SENSORIMOTOR SATELLITE MEETING
Venue: Business School, University of Auckland
Sunday, 30 January 2011

8.15-8.35	**REGISTRATION AND MORNING COFFEE**
8.35-8.45	**WELCOME AND INTRODUCTION – CATHY STINEAR**
Session 1	**SENSORIMOTOR STUFF** **Chair: SIMON GANDEVIA**
8.45-9.00	**Ingvars BIRZNIEKS (NeuRA Sydney)** Role of spike patterns in signalling the frequency of vibrotactile stimuli
9.00-9.15	**Vaughan MACEFIELD (University of Western Sydney)** Absence of muscle spindles can explain the ataxic gait and loss of proprioceptive acuity in hereditary sensory and autonomic neuropathy type III
9.15-9.30	**John BURNE (University of Sydney)** The inhibitory response to tendon and cutaneous electrical stimulation
9.30-9.45	**Chris McNEIL (NeuRA Sydney)** Motoneurone responsiveness during human muscle fatigue
9.45-10.00	**Rob HERBERT (University of Sydney)** In vivo mechanical behaviour of muscle fascicles and tendons in human gastrocnemius muscle-tendon units at short lengths
10.00-10.15	**Tjeerd BOONSTRA (Black Dog Institute Sydney)** Modelling common oscillatory input to muscle
10.15-10.30	**Mark BELLINGHAM (University of Queensland)** Live fast and die young? Correlates and causes of hyper-excitability in motor neurons in an animal model of motor neuron disease
10.30-11.15	**MORNING TEA**
Session 2	**STROKE STUFF** **Chair: WINSTON BYBLOW**
11.15-11.35	**John ROTHWELL (Institute of Neurology London)** Will treatment with rTMS ever achieve better outcomes in stroke than best practice therapy?
11.35-11.50	**Penelope MCNULTY (NeuRA Sydney)** Single motor unit activity after stroke
11.50-12.05	**James STINEAR (Northwestern University Chicago)** Can non-invasive brain stimulation enhance ankle motor practice in stroke survivors?
12.05-12.20	**Lynley BRADNAM (University of Auckland)** Reducing upper limb impairment after stroke: targeting non-invasive brain stimulation based on corticospinal integrity
12.20-12.35	**Anna MACKEY (University of Auckland)** Understanding hand function in youth with hemiplegia, cerebral palsy – insights from neuroimaging and neurophysiology
12.35-12.50	**Andrew CLARKSON (University of Otago)** What role does modulating NMDA receptor signaling pathways have in post-stroke recovery?
12.50-2.00	**LUNCH**

Session 3	**TMS AND OTHER STUFF** **Chair: JOHN ROTHWELL**
2.00-2.20	**Gary THICKBROOM (University of Western Australia)** I-wave and integration at the spinal cord
2.20-2.35	**Florent LEBON (University of Auckland)** Corticomotor excitability is modulated by imagery quality
2.35-2.50	**Robin CASH (University of Western Australia)** LTP- and LTD-like effects generated by targeting I-waves
2.50-3.05	**Sebastian DOELTGEN (University of Adelaide Australia)** Primed theta-burst TMS induces metaplastic effects
3.05-3.30	**AFTERNOON TEA**
Session 4	**OTHER STUFF AND TMS** **Chair: JANET TAYLOR**
3.30-3.50	**Martin LOTZE (University of Greifswald Germany)** Sensorimotor integration and motor training
3.50-4.05	**Liz FRANZ (University of Otago)** Conceptual unifying constraints reduce interference on bimanual actions
4.05-4.20	**Rebekah SCOTT (University of Otago)** Distinct neural mechanisms underlie movement deficits in conversion and feigned paresis
4.20-4.35	**Melissa BARRY (University of Otago)** Effects of intermittent theta burst stimulation on interhemispheric inhibition in pyramidal neurons of the motor cortex in vivo
4.35-4.50	**Wei TEO (University of Western Australia)** Corticomotor excitability after rhythmic finger movement
4.50-5.05	**Ron BALNAVE (University of Sydney)** Mid-brain periaqueductal gray organises breathing for survival behaviour
5.05-5.20	**DISCUSSION**
5.30	**CLOSE**
5.30-8.30	**DRINKS AND INFORMAL DINNER**

POSTER

Poster 1 Jocelyn Bowden and Penelope McNulty
Mapping the motor point in human tibialis anterior

