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Basic Science

Abstract Title

Partial Rescue of a Yeast Model of Bowen-Conradi Syndrome by Exogenous Methionine Supplementation

Authors

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Background

Bowen-Conradi Syndrome (BCS), a recessive disorder found in the Hutterite population is the result of a variant in the EMG1 protein, involved in ribosome biogenesis, which replaces an aspartic acid residue (D86) with a glycine residue resulting in lower stability and thus interferes with its ability to aid in ribosome biogenesis. SAM is used by EMG1 in methylation as well as in many other biochemical functions and is vital to cellular growth. Previous studies by our lab found that increasing SAM levels partially rescues growth in BCS cells. However, exogenous SAM supplementation is expensive.

Objective

SAM is formed via the fusion of ATP and methionine via the Met cycle, which can be upregulated via exogenous supplementation of methionine to increase SAM concentrations and partially restore growth in BCS cells.

Methods

BCS cells were grown media lacking methionine to establish their growth defect. These were then split into methionine supplemented and non-supplemented cells and the rate of growth was observed over a 10-hour time period using optical density. Western blots were also done from cells harvested before, during, and after the 10 hours of growth.

Results

Upon methionine supplementation, optical density measurements showed the BCS cell proliferation was improved when compared to the non-supplemented cells. This suggests the increase in SAM formation

was able to partially rescue the growth defect. Furthermore, western blot analysis shows that initially low levels of EMG1 in BCS cells with established sickness can be increased with methionine supplementation. This proposes that, by increasing levels of SAM, the cells are able to improve metabolic functions.

Conclusion

Through exogenous supplementation of methionine, growth of BCS cells is partially restored similarly to supplementation of SAM. The improvement of growth and protein levels suggests potential therapeutic usage of methionine in rescuing BCS growth defects.