

NeuroRehab Technologies

Neurotechnology for effective movement recovery after stroke

Problem: Stroke is a neurological disorder caused by brain hemorrhage or lack of blood flow to the brain leading to rapid death of neurons. It is the leading cause of death after heart disease and cancer in the US and Europe, and the developing world is fast catching up. Those who survive stroke, suffer disability – in terms of being unable to move their hands and legs, unable to talk, and suffer fractures from falls, depression, and other psychological problems. There are more than 7 million stroke survivors today! And they have tremendous economic costs for medical care.



Solution: Stroke breaks the connection between the brain and limbs. Unlike current treatments for stroke rehabilitation, our solution concurrently activates of the affected brain region and the stimulation of affected limbs repeatedly. The brain would reorganize itself to result in recovery of movement – because the brain is highly plastic and malleable! Hence, this new technology provides substantial improvement in recovery of movement in clinical terms, leading to a reduction in patient's dependence on others for daily activities, improvements in quality of life, and a reduction of direct and indirect cost of stroke.

Market: In the USA, more than 795,000 people suffer from stroke every year (CDC, 2015). About 610,000 of these are first or new strokes. In 2005, the global prevalence of stroke survivors was estimated to be 62 million, with projections to reach 77 million by 2030 (WHO, 2012). In Chile, there are around 2000 new cases of patients that survive stroke and suffer from disability annually. Also, annually stroke leads to 946.96 years of healthy life lost per 100,000 people. Each year, the number of stroke patients is increasing due to several reasons, mostly related to lifestyle. Our technology is applicable to all the patients that survived stroke with upper or lower limb disability.

Competitive Advantage: Our technology is protected by 1 granted, 2 filed and 4 submitted patents.

	Targets the brain	Targets limbs	Non-invasive	Portable
Physical therapy	x	✓	✓	x
Brain stimulation	✓	x	x	x
Our Solution: NEUMOD-Stroke	✓	✓	✓	✓

Business Model: Initially, we will provide this technology as a product to the hospitals and clinics that treat stroke patients. We plan to target university hospitals and clinics as they are usually the first adopters of new technology. In the next 5-7 years, we anticipate doctors to prescribe our rehabilitation treatment program to patients with our technology/ product. In addition to the sale of the product directly to the clinics, we are planning to develop a service model of rehabilitation in our company owned rehabilitation centers. Our company's representative will approach doctors and physiotherapists treating stroke patients to adapt our new technology based on our results in clinical trials that we plan to run in the next 12 months.

Team: Prof. Ranganatha Sitaram, ME, PhD (CEO) is professor of biomedical engineering and neuroscience in the Pontificia Universidad Católica de Chile (UC) , Prof. Sergio Ruiz MD, PhD (CMO) is professor of psychiatry and neuroscience in UC, and Dr. Mohit Rana MS, PhD (CTO) is biophysicist and neuroscientist. We have been working together on research projects in the areas of biomedical engineering, neuroscience and Brain Computer Interfaces (BCIs) for more than 10 years (<http://brainmachinelab.uc.cl/>) in Chile, Germany and the USA for studying and rehabilitating brain disorders.