Poster 2 John Burne
Comparison of the inhibitory response to tendon and cutaneous electrical stimulation

Poster 3 Graeme Hammond-Tooke
Modification of ipsilateral reaction times by 1 Hz repetitive transcranial magnetic stimulation of the motor cortex

Poster 4 Siobhan Schabrun
The effect of muscle pain on intra-cortical inhibitory and facilitatory networks in primary motor cortex

Poster 5 Jin Quek and Sei Wai Lim
Refractory periods in 3 sensory modalities, a multidomain investigation

Poster 6 Andisheh Bastani
Anodal transcranial direct current stimulation enhances excitability of the motor cortex: a systematic review and meta-analysis of stimulus parameters

Poster 7 Shapour Jaberzadeh
Does longer application of anodal transcranial direct current stimulation coincides with larger excitability changes in human primary motor cortex?

Poster 8 Ron Balnave and Jon Marsden
Muscle electrical failure leads off early in muscle fatigue during near-maximal dynamic exercise in biceps

SENSORIMOTOR SATELLITE MEETING
Venue: Business School, University of Auckland
Sunday, 30 January 2011

ABSTRACTS

Sunday, 30th January 2011

Session 1 **SENSORIMOTOR STUFF** **8.45 am – 10.30 am**
Chair: SIMON GANDEVIA

Ingvars BIRZNIEKS (NeuRA Sydney)
Role of spike patterns in signalling the frequency of vibrotactile stimuli
Ingvars Birznieks and Richard M Vickery

Our study provides proof that the pattern of individual spike times generated in tactile afferents is crucial for signalling stimulus features. Our experiments have revealed fundamental rules about how complex afferent discharge patterns are interpreted by the nervous system and translated into frequency perception for vibrotactile stimuli.

Vaughan MACEFIELD (University of Western Sydney)
Absence of muscle spindles can explain the ataxic gait and loss of proprioceptive acuity in hereditary sensory and autonomic neuropathy type III
Vaughan G. Macefield, Lucy Norcliffe-Kaufmann, Felicia Axelrod and Horacio Kaufmann

The hereditary sensory and autonomic neuropathies (HSAN) expressed at birth (HSAN II-IV) are associated with reduced or absent pain and temperature sensibilities and, with the exception of HSAN IV, absent deep tendon reflexes and H reflexes and reduced proprioceptive acuity. Given the latter, and the ataxic gait associated with HSAN III, we tested the hypothesis that muscle spindles are absent in this condition by undertaking a microneurographic exploration of the common peroneal nerve in 10 patients with HSAN III; for comparison we also studied two patients with HSAN II and two with HSAN IV. Tungsten microelectrodes were inserted percutaneously into fascicles of the common peroneal nerve at the fibular head. Intraneural stimulation within muscle fascicles evoked twitches at normal stimulus currents (10-30 mA), and deep pain at high intensities (1 mA). Microneurographic recordings from muscle fascicles revealed normal muscle spindles in HSAN IV but a complete absence in HSAN II and III. Intraneural stimulation within cutaneous fascicles evoked parasthesiae in the fascicular innervation territory at normal stimulus intensities, but cutaneous pain was not reported during high intensity stimulation in any of the patients. Microneurographic recordings from cutaneous fascicles revealed the presence of normal large-diameter cutaneous mechanoreceptors in HSAN III. Our results suggest that the complete absence of muscle spindles in HSAN II and III explains the loss of proprioceptive acuity and tendon reflexes in these patients. Moreover, we suggest that the ataxic gait is sensory in origin, due to the loss of muscle spindles and hence compromised sensorimotor control of locomotion.

John BURNE (University of Sydney)
The inhibitory response to tendon and cutaneous electrical stimulation
Nigel Rogasch, John A Burne and Kemal Turker.

The parameters of the inhibitory response in single motor units (SMU) to gastrocnemius (GA) tendon and sural nerve electrical stimulation were compared. The timing of both inhibitory responses were similar to those reported from surface EMG. Sural nerve stimulation produced less trials with significant decreases in SMU firing probability as measured by PSTH and less trials with significant decreases in SMU discharge rate as measured by PSF. These results were not accompanied by any significant differences in contraction strength, SMU firing rate or strength of SEMG inhibition.

