The Effect of Melatonin on Tau Protein Hyperphosphorylation in Hypothrmic SH-SY5Y Cells

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Abstract

- Tauopathies are caused by tau hyperphosphorylation in neurons
- SH-SY5Y human bone marrow neuroblastoma cells are adequate simulations of brain conditions that multiply
- Melatonin was tested on hypothermic cells to test effects against tau
- 5 different concentrations testing both preventative and reversal applications of melatonin
- Found that melatonin was successful as a preventative and reversal option

Introduction to Alzheimer's Disease

- Over half of adults 85+ have some form of dementia
- No cure for Alzheimer's currently; only 5 approved medications
- Two theories:
  - Amyloid-beta aggregation
  - Tau-lewy body formation
- Melatonin proved successful against amyloid-beta aggregate formation in mice
- Hypothermic conditions theoretically cause tau hyperphosphorylation
- SH-SY5Y cells are derivatives of human bone marrow neuroblastoma cells that multiply every 48 hours

Purpose

- Prove hyperphosphorylation to be caused by hypothermic incubation
- Determine if melatonin can potentially be used as a reversal or preventative treatment for Alzheimer’s and a number of different tauopathies

Background

Hypothesis

- Hypothermic incubation will cause hyperphosphorylation
- Melatonin will reduce or prevent tau hyperphosphorylation

Materials

- SH-SY5Y human bone marrow neuroblastoma cells and EMEM media
- Melatonin
- Epi Fluorescent plate reader
- 48 well plates
- Incubators (at 30 C and 37 C)
- Phospho Tau ELISA kit
- Cell Extraction buffer

Methods

- Culture cells
- Addition of initial cellular insult
- Preparing stock solutions
- Addition of melatonin
- Continuation of cellular insult
- Cell lysis protocol
- ELISA kit
- Epi Fluorescent plate reader

Results

- GRAPHS

Results

Results

Statistical analysis

Discussion

Conclusion