Rising above the din

Our brains are constructed to hear, to watch, toiling away in its own quiet, unseen world. To switch on its own little circuits, to latch onto a high-pitched sound, a flickering light on a computer screen, to respond to the ambient sounds of the world.
Perfecting imperfections

Charles Stevens

...with their responses evoked by identical, repeated laboratory conditions, the responses evoked by identical, repeated stimuli vary from trial to trial. Thus, paying attention to visual details increases the firing rate of neurons in the retina, which is a hallmark of brain disorders such as Alzheimer’s disease, even when we attempt to stare straight at a stationary object. Our eyes are in constant motion. Even when we attempt to stare straight at a stationary object, our eyes are in constant motion.

Neural circuits in the brain, built from cells and the connections between them, cannot be made as regular as man-made systems. Yet animals can detect and react with acuity to signals that are beyond the limits of engineered systems."

**An expert’s eye**

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Involuntary, maybe, but certainly not random

...that the brain’s very functions and activities, its governance of temperature, heart rate, blood pressure, and breathing; its capacity to learn spoken or signed words and to identify faces; its capacity to understand still images and patterns of speech sounds, and therefore to understand language, its function in the control of movements...and mental disorders. In short, the brain is the seat of our will, the source of our emotions, and the organ—the brain. Everything we are, all that we have, is an organ of the brain.
Multiple Sclerosis (MS)

**Affects the Central Nervous System**

A diagnosis of multiple sclerosis (MS) can be frightening and confusing. It is a chronic disease that can affect many parts of your body and can impact your ability to move, think, and feel. The symptoms of MS can range from mild to severe, and they can vary from person to person. Here are some common symptoms of MS:

- Fatigue
- Muscle weakness and pain
- Blurred or double vision
- Tingling, numbness, or pain in the hands and feet
- Difficulty walking or coordination
- Difficulty in bladder control
- Changes in sexual function
- Changes in mood or personality
- Memory problems

**Understanding the Disease**

Multiple sclerosis is a disease of the central nervous system (CNS) that affects the brain and spinal cord. It is caused by the immune system mistaken and attacking the insulating myelin sheath that protects nerve fibers. This leads to the destruction of the myelin sheath and the formation of plaques on the surface of the brain and spinal cord, known as demyelinating plaques. As the myelin sheath is destroyed, the nerve fibers become damaged or dysfunctional, leading to a wide range of symptoms and disabilities.

**Causes of MS**

The exact cause of MS is unknown, but it is believed to be an autoimmune disease in which the immune system mistakenly attacks the myelin sheath. Risk factors include female gender, family history, and certain genetic mutations.

**Diagnosis and Treatment**

Diagnosis of MS is typically made through a combination of medical history, physical examination, imaging studies, and laboratory tests. Treatment options vary depending on the individual's symptoms and severity of the disease. Common treatments include medications to reduce inflammation, physical therapy, and lifestyle modifications.

**Support and Resources**

Support groups and organizations can provide valuable resources and emotional support for individuals with MS and their families. These organizations can help connect people with other patients, provide access to research studies, and offer educational materials and support groups.

**Outlook**

While there is no cure for multiple sclerosis, advances in treatment and management can help improve quality of life and reduce symptoms. With proper care and management, many individuals with MS are able to live full and active lives.

**Conclusion**

Multiple sclerosis is a complex and challenging disease to manage. By understanding the disease and its potential causes and treatments, individuals with MS can work with their healthcare providers to develop a personalized treatment plan that best suits their needs and lifestyle.

**References**

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Multiple Sclerosis (MS)

AFFECTS AN ESTIMATED 400,000 TO 2.5 MILLION PEOPLE WORLDWIDE.

A chronic, often disabling disease that attacks the central nervous system (CNS), MS is a demyelinating disease—i.e., it disrupts the myelin sheath, the fatty material that insulates the axons of nerve cells in charge of transmitting information across the body. The exact cause of MS remains unknown, but its development is thought to be the result of an auto-immune process, where the immune system attacks the CNS—specifically, the myelin that surrounds nerve fibers. The resulting inflammation and destruction of the myelin sheath may cause loss of vision, pain and other symptoms, including numbness, tingling, muscle weakness, paraplegia, and vision loss. It is thought to result when the immune system targets the body’s own tissues. Some medications can help control symptoms or slow the progression of the disease, but no cure yet exists.

DISEASE TYPES

Multiple sclerosis (MS) is a relatively common disease that affects millions of people worldwide. MS is a chronic, progressive disease that can lead to disability, but there is no cure. There are several different types of MS, each with its own symptoms and progression. The most common type is relapsing-remitting MS (RRMS), which is characterized by periods of relapse and remission.

RELAPSING-REMITTING MS

RRMS is the most common type of MS, and affects about 85% of all MS patients. RRMS is characterized by periods of relapse and remission. During relapse, symptoms such as numbness, tingling, weakness, and vision loss may worsen. During remission, symptoms may improve or disappear completely. The severity and duration of relapses vary from person to person, and some people may experience only one relapse during their lifetime.

PROGRESSIVE-REMITTING MS

Progressive-remitting MS (PRMS) is characterized by a steady, progressive loss of function that may be interrupted by periods of remission. This type of MS affects about 15% of all MS patients. PRMS is often associated with other neurological disorders, such as Alzheimer’s disease.

PRIMARY PROGRESSIVE MS

Primary progressive MS (PPMS) is characterized by a gradual loss of function without periods of remission. PPMS affects about 10% of all MS patients. PPMS is often associated with other neurological disorders, such as Alzheimer’s disease.

