

EXOGENOUS KETONE SUPPLEMENTATION IMPROVED MOTOR FUNCTION IN RODENT MODELS

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Nutritional ketosis has beneficial therapeutic effect on epileptic seizures and on other neurological disorders, but many patients find the ketogenic diet (KD) unpalatable and difficult to sustain. In order to circumvent the need for severe dietary restrictions, exogenous ketone supplementation has been developed to increase blood ketone level to therapeutic levels. The focus of this study was to investigate the effects of ketone supplementation on motor function in healthy and pathologic animal models.

Accelerating rotarod test were performed and recorded along with the circulating blood beta-hydroxybutyrate (β HB) level measurements in Sprague-Dawley (SPD), Wistar Albino Glaxo/Rijswijk (WAG/Rij) rats and Glucose Transporter Type-1 Deficiency Syndrome (G1D) mice strain and hanging wire test in G1D mice. We performed acute and sub-chronic experiments on gavage fed rats one day or seven consecutive days and we performed chronic experiment feeding G1D mice with special diet for 10 weeks.

The effect of ketogenic diet (KD), butanediol (BD), ketone-ester (KE), ketone-salt (KS) and combinations (KE+KS) or mixtures with medium chain triglyceride (MCT) (KE+MCT, KS+MCT) were compared with the control group and/or with the baseline.

The motor performance of healthy SPD rats was enhanced by the single administration of KE+MCT supplement. KE and KS alone improved the motor function of the sub-chronic experiment in SPD rats, while KD and KE in the chronic experiment in G1D mice. The motor function of the WAG/Rij rats showed improvement in KE+KS and KE+MCT groups.

Blood ketone levels were elevated by the KD and exogenous ketone supplementation effectively in all rodent models. We conclude that exogenous ketone supplementation improved motor function without dietary restrictions in rodent models with and without pathology.

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