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## **RIPK3 KO ameliorates emotional functions in mice with diabetic kidney disease**

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### **Objectives:**

Although it is well known that the prevalence of cognitive/emotional declines in diabetic patient is relatively high, the relationship and mechanisms with diabetic kidney disease (DKD) and its abnormalities are not yet known. Therefore, this study focuses on the effect of DKD on brain function and whether Receptor-Interacting Serine/Threonine-Protein Kinase 3 (RIPK3), that mediate necroptosis, influences DKD-induced brain dysfunction.

**Methods:** C57BL/6 male mice were categorized into 4 groups. Control group ( $n=3$ ), RIPK3 knockout (KO) group ( $n=3$ ), Diet-induced obesity (DIO) group ( $n=3$ ), DIO RIPK3 KO group ( $n=3$ ) went through following diverse behavior tests to identify the cognitive/emotional functions of the brain. Open Field Test (OFT) measures the locomotor activity and the anxiety. Light & Dark Box Test (LDT) and Zero Maze Test (ZMT) measure the anxiety. Forced Swim Test (FST) measures the depression. Novel Object Recognition Test (NORT) measures the object recognition memory. Y-Maze Test (YMT) measures the spatial working memory.

### **Results:**

The object recognition memory measured by NOR showed no difference between DIO and control group. While the locomotor activities and the spatial working memory were decreased in the DKD group, the emotional dysfunctions related with the anxiety and the depression levels were increased. The anxiety and depression levels of RIPK3 KO mice group was significantly rehabilitated to the control group, whereas the locomotor activity and the spatial working memory unchanged.

### **Conclusions:**

RIPK3 KO ameliorates emotional abnormalities in DKD. Therefore, RIPK3 KO could play an important role in the restoration of anxiety and depressive declines in DKD as novel therapeutic approaches.