



HYPOTHALAMIC NEWSLETTER

Welcome to this edition's Hypothalamic Newsletter! We will be discussing Prions disease, the development of Autism, and Spina Bifida.

Prions diseases

What is the deadliest disease on Earth? Is it ebola? Cancer? Genetic diseases? One disease that many would argue deserves a place on this list is a category of diseases known as prions. Prions are not actually viruses or bacteria. They are actually a special type of protein that causes dysfunction in the human brain. How do they do this? In cells, proteins are very important biological molecules with a plethora of functions, all of which depend on their specialized three dimensional structure.

Prions have the ability to alter the way that proteins in the human brain fold, causing fatal dysfunction. Symptoms that arise from this include memory loss, difficulties with movement, dementia, muscle stiffness, fatigue, difficulty speaking, confusion, and eventually death. Scientists believe that prions are transferred through the consumption of infected meat. This disease can be diagnosed with MRIs to detect brain abnormalities, such as unusually high activity in the caudate and putamen, two structures that make up the dorsal striatum.

Sept 1, 2021

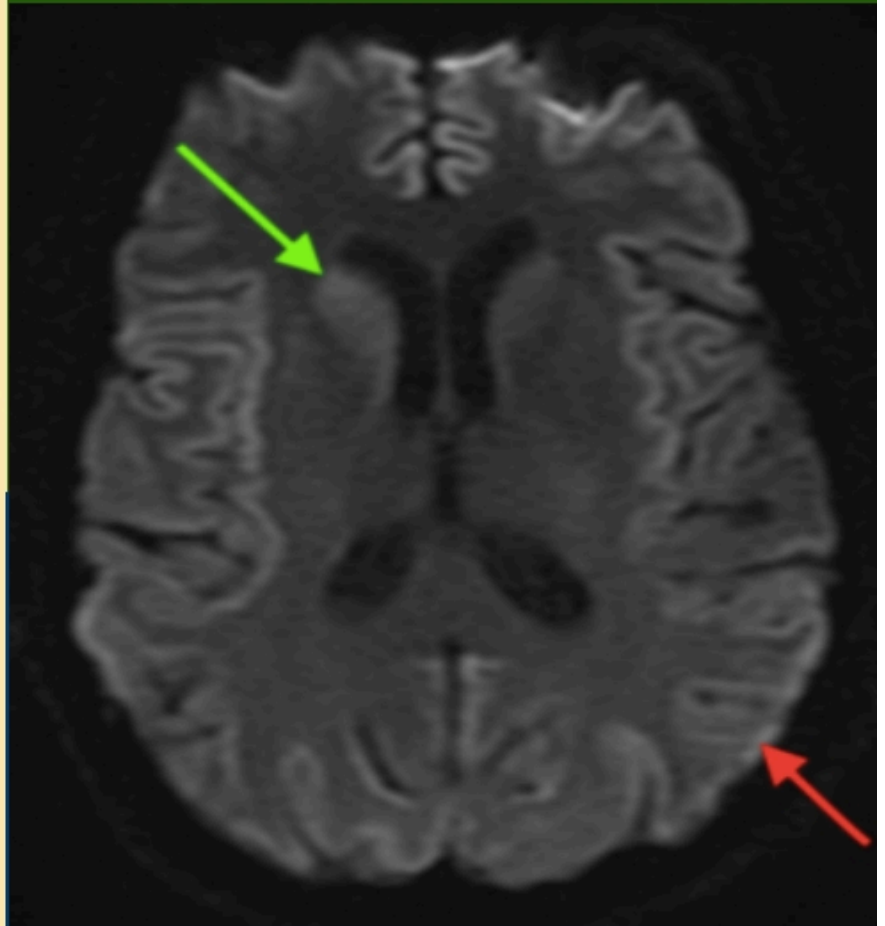
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The spinal cord actually stops at the end of the thoracic spine

Prions Disease continued

The main function of this region is to regulate the preparation and execution of movements. Other methods include blood samples, lumbar punctures (extraction of lower cerebrospinal fluid), and electroencephalograms. There are several different types of prion diseases. Creutzfeldt Jakob Disease (CJD) is the most common, which usually leads to severe disabilities. There is a variant of CJD known as "mad cow disease", which generally infects younger individuals. Kuru is a prion discovered in New Guinea, where the native people were contracting the prions from eating the infected brains of the deceased as part of a funeral ritual. Another prion is characterized by its infliction of fatal insomnia on the infected individual. Extreme inability to sleep leads to hallucinations, paranoia, weight loss, and general decline of health.

One thing that all of these prion diseases have in common is inevitable death and the lack of a long term cure. A notable step towards finding a cure can be found in the case of Jonathan Simms.

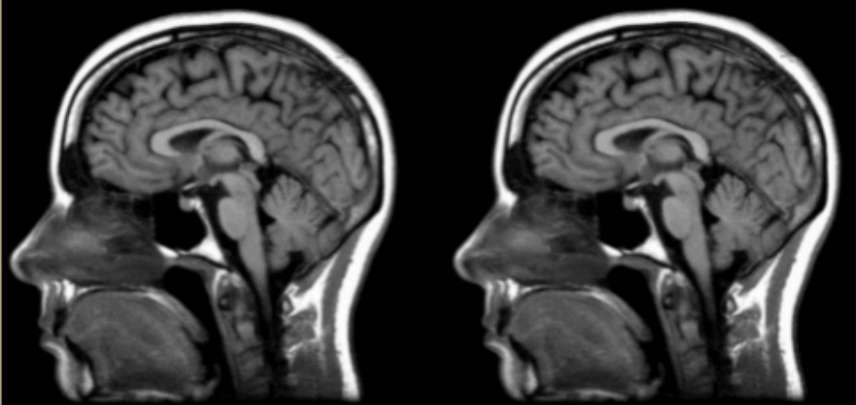


In 2001, 17 year old Jonathan Simms contracted CJD from infected cow's meat. He was treated with pentosan polysulphate, an experimental drug. While his symptoms lessened, he ended up succumbing to his illness 8 years later at the age of 27. However, most patients have a lifespan of an average 8 months, so this was a remarkable feat indeed. The treatment was repeated in the future, with similar results (slowing the progression slightly). However a true cure has not been discovered. Prions seem to be an incredibly terrifying and dangerous disease. But do not fret! Infections from prions are extremely rare, infecting only one out of one million people per year.

