

World Brain Mapping and Therapeutic Initiative: A proposed G20 priority due to Major Impact of the Cost of Neurological Disorders on the World Economy

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Introduction

According to the recent World Health Organization's large-scale studies, about a third of the adult worldwide population suffer from a mental disorder such as depression, anxiety and schizophrenia. If also taken together with neurological disorders, such as dementia and stroke, these "disorders of the brain" account for 13% of the global disease burden. This surpasses both cardiovascular diseases (5%) and cancer (10%). Countries with the highest rate of burden >650 Disability Adjusted Life Years [DALYs] per 100,000 population included the USA, UK, Russia, and Australia. The annual cost of taking care of patients with neurological disorders in the US alone approaches \$400B of which \$200B is for Alzheimer patients. We believe that this cost in 10 years could reach to \$1T in the US alone. In China 975,000 people die annually from brain trauma alone and the Alzheimer population in the Australasia corridor is rapidly on the rise. Thus, European Union, China, India, Japan and Australia are not immune from such high cost of healthcare despite having 100% government insurance.

About 3 million Australians are estimated to experience symptoms of a mental disorder (Australian Bureau of Statistics, 2008). Australian Institute of Health and Welfare's (AIHW) estimates that over \$6 billion per annum is spent on mental health-related services in Australia. From the European Brain Council study, it is estimated that the annual cost of brain disease in Europe was 798 billion Euros in 2010 [1]. The total estimated worldwide costs of dementia were US\$604 billion in 2010. About 70 percent of the costs occur in Western Europe and North America. According to a US government study, the National Comorbidity Study Replication estimated [2] that serious mental illness accounted for \$193 billion in lost earnings (based on data from 2002). Independently, the Milken Institute estimated in 2007 that mental illness accounted for \$171 billion in lost economic output (based on 2003 data). Moreover, National Institute of Health in the US spends near \$5.5B per year on neurological disorders with no significant success in better identifying technologies and treatments for patients with devastating brain and spinal cord disorders. Same disappointing statistic applies to the US-Department of Defence (DoD), which has spent \$2.7B on traumatic brain injury in the last 5 years (not including the cost of physician and medical staff salary); clearly these costs and outcomes are no longer sustainable or justifiable.

In addition, the worldwide withdrawal of pharmaceutical companies from key areas of clinical neuroscience research [3] poses

an additional threat for the advancement of treatments for brain disorders. We need to transform how funding is allocated, with the focus on distributing funding according to the overall economic burden of the diseases. This is particularly critical for the mental health domain. Within the total range of disorders of the brain, neuropsychiatric illness has become the health care challenge of the 21st century in Europe. Highly prevalent disorders such as depression, anxiety and addiction are responsible by far the highest proportion of the region's total disease burden.

Current Initiatives in the US, EU and Australia

The European Commission has officially announced the selection of the Human Brain Project as one of its two Flagship projects. The new project will federate European efforts to address one of the greatest challenges of modern science: understanding the human brain. The cost is estimated at 1.19 billion Euros. The US government through President Obama's recent 100-million-dollar brain activity map initiative including the NIH's \$40 million contribution in fiscal 2014 is in addition to the approximately \$5.5 billion slated in the NIH fiscal 2014 budget for neuroscience research. Similarly a recent 200 million dollar initiative on dementia by the Prime Minister of Australia is in the right direction. The Society for Brain Mapping and Therapeutics (SBMT) and the Brain Mapping Foundation based in California played a very significant and critical role in Obama's Brain initiative by interacting directly with the congressional neuroscience caucus at the White House.

SBMT is a non-profit society organized for the purpose of encouraging basic and clinical scientists who are interested in areas of Brain Mapping, engineering, stem cell, nanotechnology, imaging and medical device to improve the diagnosis, treatment, and rehabilitation of patients afflicted with neurological disorders.

This society promotes the public welfare and improves patient care through the translation of new technologies/therapies into lifesaving diagnostic and therapeutic procedures. The society is committed to excellence in education, and scientific discovery. The society achieves its mission through multi-disciplinary collaborations with government agencies, patient advocacy groups, educational institutes and industry as well as philanthropic organization. The SBMT, now through its local chapter (SBMT Australia), is promoting these objectives in South Pacific regions. For the first time in Australasia, Sydney hosted the SBMT 11th World Congress in March 2014.

We strongly believe G20 summit is a fantastic and timely opportunity for the Honourables Abbott and Obama to lead a World Brain Mapping and Therapeutics Initiative, so together we bring the best minds of the world on a common platform to address neurological disorders in a fundamental way. Asia Pacific, Central Asia regions including Australia harbour majority of global patients with neurological and psychiatric ailments and thus can play a significant role in brain and neuroscience research, discovery and be a Australasia-pacific hub for biotech/pharma spin offs.

Conclusion and Possible Solution to the Problem

We believe there is a great need for a global action focused on: 1) more systematic and methodical study of brain in human health with consortium; 2) well-coordinated global response to the rising burden with neurological disorders and global harmonizing of the related policies; 3) well planned neuro-economical assessment of the future impact of disease, diagnostics and prevention; 4) facilitating

translation of technologies across disciplines of science in order to rapidly identify and introduce new generation of therapeutics including stem cells; 5) unifying global regulations and guidelines on clinical trials and drug/device-combination discovery; and 6) global partnership and new funding initiatives across academic, educational, industry and non-profit organizations.

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