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Research team at the UPR-School of Medicine discovers how the brain responds to frustration [1]

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San Juan - It has happened to us more than once that we find ourselves in a hurry and the elevator we are waiting for takes too long to arrive. Immediately, we proceed to press the up or down key repeatedly, until we give up and decide to take the stairs. From a research perspective, the explanation for this fenomena of frustation was unknown until today. Guided by Drs. Fabricio Do Monte and Gregory Quirk, a team of neuroscientists in the School of Medicine at the University of Puerto Rico (UPR-RCM), discovered how the brain reacts to a frustrating event.

According to the researchers, a subcortical brain region called paraventricular nucleus of the thalamus (PVT), is activated during moments of frustration. They went even further, by determining the brain structures that receive information from the PVT during frustrating events.

“On one hand, PVT sends information to a region that registers associations of positive experiences, called nucleus accumbens, to reduce anxiety during aversive situations. On the other hand, the PVT also sends information to another region that registers associations of mainly negative experiences called the amygdala, to increase anxiety.”, explained the veterinarian and neuroscientist Dr. Fabricio Do Monte, who is now an outstanding researcher at the University of Texas, Houston.

The results were obtained after they performed a conditioning experiment in rats, in which they trained the animals to press a bar at the signal of light, in order to get a food pellet as a reward. Then, they performed a behavioral test to evaluate how the rats reacted when the light signal was presented but the food was not available.

“The rats that experimented this frustrating event pressed the bar for food repeatedly. Moreover, behavioral tests performed after the omission of the reward revealed that the rats were more anxious immediately after the event.”, emphasized Dr. Gregory Quirk, professor and neuroscientist in the Departments of Psychiatry and Anatomy and Neurobiology in the RCM.

Other studies have demonstrated that the unexpected omission of a reward leads to behaviors related to aggression, addiction, and depression in animals. The team believes that these results shine light on the understanding of how these brain circuits integrate information on events that have an emotional impact. They hope this will lead to the development of improved treatments and quality of life for people that suffer from such disorders.

The study was published in the most recent edition of the renown scientific journal, Neuron, published by Cell Press.

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