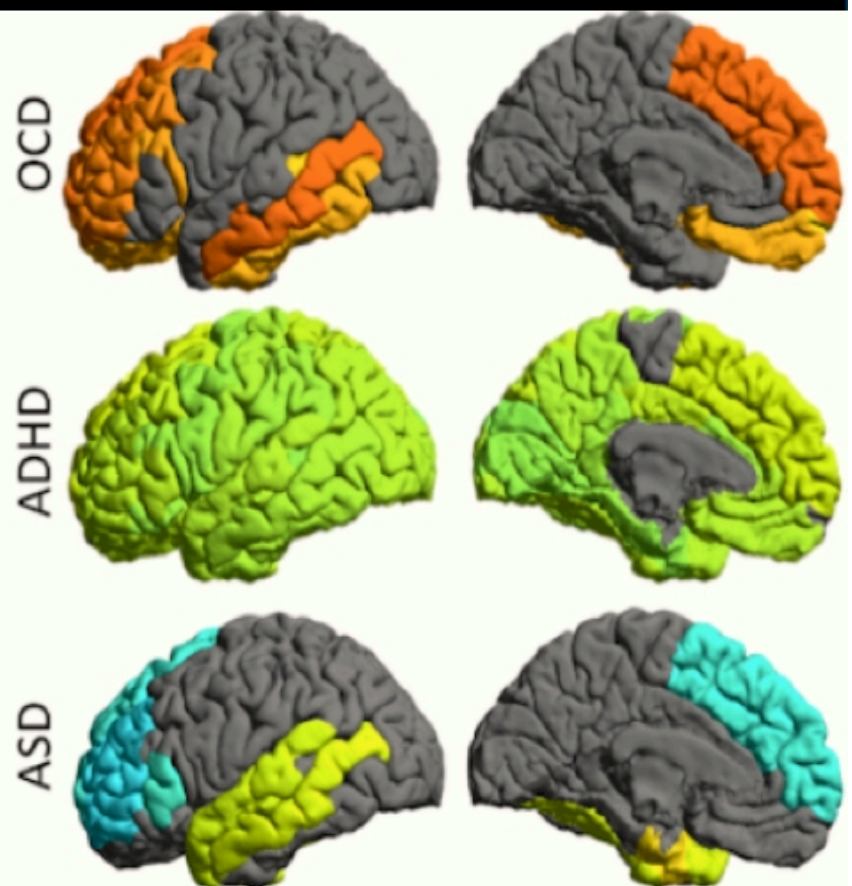
How does Autism Develop?

including social development, communication, and repetitive behavior. While a level of IQ can affect the emergence of autism in an individual, the disorder can appear at any point in the IQ spectrum. Autistic people tend to have extremely routine behavior, as well as a desire for repetitiveness and unison. There have been several studies to determine what exactly causes this to occur, and research has identified several anatomical abnormalities in the brain that lead to this disorder. The cerebellum, brain stem, parietal lobes, hippocampus, frontal lobes, and amygdala are the areas of the brain that tend to develop such abnormalities. "Abnormalities" can be characterized as the extremely dense packing of neurons in these areas, a very low degree of dendrite branching, as well as the reduction in the size of cortical minicolumns.

A huge part of understanding autism is recognizing the social-cognitive neurodevelopment that takes place from infant onward. As autism develops in the infant, they begin to divert eye contact and attention from other people and adopt "joint attention" -- meaning they begin to share information through a common perceptual perspective. As such social-cognitive behaviors further develop, they begin to greatly affect the degree to which the autism disorder influences the human being.



Spot the difference



An Overview of Spina Bifida

The neural tube, a layer of cells that eventually grows into the brain and spinal cord, can fail to seal fully during the first few weeks of embryonic development, resulting in spinal bifida. As a result, the bones of the spinal column do not completely seal around the growing nerves of the spinal cord when the spine develops. A portion of the spinal cord may protrude through a spine hole, causing irreversible nerve injury. Spina bifida is categorized as a neural tube defect since it is caused by defects in the neural tube. A meningocele is a fluid-filled sac on the back of a child born with spina bifida that is covered by skin. A myelomeningocele is a bag that includes part of the spinal cord and its protective covering.

Depending on where the hole in the spinal column is placed and how much of the spinal cord is retained in the sac, the signs and symptoms of these anomalies range from moderate to severe. Loss of sensation below the level of the incision, weakness or paralysis of the feet or legs, and bladder and bowel control issues are all possible complications. Additional issues for some people with this condition include a buildup of extra fluid around the head (hydrocephalus) and learning difficulties. Many people with spina bifida survive into adulthood thanks to surgery and other treatments. Spina bifida occulta is a milder type of the disorder in which the bones of the spinal column are improperly formed but the nerves of the spinal cord grow normally. The spinal cord does not protrude through a hole in the spine, as it occurs with the more severe form of spina bifida. The most common symptom of spina bifida occulta is no symptoms, however it can occasionally produce back discomfort or abnormalities in bladder function.

Your brain controls a big part of muscle strenght