D.	26.14, 236.3
Fedirchuk, B.	446.15
Fernyhough, P.	143.9
Fonseca, M.	26.14, 236.3
Fotheringham, J.A.	142.3
Freeman, L.	143.9
Furman, C.S.	505.18, 749.11
Geiger, J.D.	142.3, 581.11
Gilmore, J.	446.15
Glazner, G.W.	143.9, 143.11
Gueorguiev, A.	523.5
Hertzberg, E.L.	649.12
Jordan, L.M.	65.8, 65.13
Kong, J.	581.11
Kontos, A.	143.9
Lafreniere–Roula, M.	65.13
Latta, P.	404.5
Le, T.N.	26.14
Li, W.E.I.	649.12
Li, Z.	65.8
Mayne, M.B.	142.3
McCrea, D.A.	65.13
McMahon, D.G.	65.8
Meng, S.	404.5
Mushahwar, V.K.	851.15
Nagy, J.I.	505.18, 649.12, 749.11, 836.7
O'Brien, J.	836.7

Pattarini, R.	581.11
Pereda, A.	836.7
Prochazka, A.	851.15
Purves, T.	143.9
Qiao, M.	404.5
Qiu, X.	26.14, 236.3
Rash, J.E.	505.18, 749.11
Rash, J.R.	836.7
Richter, W.	583.9
Roshek, D.M.	523.5
Rubenstein, J.L.R.	236.3
Ryner, L.	583.9
Sale, K.M.	0
Scemes, E.	649.12
Schapansky, J.	143.9, 143.11
Shefchyk, S.J.	851.15
Spray, D.C.	649.12
Sun, J.	26.14
Tomanek, B.	404.5
Tuor, U.	404.5
Xue, M.	207.7, 404.3
Yasumura, T.	505.18, 749.11, 836.7
Zhou , Q.P.	26.14

## Key Word Index

ACTION POTENTIAL	446.15
ASTROCYTE	581.11
Auditory	836.7
BIPOLAR CELL	236.3
BRAIN IMAGING	404.5, 583.9
CHROMATIN	26.14
CHX10	236.3
CNS	505.18
COGNITION	583.9
DEVELOPMENT	404.5
DNA microarray	207.7
EVOKED POTENTIALS	583.9
FOREBRAIN	26.14
FUNCTIONAL MRI	583.9
GFAP	581.11
GLYCOGEN	581.11
Gap Junction	836.7
HOMEobox	26.14
HORIZONTAL CELL	236.3
IMMUNOHISTOCHEMISTRY	404.5
ISCHEMIA	404.5
MAP kinase	142.3
MONOAMINE	446.15
RETINAL GANGLION CELL	236.3
SFN	0
STRIATUM	26.14
Synaptic plasticity	836.7
Synchronization	836.7
WHITE MATTER	581.11
antibody	143.9
apoptosis	143.9
business	0
calcium	523.5
calcium channels	523.5
calcium influx	523.5
cell death	404.3
connexin43	649.12
correlation	65.13
cytokine	142.3, 143.9
electron microscopy	749.11
fluorescence	505.18, 749.11
gap junctions	649.12
glia	649.12

immunocytochemistry	505.18, 749.11
inflammation	404.3
intracerebral hemorrhage	404.3
locomotion	446.15
macrophage	142.3
magnetic resonance images	404.3
meeting	0
member	0
micturition	851.15
muscular dystrophy	523.5
neonatal	207.7
neuromodulation	446.15
periventricular	207.7
protein phosphatase	649.12
purinergic	142.3
spike trains	65.13
spinal cord injury	851.15
stroke	207.7
synergists	65.13
transcription	143.9
ultrastructure	505.18, 749.11
urethral sphincter	851.15
urinary	851.15