NOVELTIES IN NEUROLOGY AND NEUROSURGERY

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Editorial

Did you know that the first human head transplantation is scheduled for the near future?

This remarkable event is planned to take place in December this year and will be the first human head transplant in history [1]. The operation will be performed by the Italian neuroscientist Dr. Sergio Canavero on a Russian volunteer who suffers from Werdnig-Hoffmann Disease; a rare and often fatal genetic disorder that breaks down muscles and destroys motoric nerve cells in the brain and spinal cord. If his head is grafted onto a new body and the spinal cords fused, the owner of the head might enjoy the functional use of the body. However, these plans have already caused huge controversy in the scientific world. Besides the ethical debates [2], the scientific data to support Canavero's claims has also been widely criticised. Almost all head transplants on animals have had limited success to say the least, resulting in inability to move and certain death within a week after the operation. Canavero's response was that the transplant- which requires at least 80 surgeons and costs 10 million dollars- would still be possible with the recent development of fusogens to help refuse the spinal cord within weeks [3]. If so, this could be a massive breakthrough in science and medicine wherein the success of the operation will lead to infinite possibilities. Whatever the outcome may be, this will be an exciting Christmas!

Did you know that the U.S. presidential candidate Ben Carson was the first to successfully separate conjoined twins?

Ben Carson, one of the Republican nominees in the 2016 presidential election in the United States and also a very talented neurosurgeon, was the first to successfully separate conjoined twins who were attached at the back of the head (occipital craniopagus twins). In 1987, in a 22-hour-long operation, he led a surgical team of 70 people to complete this groundbreaking procedure. For this operation to succeed, Carson used a radical approach during which the twins' body temperatures were lowered to the point of circulatory arrest. Carson also optimized hemispherectomy, in which half of the brain is removed to prevent seizures in people with severe epilepsy. At the moment, Dr. Carson is the U.S. Secretary of Housing and Urban Development in the Trump administration [4].

Did you know that when you're training your hand for a certain task, your foot is simultaneously being trained for the same task?

Johns Hopkins researchers have discovered that training tasks with your hand also stimulates the areas of the motor cortex that control your foot. This so called motor learning is therefore transferred from one part of the body to another by the cerebellum, which means that practicing a newly learned task involving the hand can also improve a person's ability to perform the same task with the foot and vice versa. Thanks to the brain stimulation technique named 'Cerebellar inhibition', which shows how connections in the brain alter when people learn new motor skills, this study gives new insight into the cerebellum's role in the learning process to accurately coordinate and time movements. Hopefully, in the future, this newly gained knowledge can be used for the rehabilitation of patients who have lost functions in certain parts of their body [5].

Did you know that the new manual EEG device can detect brain bleeding after an injury faster and cheaper than a CT-scan?

In September 2016, the FDA approved a hand-held EEG device that can quickly and with 97% accuracy rule out brain bleeding in a person with an injury to the head. This clinical trial was conducted in 11 hospitals by researchers from the John Hopkins School of Medicine who discovered that the device did not cause any type of sensation or risk in contrast to the radiation exposure of a CT-scan. Most of the patients with suspected head injury receive a CT-scan which costs about $1,200 per scan in the United States and approximately 130,- in the Netherlands [6]. Although the exact costs have not yet been determined by Brainscope, the manufacturer of the instrument, the company states it will be a mere fraction of the CT-scan costs and that it will be significantly faster [7].

Did you know that the brain center of creativity may be situated in the cerebellum?

In a revolutionary discovery, new research from Stanford University reports that the cerebellum may be the seat of creativity in the brain. Traditionally, the cerebellum is only viewed as the centre of muscle movement and coordination, which means this could be a great turning point in Neuroscience research putting the cerebellum in the spotlight. In the predominant 'left-brain-right-brain model', creativity is believed to be in the right hemisphere. However, the Stanford study shows that activation of the brain's executive-control centres in the cerebrum actually impairs creative task performance. In other words: the more you think about it, the more you mess it up. Interestingly, high creativity scores were associated with lower activity in the left hemisphere combined with higher activation in the cerebellum, but not necessarily in the right hemisphere. According to the senior author Allan Reiss MD, professor of radiology and of psychiatry and behavioral sciences, it is likely that the cerebellum is the coordination centre of the brain, allowing other regions to be more efficient as well. Since the cerebellum holds 50% of the brain's total neurons even though it is just 10% of the total brain volume, the results could suggest that the functions that are executed by the cerebellum may be underestimated [8].

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