Chris McNEIL (NeuRA Sydney)
Motoneurone responsiveness during human muscle fatigue
Chris McNeil, Sabine Giesebrecht, Serajul Khan, Simon Gandevia and Janet Taylor

We recently documented a profound reduction in motoneurone excitability during a sustained 2min maximal contraction (McNeil et al. J Phyiol 2009). We proposed a fatigue-related decrease in Ia afferent input to motoneurones as a possible mechanism. Here, vibration to increase Ia input to motoneurones had no effect on the fatigue related reduction in motoneurone excitability.

Rob HERBERT (University of Sydney)
In vivo mechanical behaviour of muscle fascicles and tendons in human gastrocnemius muscle-tendon units at short lengths
Robert Herbert, Jillian Clarke, Li Khim Kwah, Joanna Diong, Josh Martin, Lynne Bilston, Simon Gandevia

Little is known of the mechanical behaviour of muscles and tendons at very short lengths in vivo. In this study ultrasound imaging was used to observe length changes in muscle fascicles of human gastrocnemius at short lengths. We present three new findings: 1. In some subjects the tendinous aponeuroses “buckle” at short lengths. 2. The slack lengths of muscle fascicles are distributed. Some muscle fascicles are slack over more than half the physiological range of muscle-tendon lengths. 3. Even above their slack lengths, muscle fascicles contribute only a small part of the total change in muscle-tendon length.

Tjeerd BOONSTRA (Black Dog Institute Sydney)
Modelling common oscillatory input to muscle
Tjeerd W Boonstra and Michael Breakspear

We developed a computational model of intermuscular synchronization. This model embodies key neurophysiological processes and can be employed to test theories about motor control and inform debates concerning data processing algorithms. We show some exemplar results including rectification of EMG signals to study oscillatory components in physiological drive.

Mark BELLINGHAM (University of Queensland)
Live fast and die young? Correlates and causes of hyper-excitability in motor neurons in an animal model of motor neuron disease
Mark Bellingham, Wanhua Zhong and Refik Kanjhan

Hypoglossal motor neurons in the mutant SOD1 G93A mouse model of motor neuron disease show significant hyper-excitability from birth. This hyper-excitability is correlated with a functional increase in persistent sodium current density, with increased expression of voltage-gated sodium channels, and with changes in motor neuron morphology.

Session 2 **STROKE STUFF** **11.15 am – 12.50 pm**
Chair: WINSTON BYBLOW

John ROTHWELL (Institute of Neurology London)
Will treatment with rTMS ever achieve better outcomes in stroke than best practice therapy?
John Rothwell

rTMS is assumed to work in stroke by increasing the rate/amount of benefit from each session of physical therapy, or by increasing retention of benefit across sessions. Since therapy itself provides the necessary spatial and temporal patterns of synaptic activity that drive improvement, will the final plateau be the same for any intervention?

Penelope MCNULTY (NeuRA Sydney)
Single motor unit activity after stroke
Penelope McNulty and Gaven Lin

Single motor unit activity was examined during spontaneous activity and task-driven isometric contractions in stroke patients and healthy controls. Mean firing rates and discharge variability were lower for stroke patients on the more-affected side compared to the less-affected side and controls. Spontaneous firing rates were more variable for both patients and controls.

James STINEAR (Northwestern University Chicago)
Can non-invasive brain stimulation enhance ankle motor practice in stroke survivors?
James Stinear, Sangeetha Madhavan and Lynn Rogers

Cortical mechanisms of lower limb motor control are poorly understood. We demonstrated that facilitatory transcranial direct current stimulation applied during practice of a visuo-motor ankle-tracking task enhanced post-stroke paretic ankle control. However, the extent of motor system facilitation was not correlated with the change in tracking accuracy.

Lynley BRADNAM (University of Auckland)
Reducing upper limb impairment after stroke: targeting non-invasive brain stimulation based on corticospinal integrity
Lynley Bradnam

We show that suppression of the contralesional motor cortex after non-invasive brain stimulation (NIBS) can worsen upper limb control for stroke patients with moderate-severe upper limb impairment, and improve control for patients with mild impairment. This may be important for individualising NIBS as an adjuvant to therapy after stroke.

Anna MACKEY (University of Auckland)
Understanding hand function in youth with hemiplegia, cerebral palsy – insights from neuroimaging and neurophysiology
Anna Mackey, Cathy Stinear, Winston Byblow, and Susan Stott.

Hemiplegia, cerebral palsy can result in significant movement difficulties in using the arm in everyday activities. We used advanced neuroimaging (functional MRI and DTI) and transcranial magnetic stimulation to determine how brain re-organisation in youth with cerebral palsy relates to the functional problems in the arm. This information may assist clinicians in better understanding and targeting treatments for individuals with cerebral palsy.

