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POSTER PRESENTATION

Vitamin D3 Improves Behavioral Dysfunction and Promotes Remyelination in Multiple Sclerosis Model Induced by Cuprizone

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INTRODUCTION

Approximately 2.1 to 2.5 million people have Multiple sclerosis (MS) worldwide, a chronic demyelination disease of the central nervous system (CNS) that attacks the myelin sheath around the axon and damages it [1]. Although the exact cause of MS is unknown, low levels of vitamin D have been reported as one of the most critical factors in increasing the risk of developing and the prevalence of MS, according to both experimental and clinical findings [2]. As a result, Vitamin D3 supplementation is increasingly advised to patients with MS [3]. Additionally, promoting remyelination is an essential strategy for treating MS to resolve and alleviate symptoms and protect myelin sheath from further damage.

AIM

This study aimed to investigate the effects of Vit D3 supplementation to improve remyelination in a cuprizone (CPZ) mouse model of MS.

METHODS

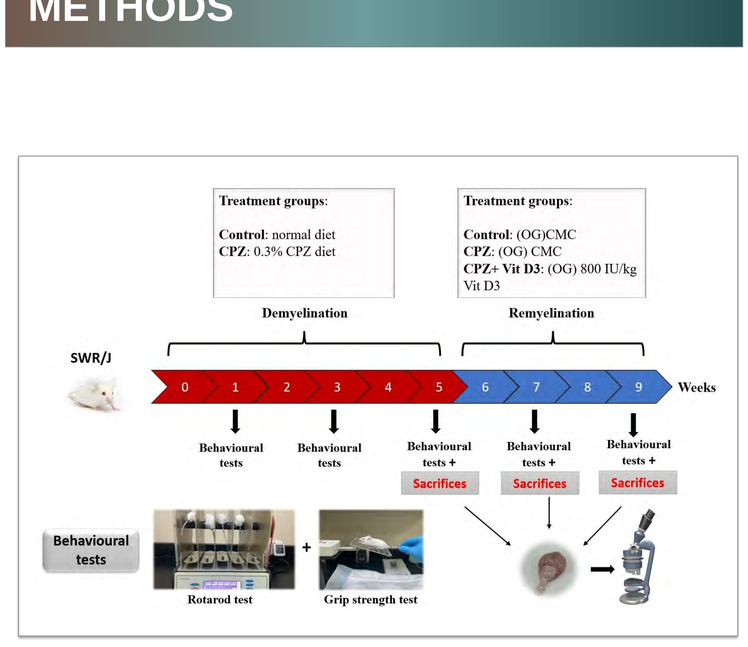

Figure 1: Schedule of the experiment and overview of the treatment groups, behavioral tests, and sacrifices. (CPZ) cuprizone, (Vit D3) Vitamin D3, (OG) oral gavage, (CMC) carboxymethyl cellulose sodium salt.

RESULTS

During the demyelination stage, figures 2(A) and 3(A) showed that CPZ significantly reduced behavior performance in mice; moreover, figure 4(A) exhibited decreased blue color staining in CC, indicating damaged myelin sheaths compared with the control group. In contrast, figures 2(B) and 3(B) revealed that the treatment with Vit D3 significantly improved mice's grip strength and motor coordination performance at early and last remyelination stages (7 and 9 weeks), respectively. Furthermore, Figures 4 (B and C) showed that Vit D3 increased blue color staining in the CC of the brain compared with the untreated group at the remyelination stages, which indicates improved myelin sheaths.

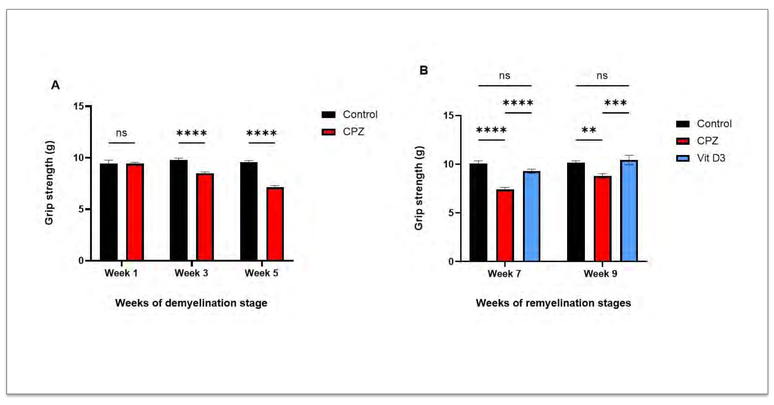

*Figure 2: Grip strength during A) de and B) re-myelination stages. Data were presented as the mean ± SEM, and two-way ANOVA followed by Šídák's and Tukey's multiple comparisons tests (A and B) were used, respectively. ns=non-significant. **p ≥ 0.001, ***p=0.0001, ****p<0.0001.*