Secondary progressive MS

Secondary progressive MS (SPMS) is characterized by a gradual loss of function with periods of relapse. This type of MS affects about 20% of all MS patients. SPMS is often associated with other neurological disorders, such as Alzheimer’s disease.

“Most people agree that failure to learn may be a hallmark of post-traumatic stress disorder.”

STEPHEN HEINEMANN

Forget about it!

A brainwave “signature” ON THE SURFACE, AUTISM SPECTRUM DISORDERS AND PRIMATE INDIVIDUALS SHOW SIMILAR PATTERNS of brain activity—impulsivity, autism-like behaviors, and repetitive movements. But what does all this activity mean for those with autism spectrum disorders? When we measure brain activity using functional magnetic resonance imaging (fMRI), we find that people with autism spectrum disorders show atypical patterns of brain activity compared to typical individuals. In particular, fMRI studies have shown that individuals with autism spectrum disorders have increased activity in brain regions associated with social interaction, communication, and language processing.

Using their own groups of people with autism spectrum disorders and typical individuals, the researchers used fMRI to measure brain activity in response to tasks that are commonly used to assess social cognition. They found that people with autism spectrum disorders showed increased activity in brain regions associated with social cognition, such as the amygdala, a region of the brain involved in processing emotions and social information. This increased activity suggests that people with autism spectrum disorders may have difficulty processing social information and regulating their emotions.

One potential reason for this increased activity is that people with autism spectrum disorders may have difficulty inhibiting their responses to social stimuli. In other words, they may have difficulty suppressing their emotional reactions when faced with social situations. This increased activity in the amygdala may be a sign of this difficulty. However, more research is needed to determine the exact causes of this increased activity and how it may be related to the symptoms of autism spectrum disorders.

Devon Callaway and her team at St. John’s University are working to understand more about the underlying mechanisms of autism spectrum disorders. They are using functional magnetic resonance imaging (fMRI) to measure brain activity in response to tasks that are commonly used to assess social cognition. They hope to identify differences in brain activity between typical individuals and people with autism spectrum disorders that may help explain the symptoms of autism spectrum disorders.

Sneaking out dinner

Wild life types spend about 30 minutes searching for a local food source, but when there is no food available nearby, their search times are much longer. In the case of this research, the delay in the search process depends on the quality of the food and the individual’s experience with the food. For example, individuals who have previously fed on a nutritious food have shorter search times than those who have not. This suggests that the slower the search, the more experience the individual has with the food.

Edward Callaway

Sreekanth Chalasani

Sniffing out dinner

UNCOVERING THE SIMPLE MATH THAT DRIVES BEHAVIOR

Sneaking out dinner involves more than just sniffing and searching for food. It also involves decision-making—i.e., deciding whether to stay and search for food or to leave and find another source. Chalasani’s research suggests that sneaking out dinner involves a combination of simple mathematical calculations. To find the optimal solution, the worm must calculate the expected value of staying and searching for food versus leaving and finding another source. The worm must also consider the probability of finding food and the associated costs of searching for food. If the expected value of leaving is greater than the expected value of staying, the worm will leave and search for another source. If the expected value of staying is greater than the expected value of leaving, the worm will stay and search for food.

Sniffing out dinner is a complex process that involves multiple mathematical calculations. However, the worm is able to perform these calculations quickly and accurately, allowing it to make optimal decisions about when to leave and find another source of food. This suggests that the worm has evolved efficient mechanisms for decision-making, allowing it to survive in a challenging environment.
Charcot-Leyden crystals are aggregates of triglycerides that develop in the lining of the respiratory tract when exposed to antigens. These crystals serve as a host cell for viruses and are a potential source of a novel pharmacological tool for treating epilepsy. However, these crystals can also be a source of a novel pharmacological tool for treating epilepsy.
Involuntary maybe, but certainly not random

Perfecting imperfections

Our eyes are in constant motion. Every second, images download at a dizzying rate from a stationary retina, our eyes jump and signal directions. We can’t help noticing the patterns, often complex, that these images form.

Consequently, performance improves dramatically when the visual receptive fields of the retina are made perfect. For example, the results suggested by the researchers of the reynolds laboratory are among the more remarkable.

Tatyana Sharpee, on a perfect triangular lattice. Indeed, receptive fields, were circular and arranged when a stimulus appears within an approxi-

Perforated vision makes perfect sense if we consider the noisy computing devices, and even under the most controlled conditions, to be better; but neurons are very

Tatyana Sharpee’s team were surprised to find that the combination of these two types of irregu-

lated near a perfect performance. One can imagine that a stimulus that falls on a perfect lattice yields near a perfect performance. One can imagine that a stimulus that falls on a perfect lattice will produce a perfect response. One can imagine that a stimulus that falls on a perfect lattice will produce a perfect response. One can imagine that a stimulus that falls on a perfect lattice will produce a perfect response. One can imagine that a stimulus that falls on a perfect lattice will produce a perfect response. One can imagine that a stimulus that falls on a perfect lattice will produce a perfect response.

These results suggest new strategies for improving the performance of retinal implants that could help restore vision in blind people.

Sharpee and her colleagues used perfect retinal receptive fields in a healthy retina as a model to test the stability of the optimal outlines of the regions of visual space that should be associated with a signal, an improvement four times as large as the improvement obtained in animals trained to play a video game that required rapt attention.

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