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Ameliorative Effect of Metformin on Cyclophosphamide-Induced Memory Impairment in Mice - Ahmad Alhowail - Qassim University

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Cyclophosphamide (CYP) is a chemotherapeutic agent that is widely used as an adjuvant cancer treatment. Unfortunately, this drug is associated with secondary side effects, including cognitive impairment in up to 70% of cancer survivors. The mechanism of this memory impairment is unclear. Thus, to understand the cognitive impairments caused by this chemotherapeutic agent, a clinically relevant dose to cancer treatment was used in mice to establish chemobrain models, and the spatial memory of these mice was assessed using multiple behavior tests. In addition, Metformin (MET) is widely used as an anti-diabetic drug and protects against oxidative stress and hepatotoxicity. Thus, this study tested the protective effects of MET in the chemobrain models.

Methods:

Four groups of mice with a weight range of 18–30g were collected and divided into the control, CYP, MET, and CYP+MET groups. A 100mg/kg dose of CYP was administered intraperitoneal (on alternate days) for a total of 4 doses. MET was dissolved in the mice's drinking water bottles at a 5mg/ml concentration from day zero to the end of the treatment period. The mice's memory was tested using hippocampal-dependent tests, including the Y-maze, novel object recognition, and elevated plus maze tests. These tests were performed for three days, starting one day after the last dose of CYP.

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period. The mice's memory was tested using hippocampal-dependent tests, including the Y-maze, novel object recognition, and elevated plus maze tests. These tests were performed for three consecutive days after 24 h of the last dose of CYP. The clinically relevant model suggests that CYP treatment causes a decline in mice models spatial memory that might be improved by MET administration.

Results:

The mice treated with CYP exhibited a decline in memory function in all the study's behavioral tests, and this decline was significant in the Y-maze test. However, this decline was rescued by MET administration.

Conclusion: The clinically relevant model suggests that CYP treatment causes a decline in mice models' spatial memory that may be improved by MET administration.

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