Andrew CLARKSON (University of Otago)
What role does modulating NMDA receptor signaling pathways have in post-stroke recovery?
Andrew Clarkson

Injuries to the brain or spinal cord from stroke, trauma or neurodegenerative disease result in the loss of limb function with limited potential for recovery. Currently, there is no effective drug treatment to promote recovery from stroke and the main treatment used following a stroke is physical therapy. Patients embark on a long, hard process of physical therapy that aims to rewire the areas of the brain affected by the stroke in order to regain some normal limb function. We have recently demonstrated that boosting cortical excitability by either dampening tonic GABA or by stimulating BDNF level in an AMPA-dependent manner can facilitate functional recovery after stroke. Here we show that modulation of NMDA receptors with Memantine can also promote functional recovery.

Session 3 **TMS AND OTHER STUFF** **2.00 pm – 3.05 pm**
Chair: JOHN ROTHWELL

Gary THICKBROOM (University of Western Australia)
I-wave and integration at the spinal cord
Gary Thickbroom

In paired-pulse (conditioned-test) transcranial magnetic stimulation (TMS) protocols, the effect of the conditioning pulse on the test response can be substantial. Epidural recordings indicate that this is mediated through modulation of late indirect (I-) wave volleys. It is not well understood how strong effect sizes could arise from the later, and usually weaker, I-wave volleys.

Florent LEBON (University of Auckland)
Corticomotor excitability is modulated by imagery quality
Florent Lebon, Winston Byblow, Christian Collet, Aymeric Guillot and Cathy Stinear

The participants were first distinguished through their imagery ability. We used the Motor Imagery Index, including psychometric, behavioural and psychophysiological recordings (Collet et al., 2010). The motor evoked potentials elicited by transcranial magnetic stimulation were then recorded during an imagined finger task. The corticomotor excitability was time-specific modulated for ‘good’ but not ‘poor’ imagers.

Robin CASH (University of Western Australia)
LTP- and LTD-like effects generated by targeting I-waves
Robin Cash, Frank Mastaglia and Gary Thickbroom

To endeavour to model spike-time dependent forms of LTP and LTD, we compared a supra-threshold repetitive paired-pulse TMS intervention at a pulse interval that corresponded to an I-wave interval (1.5ms) with a non-I-wave interval (2ms). The increase in pulse interval of just 0.5ms reversed the effect of the intervention from potentiation to depression.

Sebastian DOELTGEN (University of Adelaide Australia)
Primed theta-burst TMS induces metaplastic effects
Sebastian Doeltgen and Michael Ridding

Priming inhibitory continuous theta-burst stimulation (cTBS) with excitatory intermittent TBS (iTBS) induces greater suppression of MEP amplitude, and greater reduction of short interval intracortical inhibition (SICI) than cTBS applied alone. These findings provide evidence for metaplastic processes in excitatory and inhibitory motor circuits in the human motor cortex.

Session 4 **OTHER STUFF AND TMS** **3.30 pm – 5.05 pm**
Chair: JANET TAYLOR

Martin LOTZE (University of Greifswald Germany)
Sensorimotor integration and motor training
Martin Lotze

We investigated the effects of short and long-term training in instrumentalists showing functional and structural adaptations of the brain to training. Latest studies on professional singers have highlighted the importance of the somatosensory system for professional articulation. By using fMRI-guided TMS we tested the sensorimotor integration in the parietal lobe.

Liz FRANZ (University of Otago)
Conceptual unifying constraints reduce interference on bimanual actions
Elizabeth Franz

In a series of laboratory experiments we investigated the hypothesis that attention to high-level unifying representations will reduce typical forms of sensorimotor interference on bimanual movements. We adapted a paradigmatic bimanual task in which the requirement was for participants to reach to two different spatial targets (bimanually). Two novel manipulations were performed. One was to present the visual image of a bar which connected the two targets (unified condition), or to present two separate targets as in the standard paradigm (non-unified condition). The second manipulation was to vary the language of our instructions to participants so that they were required to 'move both hands' (as in a unified bimanual action) or 'move each hand' (as in two unimanual actions produced in parallel). Typical forms of interference related to asymmetrical movement demands were virtually abolished when unifying constraints were available. We will present some critical aspects of these data together with preliminary fMRI findings which implicate high-level language networks in the representation of unified bimanual actions.

