The biological properties of synthetic methylene blue analogues

Anzelle Delport
North-West University, South Africa

Methylene blue (MB) is a heterocyclic aromatic chemical compound composed of the phenothiazine nucleus and is not only the first synthetic drug against malaria but also the first synthetic compound to be used therapeutically. In recent years the focus has shifted to MB as an antimalarial agent and as potential treatment of neurodegenerative disorders such as Alzheimer's disease. Of interest to us are reports that MB possesses antidepressant and anxiolytic activities in pre-clinical models and has shown promise in clinical trials for bipolar disorder. MB is a noteworthy inhibitor of monoamine oxidase A (MAO-A), which is a well-established mechanism of antidepressant action. MB is also recognized as a non-selective inhibitor of nitric oxide synthase (NOS) and guanylate cyclase, and dysfunction of the NO-cGMP cascade is strongly linked to the neurobiology of depression. Since the inhibition of NOS and guanylate cyclase has been associated with an antidepressant response, this pharmacological effect of MB may contribute significantly to its antidepressant activity. The aim of this study was to synthesize novel symmetrical and asymmetrical MB analogues by employing improved synthetic routes and to evaluate the effects of the resulting structural changes on MAO-A and MAO-B inhibition.

Biography
Anzelle Delport has obtained her MSc Pharmaceutical Chemistry degree and is currently enrolled as a PhD student at the North-West University. Her doctoral is a combined study of Pharmaceutical Chemistry and Pharmacology which has given her opportunity to obtain skills in both disciplines. She won the Academy of Pharmaceutical Sciences of the Pharmaceutical Society of South Africa’s Young Scientist podium presentation award in 2013 and published an article in 2014. Her research is based on methylene blue and synthesis of new methylene blue derivatives for treatment in neurodegenerative and neurological diseases. She is currently an assistant-supervisor to a postgraduate student.

Notes: