Inhibitory effects of Melicope ptelefolia extract on compound action potentials in frog sciatic nerves and its possible mechanism of action

ABSTRACT

Melicope ptelefolia is a medicinal plant from the Rutaceae, also known as 'tenggek burung' in Malaysia. Traditionally, natives ingest M. ptelefolia to treat a wide range of illnesses. This study aimed to investigate the effects of M. ptelefolia aqueous extract (MPAE) on compound action potentials (CAPs) in frog sciatic nerves and its mechanism involving the opioid receptors. The effects of MPAE on CAPs in frog sciatic nerves were examined using the AD Instrument Nerve Chamber. The frog sciatic nerves were dissected from the lumbar plexus to the knee of the frog and placed in Ringer's solution. Three treatment groups with different dosages (1, 3 and 10 mg/mL) of MPAE, including negative (vehicle) and positive control group (3 mg/mL of morphine) were tested on the frog sciatic nerves by placing them in a nerve organ chamber. Following this, the involvement of opioid receptors in the effects of MPAE on CAPs was investigated by using naloxone hydrochloride as a non-selective opioid receptor antagonist. Our results showed that the peak amplitudes of CAPs were significantly ($p<0.001$) reduced when treated with MPAE (3 and 10 mg/mL) in frog sciatic nerves. The MPAE-induced CAPs inhibition was reversed when pre-treated with naloxone, suggesting the involvement of the opioidergic system. These results indicated the modulatory action of MPAE on nerve conduction, which may provide important leads in the development of new therapeutic drugs through the involvement of opioid receptors.

Keyword: Compound action potential; Frog sciatic nerves; Opioidergic; Opioid receptors; Melicope ptelefolia