Rebekah SCOTT (University of Otago)
Distinct neural mechanisms underlie movement deficits in conversion and feigned paresis
Rebekah Scott, Brian Hyland, Graeme Hammond-Tooke, Liz Franz, Jon Shemmell and Greg Anson

Conversion Disorder is characterised by unexplained neurological symptoms without an organic cause. Diagnosis is challenging because conversion symptoms are difficult to dissociate from intentionally feigned symptoms. Changes in behaviour, muscle and cortical activity were measured during a precued reaction time task to investigate the neural mechanisms underlying impaired volitional movement in conversion and feigned paresis.

Melissa BARRY (University of Otago)
Effects of intermittent theta burst stimulation on interhemispheric inhibition in pyramidal neurons of the motor cortex in vivo
M.D. Barry, D.E. Oorschot, and J.N.J. Reynolds

Intermittent theta burst stimulation (iTBS) is a physiologically-derived stimulus protocol which increases muscular evoked potentials in humans. An N-methyl-D-aspartic acid receptor antagonist blocks this effect, indicating that the underlying mechanism involves synaptic plasticity. In rats we found evidence that iTBS applied to the cortex differentially modulates a number of different pathways that converge onto pyramidal neurons in the opposite motor cortex. In the present experiments we used subthreshold conditioning stimuli to preferentially activate a pathway thought to innervate inhibitory interneurons, which in turn contact pyramidal neurons. Thus, we measured the effect of interhemispheric inhibition (IHI) on pyramidal neurons in the opposite motor cortex, and its modulation after iTBS. Using intracellular recordings in urethane-anaesthetised Wistar rats, we found that a subthreshold intensity conditioning stimulus applied to the contralateral cortex 4-10 ms before a test stimulus applied to the ipsilateral cortex decreased the slope of the test postsynaptic potential (PSP) (-17±2% [mean±SEM] of control, $P<0.05$, paired t-test; n=49). We then tested the effect of contralateral iTBS on IHI. When iTBS was applied at a level sufficient to evoke a PSP in the neuron, IHI was unchanged (-12±2% of control, n=7). However, when iTBS intensity was set below threshold for evoking a PSP, the IHI effect

was abolished (+6±6% at +20 min, n=7; P<0.05, unpaired t-test). Finally, IHI remained largely intact if iTBS was given in the presence of the endocannabinoid antagonist AM251, indicating that synaptic plasticity mechanisms underlie the modulation of IHI by iTBS.

Wei TEO (University of Western Australia)

Corticomotor excitability after rhythmic finger movement

Wei Teo, Julian Rodrigues and Gary Thickbroom

A maximum voluntary rate (MVR) rhythmic task deteriorates in <10 seconds. We tracked MEP amplitude for 20 minutes after a 10-sec MVR and used slower speed tasks for comparison. MEPs were reduced for ~10mins after all tasks, but less so for the MVR. Even slow rhythmic tasks reduce corticomotor excitability.

Ron BALNAVE (University of Sydney)

Mid-brain periaqueductal gray organises breathing for survival behaviour

Hari Subramanian, Zheng-Gui Huang, Ron Balnave and Gert Holstege

PAG organises breathing in the context of survival behaviors. PAG does not project to motoneurons in the brainstem and spinal cord. PAG uses its connections to the medullary premotor respiratory interneurons to organise breathing. We present electrophysiological data obtained from the rat and propose a framework for PAG-VLM respiratory pathways.

POSTERS

Poster 1

Mapping the motor point in human tibialis anterior

Jocelyn Bowden and Penelope McNulty

There is little consensus regarding the definition and number of motor points in tibialis anterior. We compared three common methods but identified only a single point regardless of method. Although the location varied between methods and between subjects, only the area differed significantly. These results suggest motor point location cannot be estimated *a priori*.

Poster 2

Comparison of the inhibitory response to tendon and cutaneous electrical stimulation

John Burne

The gastrocnemius surface EMG responses to transcutaneous tendon (TES) and sural nerve electrical stimulation are compared with respect to their timing, amplitude, threshold and effects of background contraction. The transcutaneous tendon response is also compared with that following subcutaneous or intra-tendonous stimulation using insulated needle electrodes located 1-3cm below the skin. The results underline the significant differences in the parameters of responses evoked by tendon and cutaneous stimulation.

