METHYLENE BLUE, SPATIAL MEMORY AND ANTERIOR THALAMIC LESIONS RELEVANT TO AMNESIC DISORDERS

S.M. Edlin¹, J.C. Dalrymple-Alford¹²

¹Psychology, University of Canterbury, ²Van der Veer Institute, Christchurch, New Zealand

Rationale: While recent studies have focussed on methylene blue's interaction with neurofibrillary tangles in Alzheimer's disease, no studies have investigated the efficacy of methylene blue in animal-lesion models of regional pathology relevant to AD.

Aims: To examine the effects of methylene blue on spatial memory in aged Wistar rats with lesions to the anterior thalamic nuclei (ATN rats), part of an extended episodic (hippocampal) system that shows early pathology in AD.

Methods: First, 11 ATN rats were compared to 12 aged shams (mean age: 18 months) to assess spatial memory acquisition in a standard water maze task (10 days). Rats in each group then received intraperitoneal injections of methylene blue (1 mg/kg) or placebo 1 hour after each daily trial for 10 days in which acquisition of a new platform position was examined, followed by a probe trial 5 days later.

Results: Anterior thalamic lesions impaired initial acquisition of the reference memory task. In the subsequent acquisition and probe trial, methylene blue treatment vs placebo improved spatial learning in ATN rats, but there was no effect in sham rats.

Conclusions: These results provide the first evidence that methylene blue may prevent the learning impairments observed in rats with lesions to the anterior thalamus and supports methylene blue as a potential therapeutic intervention for older humans with memory disorders associated with injury to the ATN and the extended episodic memory system.