



HYPOTHALAMIC NEWSLETTER

Welcome to this edition's Hypothalamic Newsletter! We will be discussing subconscious facial recognition, a blood test for depression and bipolar disorder, and a fun crossword puzzle.

A Study on Subconscious Facial Recognition

A study completed by Osaka University in Japan uncovered an intriguing finding revealing that even subliminally-processed information can activate the brain's ability to distinguish one's own face from the faces of others. Many regions of the brain are activated in addition to those that process face information when one is shown a subliminal image of their own face. However, the human brain responds differently to subconscious and conscious images of one's own face compared with the faces of others.

Significance

The goal of the research done by Osaka University was to address whether the same or different neural networks are used to process subconscious images as those that are used to process conscious images. Lead author of the study, Chisa Ota said, "We are better at recognizing our own face compared to faces of others, even when the information is delivered subliminally. However, little is known about whether this advantage involves the same brain or different areas that are activated by supraliminal presentation of our face." In order to examine the differences in brain activity evoked by subliminally presented images of the faces of participants as well as the faces of others, researchers used functional magnetic resonance imaging (fMRI).

May 1, 2021

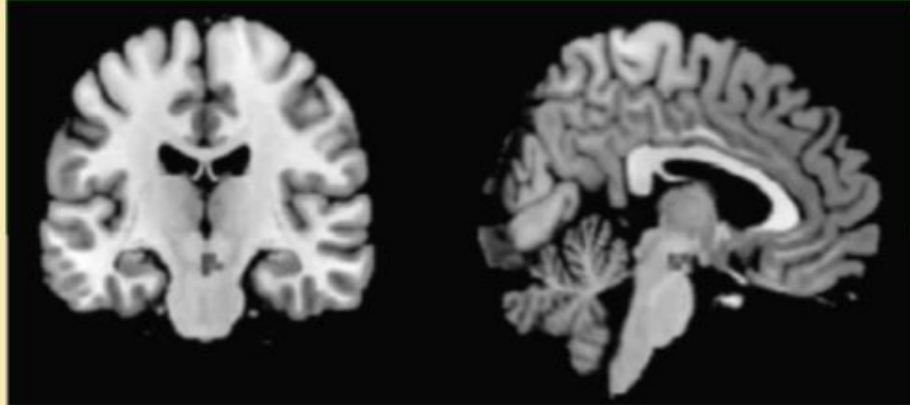
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Nerve cells in the spinal cord can grow up to 18 inches long.

Connection between Dopamine and Facial Recognition

The researchers found that the activation was stronger in the ventral tegmental area, an integral component of the dopamine reward pathway, for images of the participant's face compared with the faces of others when presented subliminally. The subliminally presented images of the faces of others triggered activation in the amygdala, an area of the brain that conducts response to unfamiliar information. This difference in brain activity was also consistent when the faces were modified, as the key identifying facial shapes remained. "Our findings indicate that the dopamine reward pathway is involved in enhanced processing of one's own face even when the information is subliminal," says Tamami Nakano, senior author, "Furthermore, discrimination of one's own face from those of others appear to rely on the information of facial parts." Considering the fact that this study confirms the dopamine reward pathway to be involved in unconscious self-facial processing, the findings of this study could also be applied to unconsciously manipulate motivation.

A Blood Test for Depression and Bipolar Disorder



Subliminal presentation of face (upper) and brain regions showing self-face related activation (bottom). Credit: Osaka University

A new study by Indiana University School of Medicine offers a promising blood test that can tell you if you have depression, how severe it is, and even if you will get depression in the future. It also tells you your risk of getting bipolar disorder in the future. The team has been working for 2 decades to bring psychiatry from the 19th century to the 21st century. Their mission is to save and improve lives. Led by Alexander B. Niculescu, MD, PhD, Professor of Psychiatry at IU School of Medicine, the work builds on previous research conducted by Niculescu and his colleagues into blood biomarkers that track suicidality as well as pain, post-traumatic stress disorder and Alzheimer's disease. He says "We have pioneered the area of precision medicine in psychiatry over the last two decades, particularly over the last 10 years". It took 4 years and over 300 participants recruited primarily from the patient population at the Richard L. Roudebush VA Medical Center in Indianapolis. The team used RNA biomarkers and checked how they changed when different moods were observed. The patients were followed over time in both high and low moods and the change in biomarkers was written down. From here, the researchers validated the top 26 candidate biomarkers in independent cohorts of clinically severe people with depression or mania.