Poster 3

Modification of ipsilateral reaction times by 1 Hz repetitive transcranial magnetic stimulation of the motor cortex

Graeme Hammond-Tooke, James Heaton, Tallabs Grajeda, Endo K, P Herbison and E Franz

Repetitive transcranial magnetic stimulation at 1 Hz to the right motor cortex was studied in healthy volunteers. Ipsilateral bimanual cost (an index of transcallosal inhibition) was increased after treatment ($p < 0.01$), suggesting that bimanual cost may be a useful biomarker to assess rTMS protocols for use in stroke.

Poster 4

The effect of muscle pain on intra-cortical inhibitory and facilitatory networks in primary motor cortex

Siobhan Schabrun and Paul Hodges

Excitability of the motor cortex can be suppressed in response to muscle pain. Yet the mechanisms are largely unknown. Using transcranial magnetic stimulation measures of short-interval intra-cortical inhibition (SICI) and intra-cortical facilitation (ICF) were made before, during and after the resolution of pain in a hand muscle. Pain was induced using hypertonic saline infusion. We demonstrate an increase in SICI following resolution of, but

not during, pain and a decrease in ICF both during and after pain. These findings suggest that muscle pain differentially alters intra-cortical inhibitory and facilitatory circuits in primary motor cortex.

Poster 5

Refractory periods in 3 sensory modalities, a multidomain investigation

Jin Quek and Sei Wai Lim

Using electroencephalography (EEG) we investigated both the left and right side of 12 young adults using a paired refractory period paradigm (interstimulus intervals of 200, 400, and 600 ms). We investigated the auditory, visual, and somatosensory domains in a within subjects design in order to determine if the gating parameters reflect a global cortical or domain specific characteristic. We believe we are the first to investigate the correlations in the cortical refractory periods between these three sensory modalities and the lateralisation of the gating responses.

Poster 6

Anodal transcranial direct current stimulation enhances excitability of the motor cortex: a systematic review and meta-analysis of stimulus parameters

Andisheh Bastani and Shapour Jaberzadeh

Purpose: To review the published literature on the efficacy of anodal transcranial direct current stimulation (tDCS) parameters on cortical excitability in healthy individuals. We aimed to look at the parameters such as density of applied current and duration of tDCS for optimal effects. Methods: The electronic databases were searched for the relevant key words. Studies meeting the inclusion criteria were assessed and methodological quality was examined using PEDro and D&B assessment tool. **Results:** Pooled analysis of two trials with 13 minutes of A-tDCS, indicates that effects were significant and moderate in size, (SMD: 0.52 (95% CI: 0.17 to 0.87) , compared to four included studies with 10 minutes of application, with small and significant effect (SMD: 0.26 (95% CI:0.02 to 0.51) both in favor of A-tDCS stimulation.
The pooled analysis of MEPs amplitude in studies with constant current density above 0.02 mA/cm^2, indicated that the effects were moderate (pooled SMD: 0.50 (95% CI: -0.20 to 1.20) compared to constant current density below 0.02 mA/cm^2 with small significant effects (pooled SMD: 0.29 (95% CI: 0.11 to 0.47) in favor of experiment. We found that longer durations of tDCS applications and higher densities of current have larger effect size in favor of experiments. Conclusions: Anodal tDCS could be used as a standalone or as an adds-on approach. Further clinical research is needed to confirm optimal stimulation parameters for anodal tDCS.

Poster 7

Does longer application of anodal transcranial direct current stimulation coincides with larger excitability changes in human primary motor cortex?

Shapour Jaberzadeh and Andisheh Bastani

We aimed to investigate the effects of short (10min, 1mA) and long (20 min, 1 mA) duration anodal transcranial direct current stimulation (atDCS) on the excitability of human primary motor cortex (M1). In 6 healthy individuals,TMS-elicited MEPs were recorded at rest from the right wrist extensor muscle group, and tDCS was given with electrodes over the left M1 (anode) and the contralateral orbit (cathode).

Poster 8

Muscle electrical failure leads off early in muscle fatigue during near-maximal dynamic exercise in biceps

Ron Balnave and Jon Marsden

Decrease in mean power freqency and increase in root mean square derived from biceps surface EMG during a 6 Repetition Max, 90% isometric voluntary contraction, suggest a progressive loss of large muscle fibres and increase in firing rates of smaller muscle fibres sustaining lifting until failure. We propose the initial fatigue process is due to failure of electrical conduction in large fibres effective from the first contraction.