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Neurobiology of stress and addiction



1.-Raul, can you tell us what kind of work you did at Harvard?

At Harvard I was a member of the teaching staff, a Psychiatry instructor and I also carried out translational studies with humans and rodents. We studied the molecular mechanisms of psychiatric disorders in mice and tried to apply the knowledge to cure these disorders in humans. One of the most important techniques that I learnt there is called optogenetics, which is the stimulation of neural groups with light. It is a very potent technique because with a very brief (milliseconds) stimulation of certain neurones we can enhance learning, inhibit the inflammatory system or cure a symptom of Alzheimer's or Parkinson in animal models. This does not mean that it is strictly applicable to humans, but it does help us understand how the biological bases of some diseases work and how to advance in our studies to treat them.

2.-We see you study the neurobiology of fear; ¿Why is this subject of special interest to you?

In reality, I am interested in understanding the mechanisms of memory. Specifically, I focus on the memory of fear because it is the most conserved memory between rodents and people. The mechanisms of fear are very primary and can be easily measured in a

rodent. These studies have a high translational component and can potentially be applied to humans. We have been doing these studies for years, I started as a postdoc researcher at Emory University, then as a professor at Harvard and now we hope to continue these studies here at the INc.

3.-Why have you decided to return to the INc?

First of all because the UAB is one of the best universities in the country and the INc in particular is one of the best places to perform brain research. It is a multidisciplinary institute in areas such as Alzheimer's, Parkinson, inflammatory diseases and memory, and I believe that it is the ideal centre to carry out my translational programme.

4.-What is the focus of your investigation at the moment?

We are trying to continue the studies that I started while at Harvard: to find markers for psychiatric diseases like PTSD (Post Traumatic Stress Disorder), OCD (Obsessive Compulsive Disorder) or Panic Disorder. We want to find biological markers in humans, for example in blood. We try to reverse the effects of these markers by using drugs in rodents to see how we can potentially cure the psychiatric disorders related to fear and pathological anxiety in humans. To do so, we use advanced techniques like optogenetics.

5.-How would you encourage future scientists to take part of Neuroscience research?

Neuroscience is an enthralling job, it is very creative, very competitive and it requires a lot of travelling. It is one of the most exciting research fields of the 21st century, due to the great interest that society currently has for the brain and above all, because of the countless spectacular new techniques that are being developed that allow us to have precise control over the brain and that we believe will allow us to cure psychiatric disorders for the first time. This is not yet a reality, but we hope that it will be very soon.

Listen to the [whole interview](#).