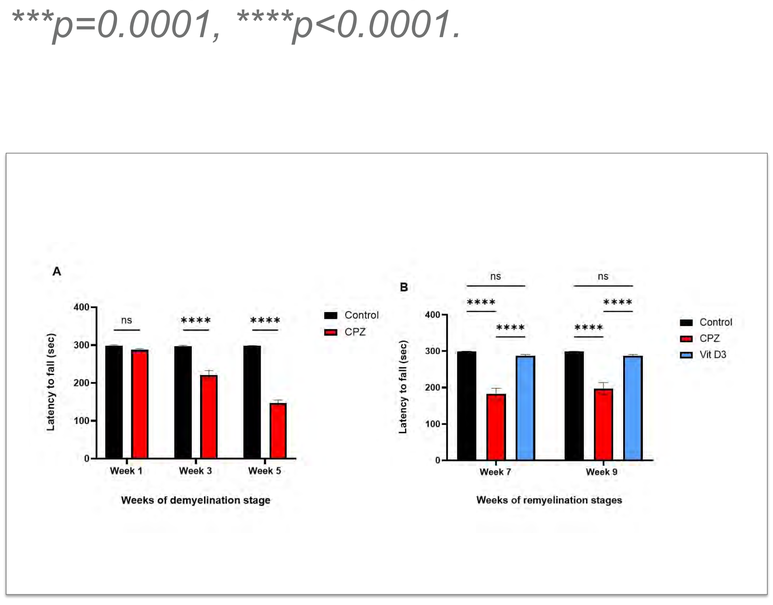

*Figure 3: Latency to fall in the Rotarod test during A) de and B) re-myelination stages. Data are presented as the mean ± SEM, and two-way ANOVA followed by Šídák's and Tukey's multiple comparisons tests (A and B) were used, respectively. ns=non-significant. ****p<0.0001.*

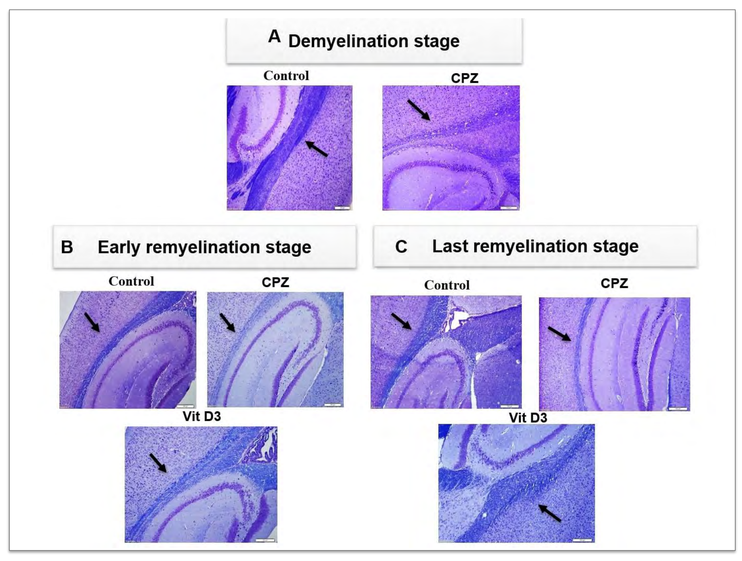

Figure 4: Representative images of the corpus callosum (CC) using Luxol fast blue (LFB) staining. A) De and B&C) re-myelination stages. Scale bars are 100 µm.

CONCLUSIONS

These results demonstrated that Vit D3 could improve remyelination in a CPZ-demyelinating mouse model of MS.

BIBLIOGRAPHY

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