Postoperative Cognitive Dysfunction (POCD) is associated with increased mortality and disability. POCD may develop as a consequence of lipid peroxidative byproducts, such as acrolein, which accumulate with aging. Sevoflurane sequesters acrolein, which promotes the formation of a novel species of neuromelanin that may play a role in POCD. In this study we examined the properties of a serotonin-derived melanoid-like compound (SDM) and hypothesized that SDM may be neurotoxic.

**INTRODUCTION**

- Postoperative Cognitive Dysfunction (POCD) is associated with increased mortality and disability.
- POCD may develop as a consequence of lipid peroxidative byproducts, such as acrolein, which accumulate with aging.
- Sevoflurane sequesters acrolein, which promotes the formation of a novel species of neuromelanin that may play a role in POCD.
- In this study we examined the properties of a serotonin-derived melanoid-like compound (SDM) and hypothesized that SDM may be neurotoxic.

**METHODS**

- SDM was produced using a 2-phase system using an upper aqueous phase containing serotonin and a lower phase containing sevoflurane and acrolein.
- Fraction at the interface was removed and dialyzed.
- Uni-lamellar vesicles (ULVs) of dioleoyl-phosphatidylcholine were made by extrusion.
- Interaction of SDM with ULVs was examined using two membrane probes:
  - Diphenyl-hexatriene (DPH)
  - Merocyanine (MC)
- Absorbance spectra of SDM were also examined. Vesicle disruption was investigated by monitoring the leakage of dye from calcein-loaded ULVs.
- Results were analyzed by linear regression and unpaired Student t-tests (p<0.05).

**RESULTS**

- SDM Promotes Lipid Bilayer Disorganization
  - SDM redistributes phospholipid headgroups
  - SDM enhances membrane fluidity and decreases DPH anisotropy

- Consequences of SDM-ULV Interaction
  - SDM increases detergent-mediated dye leakage from calcein-loaded ULVs
  - Effects of ULVs on the SDM absorbance spectrum in the UV range

**CONCLUSION/DISCUSSION**

- Serotonin-Derived Melanoid (SDM)
  - Disrupts membrane organization
    - Acyl chains
    - Phospholipid headgroups
  - Interacts with ULVs
  - Restructures SDM
  - Vesicle rupture