THE EFFECTS OF EXERCISE AND B VITAMINS ON GLUTATHIONE LEVELS VIA THE TRANSSULFURATION PATHWAY IN PARKINSONS DISEASE

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Individuals with Parkinson's disease (PD) suffer from oxidative stress, lower glutathione (GSH) and B₆ levels and elevated homocysteine. Levodopa exaggerates these conditions. Glutathione and homocysteine have been shown to be negatively correlated. B vitamins and exercise have been recommended to reduce homocysteine levels and improve GSH.

Aims: To assess the use of exercise and supplementation of B₆, B₁₂, and folic acid to reduce homocysteine levels and determine if this will increase GSH levels via the transsulfuration pathway and reduce oxidative stress.

Methods: Twenty-four volunteers with PD (50-80 years old) were recruited and randomly assigned to one of four groups. Aerobic exercise training with weight training (PD-Ex), PD-Ex with B vitamin supplementation (PD-Ex-Vit), B vitamin supplementation with no training (PD-Vit), or a control group (PD-C). Exercise was performed twice weekly for 6 weeks; vitamin supplementation was daily for 6 weeks.

Results: Homocysteine levels were reduced only in the PD-Vit and PD-Ex-Vit groups. Glutathione levels were increased only in the PD-Vit-Ex and PD-Ex groups. There was no correlation between GSH and homocysteine. There was a change in aerobic capacity and strength in the PD-Ex and the PD-Vit-Ex groups. There was a positive correlation between exercise and GSH.

Conclusions: Vitamin supplementation alone was effective in reducing homocysteine. However vitamins alone had no impact on GSH levels or oxidative stress. Exercise had no impact on homocysteine levels; however it had a positive impact on GSH levels. The greatest reduction in homocysteine and increase in GSH was the combination of exercise and vitamin supplementation.