A young neurologist explores the mysteries of the teenage brain

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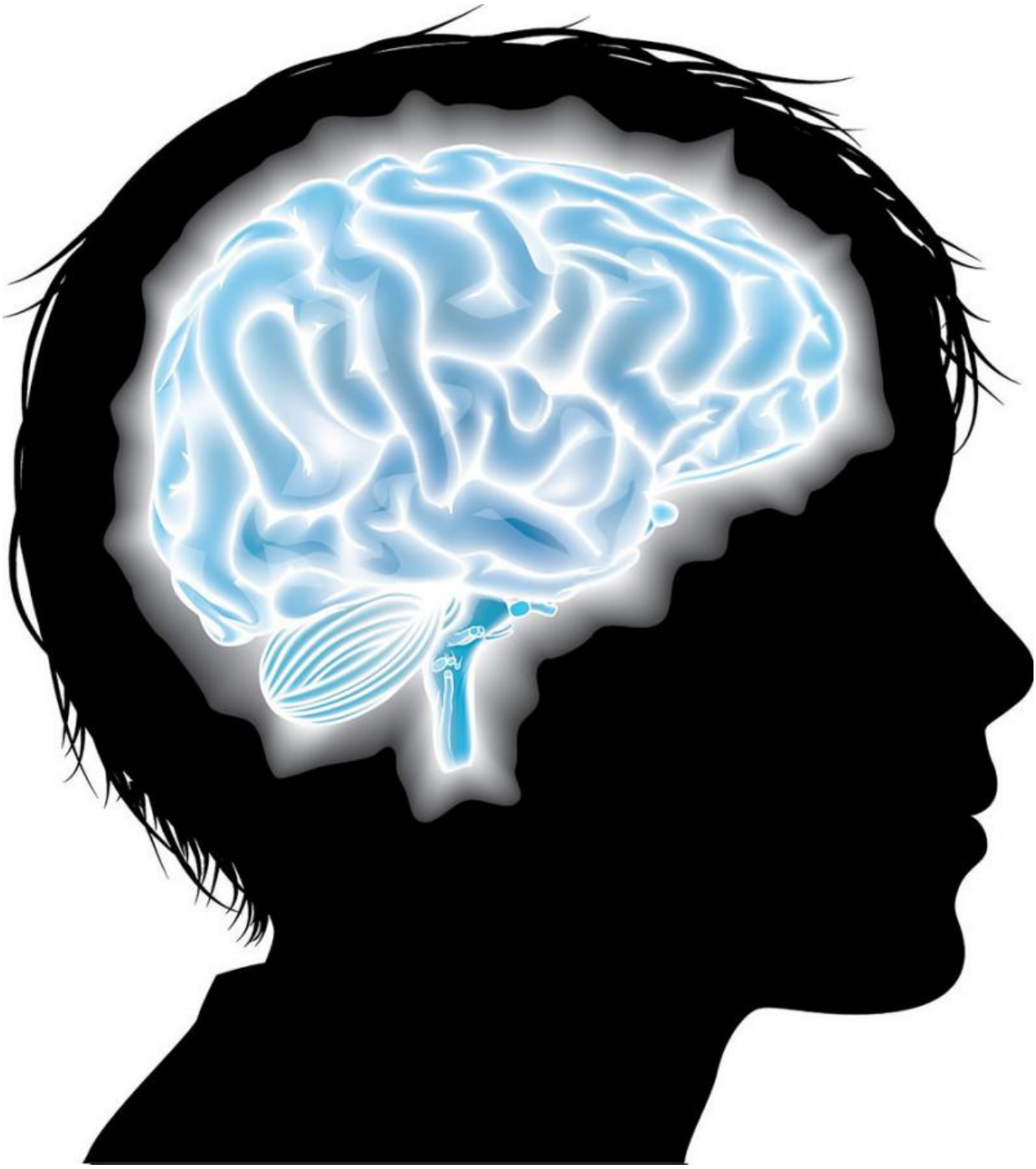

The mysteries of the teenage brain.

Mexican doctoral student Lucia Magis Weinberg at the University

College London (UCL) researches how the brain develops during adolescence. In this stage of life, the brain undergoes important development and brain maturation occurs at different speeds among different areas.

These differential maturation states generate an imbalance that impacts their behavior: "The part of the brain that could be compared to the gas pedal of a car is related to emotions and rewards, and matures before the brakes—the prefrontal cortex, which has a slower rate of maturation."

Magis, a student in cognitive neuroscience, explains that this imbalance in adolescents makes them more likely to take risks and make bad decisions when faced with many emotions or situations with multiple rewards, such as drug use, the desire to impress their peers, or attending a party.

Lucia, who studied at the Faculty of Medicine of the National University of Mexico (UNAM), always wanted to do research in neurology and psychiatry. "I am particularly interested in neurodevelopmental research on healthy people. I searched for laboratories that do this kind of work and found a lab in UCL. Here, I studied for my masters with support from the Mexican government, as I am doing with my Ph.D. "

Magis says that her research compares adolescents with adults. She invites them to go to the laboratory and practice computer games. There, she measures their memory, attention span and impulse control, to observe their behavior.

Participants can be tested sitting in front of a computer or inside an MRI machine, a neuroimaging technique to indirectly measure oxygen consumption to quantify brain activity. This allows the researchers to compare how the patterns of brain activity associated with the possibility of solving these tasks are different between adolescents and adults.

"In one of the latest experiments, subjects performed memory tests and we measured how many errors adolescents and adults make when there is an economic reward. Then we compare how much the financial reward affects them to how well they perform on the memory task. "

Using magnetic resonance imaging, researchers can see which brain regions are activated and which are not during the tests to compare activity patterns in adolescents and adults.

During adolescence, the ability to regulate behavior is much more susceptible to the environment, particularly if there are rewards or strong emotions involved.

"I would like to understand how the adolescent brain works during particularly vulnerable moments in order to know how the brain could better control the behavior. This comparative perspective of age groups would help us to have a better understanding of the processes of addiction and its development during adolescence as a time of particular risk."

It is noteworthy to mention that it was not until the 1990s that noninvasive imaging techniques allowed children and adolescents to be studied. In the last two decades, it has been found that the structure and functioning of the brain changes a lot.

It was with the development of MRI techniques that specialists obtained evidence that the adolescent brain changes, and this partly explains their behavior. This was what attracted Lucia Magis to study neuroscience, and once she completes her Ph.D., she hopes to return to Mexico and continue this line of research. Parallel to this, she works on science communication activities for the blog Neuromexico.org.