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Editorial

# Depression, Anxiety and Heart Disease Risk

**Pramod A**

*Department of Pharmacology, Vaagdevi College of Pharmacy, Warangal, Telangana, India*

## Editorial

While millions of people worldwide are affected by depression and anxiety, there is still something we don't know about them. In fact, we still do not completely understand which regions of the brain are involved in depression and anxiety, and how they vary between individuals with various symptoms. To create better therapies, understanding how or why these variations exist is important.

So far, we know that part of the frontal lobe of the brain, the prefrontal cortex, frequently exhibits variations in behavior in persons with depression and anxiety. Parts engaged in perception and attitude control are underactive, while other parts involved in producing impulses and internal body functions are over-active.

The subgenual anterior cingulate cortex (sgACC), believed to be involved in emotional responses, is one main area found to be over-active in people with depression and anxiety. Neuroimaging tests, though, still display a correlation and do not tell us that any of the effects are triggered by over-activity. But our recent study has shown that over-activating sgACC triggers symptoms of anxiety and depression highlighting casuality.

We have used marmosets (a type of primate) for our research because their brain closely resembles the brain of a person. In this area, we found that over-activity causes many main characteristics of mood and anxiety disorders, especially how reactive they are to the danger. As patients with depression and anxiety appear to interpret and respond more negatively to conditions, their response to danger is significant.

Why individuals with depression also have a higher chance of heart failure is another excellent issue. Although there are obviously lifestyle and socioeconomic variables that connect heart disease and depression, we decided to assess whether cardiovascular function could be compromised by sgACC over-activity itself. We figured this area could be important because it's related to the brainstem that rules our region and heart rate and blood pressure.

We found that not only did sgACC over-activity exaggerate the blood pressure reaction of marmosets to the hazard, it also increased heart rate and decreased heart rate variability even at rest. Heart rate variability is an essential indicator of how easily the heart will respond to external changes, especially indications that predict reward or punishment.

Any of the heart dysfunction observed in depression and anxiety mirrors these changes. The elevated heart rate and decreased heart rate variability mean that sgACC over-activity encourages the "fight-or-flight" reflex of the body, which places the heart under additional pressure if it persists for extended stretches of time and can explain the increased occurrence of heart disease.

***Correspondence to:** Pramod A, Department of Pharmacology, Vaagdevi College of Pharmacy, Warangal, Telangana, India, E-mail: aloorpramod@gmail.com

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