**Ion currents registered in isolated neurons of land snail *Achatina fulica***

**with a patch-clamp method**

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Molluscan neurons are a popular model for investigating cellular and molecular mechanisms underlying neural function and behavior [1, 2]. They express a wide variety of ion channels, investigating these channels, such as their voltage dependence, kinetics, and pharmacology, can provide insights into their functional roles in the nervous system, evolution [4, 5] and be targets for the treatment of neurological disorders [3]. The purpose of our investigation is to identify and characterize the electrophysiological properties of the main types of ion currents in *Achatina fulica* neurons.

Animals were collected from the region of MSU BIT University Campus, Shenzhen city (China). Unidentified neurons were isolated according to [6]. The batch solution contained (in mM): 100 NaCl, 4 KCl, 10 CaCl2, 4 MgCl2, 5 HEPES, pH 7.5. Currents from the isolated neurons were recorded using single-electrode voltage clamp mode (AxoPatch 200B amplifier). The electrodes with resistance of 2.5-2.7 MΩ were pulled from fire-polished borosilicate glass capillaries (Satter Instrument) with a puller PC-100 (Narishige) and were filled with a pipette solution containing (in mM): 100 KCl, 4 MgCl2, 5 EGTA, 5 HEPES, 2 MgATP, pH 7.4. Data acquisition and analysis were performed using Clampfit 10.4 and Excel software. The experiments were performed at a room temperature of 20-23°C.

The neurons we studied exhibited both outward and inward ion currents. The outward current includes a component that showed a rapid increase upon depolarization, followed by quick inactivation. We classified this component as the A-type current. The transient A-type current was then replaced by a sustained component that demonstrated slow inactivation. In addition, rapidly inactivating inward currents were observed in response to depolarization, which were identified as Na+ currents. By substituting Na+ with TEA we were able to record the slower component of the inward current, which we classified as a Ca2+ current. The average current amplitudes, the proportion of the tail current to the main current as well as average deactivation rate of the tail current were calculated. Voltage-current curves were plotted for all investigated ion current components based on data analysis.

**References**

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