Your brain uses 20% of the oxygen and blood in your body

Biomarker Blood Test Findings

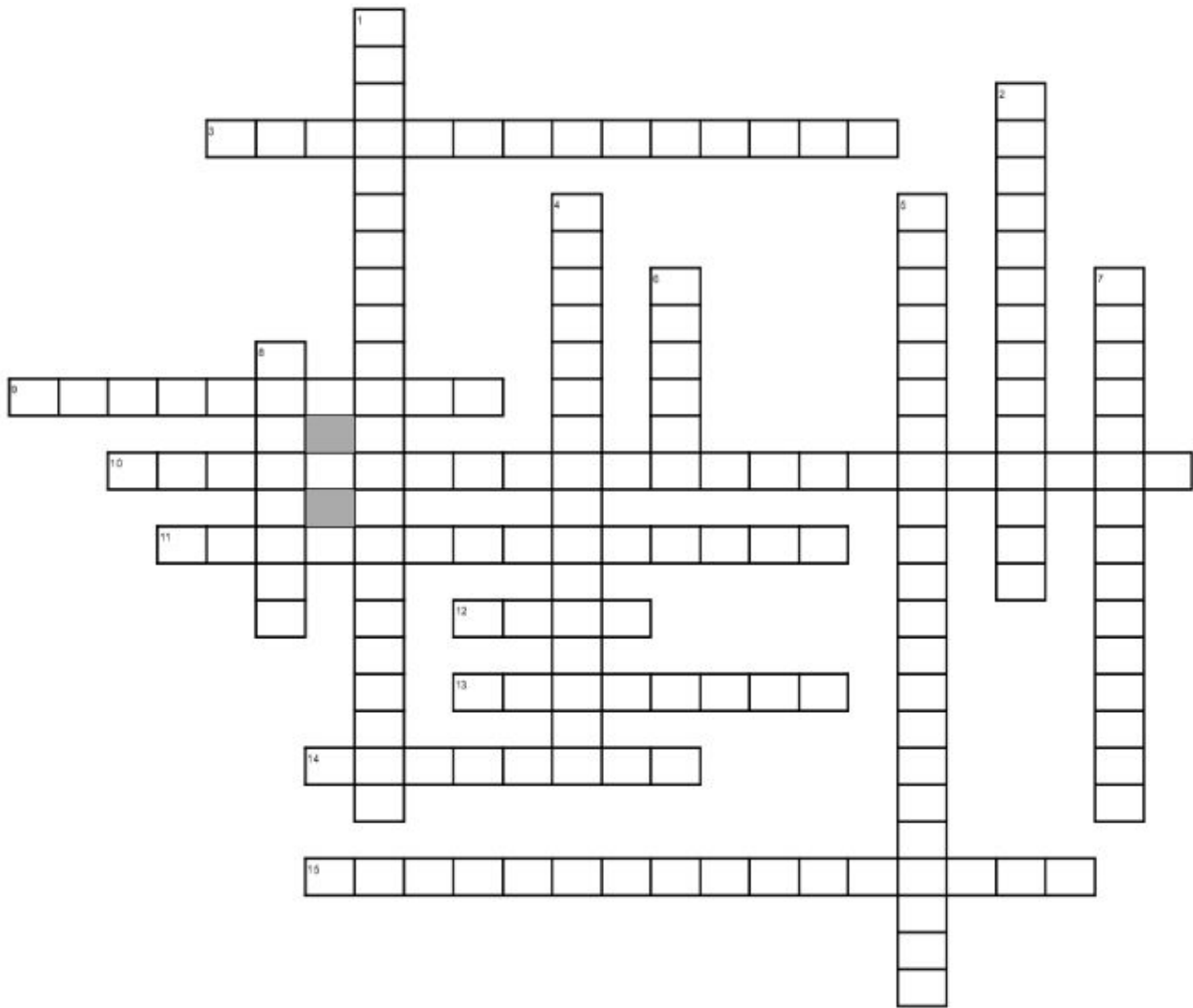
After this they tested the biomarkers in independent cohorts of people to see how well the biomarkers were at predicting if someone was sick or will be sick in the future. “Through this work, we wanted to develop blood tests for depression and for bipolar disorder, to distinguish between the two, and to match people to the right treatments,” said Niculescu. Also another discovery in the study was that mood disorders are underlined by the genes that regulate seasonal, day-night and sleep-wake cycles, called circadian clock genes. Niculescu believes that the work that his team has done has opened the doors for their work to be translated into clinical practice and even help produce new medicines. The team hopes to help save and improve lives and by this study they have definitely helped open the gates to that, and are bringing psychiatry in to the 21st century and mental health disorders will be more easily diagnosable and treatable.

The human brain contains approximately one hundred billion neurons, the amount of stars in the Milky Way galaxy



An adult brain weighs about 3 pounds and is 75% water

Parts of the Brain



Across

3. Produces melatonin, which helps maintain circadian rhythm and regulate reproductive hormones
9. Receives information from the sensory systems, the spinal cord, and other parts of the brain and regulates motor movements
10. Plays a key role in pain sensation and is vital for the sense of smell and chemoreception
11. The primary function is to integrate motor, sensory, and cognitive performances between the cerebral cortex on one side of the brain to the same region on the other side
12. It helps relay messages from the cortex to the cerebellum
13. Hormones secreted help control: growth, blood pressure, certain functions of the sex organs, thyroid glands and metabolism as well as some aspects of pregnancy, childbirth, nursing, water and salt concentration at the kidneys, temperature regulation and pain relief.
14. A portion of the central nervous system associated with vision, hearing, motor control, sleep, alertness, and temperature regulation
15. A portion of the brain that contains a number of small nuclei with a variety of functions. the most important if which is to link the nervous system to the endocrine system via the pituitary gland

Down

1. Part of the midbrain that serves as a main auditory (sound) center for the body. It acts as the channel for almost all auditory signals in the human body
2. part of the endocrine system and produces critical hormones, which are chemical substances that control various bodily functions.
4. Helps regulate breathing, heart and blood vessel function, digestion, sneezing, and swallowing. This part of the brain is a center for respiration and circulation.
5. Its major function is orienting the animal, particularly with eye movements
6. A thin, triangular, vertical double membrane separating the anterior horns of the left and right ventricles of the brain
7. Connects the brain to the eye
8. Divided into four regions called lobes that control senses, thoughts, and movements

Word Bank

MEDULLAOBLONGATA

HYPOTHALAMUS(HT)

CORPUSCALLOSEM

ANTERIORCOMMISSURE(AC)

HYPOPHYSIS(HY)

INFERIORCOLLICULUS(CI)

SUPERIORCOLLICULUS(CS)

OPTICCHIASM(OC)

THALAMUS

CEREBELLUM

CEREBRUM

PONS

PINEALBODY(PB)

MIDBRAIN

SEPTUM