

5th World Congress on Brain Injury

23-26 May, 2003; Stockholm, Sweden

The Fifth World Congress on Brain Injury consisted of plenary, parallel, workshops and poster presentations. The congress abstracts were published in the May issue of *Brain Injury*, now the official journal for the International Brain Injury Association, who held the congress in association with Kong Li Carolinska Medico Chirurgiska Institute.

Dr J D Macklis questioned the reasons behind the absence of neurogenesis in the post-natal cortex and whether this is due to limits of endogenous precursors potential or lack of signal for neuronal differentiation. Through the manipulation of transplanted or endogenous precursor cells (stem cells), it is possible to achieve cellular reconstruction and cellular repair of complex neocortical circuitry. He confirmed that it is possible for immature neurons to integrate in the adult cortex and join complex circuitry and questioned if it is possible to generate new neurons from precursor cells within the adult brain? And whether such neurons can become functional and contribute to complex behaviour?

Dr O Lindvall from Sweden presented the results from 350 Parkinson's disease patients who have undergone neural transplantation with primary dopaminergic neurons transplanted in the striatum. He provided evidence that the grafted dopaminergic neurons can survive, form connections, re-innervate the striatum and survive for ten years and are able to become integrated functionally in the human brain. Issues relating to availability of foetal stem cells, functional outcome, standardisation and troublesome dyskinesia were raised.

Dr J Frisen outlined the source for stem cell treatment as being embryonic stem cells, neuronal stem cells from embryonic tissue, stem cells from other tissues and finally neuronal precursor cells from the adult brain.

Dr J Weiseberg shifted the emphasis in his paper to assistive technology concentrating on controlling mechanical devices by central brain – machine interface based on peripheral signals collected through surface and needle EMG from multiple muscles and the application of such recordings to the artificial hand project at Lund University.

His paper concluded that it is possible to achieve control of a robot in real time through the reconstruction of movement using brain activity. Current research is concentrating therefore on providing feedback, closed loop control (visual, tactile and direct) cortical feedback, functional control of a device. Improved adaptive algorithms, implantation chips for signal recording and chronic cortical recordings in humans.

Papers in the afternoon started with an epidemiological study from J Bazarian on lateral automobile impacts and the risk of traumatic brain injury. He stressed the fact that the relative number of deaths and the severity of traumatic brain injury (TBI) from such impacts is increasing. H S Goldsmith presented a paper on the potential benefits of omentum transportation in traumatic brain injury. Dr Karen concluded that the autonomic nervous system is dysfunctional during the early stages post injury and therefore heart rate variability following TBD is not a useful predictor of functional outcome.

In a keynote presentation, Mike Hallett introduced the general principles of plasticity in brain injury as the capability of the brain to undergo change and of the continuous competition between body parts for representation in the central nervous system. The use of a body part enhances representation and disuse leads to loss of representation.

Animal experimental studies on the effects of enriched environment on recovery following brain injury were presented by B Johanson. The studies demonstrated increased sprouting and increase cell proliferation in the hippocampus even when the hippocampus was not involved in the primary lesion.

The clinical relevance or recent evidence demonstrating that functional alterations in motor cortex organisation are accompanied by changes in dendritic and synaptic structure, as well as the regulation of cortical neurotransmitter systems, was a paper presented by R Nudo.

E D Beiger's paper on functional imaging following acquired brain injury overviewed all the latest techniques. He emphasised that it is important that such imaging modalities are integrated when assessing acquired brain injury.

A paper on fatigue and attention following TBI concluded that TBI participants in the study with higher fatigue levels as assessed by Visual Analogue Scale for Fatigue (VAS-F) and Fatigue Severity Scale (FSS) exhibited significantly slower and more variable reaction time.

The relationship between persistent post concussional syndrome and the impairment of oculomotor and visuomotor function can provide sensitive markers of cerebral function following closed head injury and could supplement assessments identifying potential post concussive syndrome patients.

Computer assisted problem solving training was a pilot study from Hong Kong.

Further MRI evidence of brain spasticity and neuronal synchronisation during movement preparation after TBI were two interesting papers presented that afternoon.

Quality management; 6,800 TBI patients from injury to re-entry in the community demonstrated the German perspective, was an epidemiological study spanning two years and compared two regions in Germany.

Ylvisaker described a project started in 1995 of community support for adolescents and young adults with cognitive and behavioural disabilities after brain injury. It emphasised the importance of staff training, the apprenticeship of people with brain injury and the cascade of training, the Malec and Mayo Clinic out-patient programme in brain injury rehabilitation, its inclusion criteria, goals, staffing and group treatments.

Leon-Carrion emphasised the need for a combined pharmacological and neuropsychological approach in rehabilitation of people with emotional disorders following brain injury.

B A Wilson presented evidence for successful treatment of every day memory problems using neup pager. The message in this paper was that rehabilitation makes economic and clinical sense and that it is possible to combine theory, scientific methodology and clinical relevance within a rehabilitation programme.

Zafonte discussed advances in the role of dopaminergic agents in brain injury, their mechanisms.

The congress ended with a key note presentation from Zasler on pharmacology therapy in rehabilitation and TBI. This was a detailed review of the up to date pharmacological treatment, its applications, its rules, side effects and the variety of agents available.

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