Evaluation of the Antinociceptive and Antinociceptive Properties of Organoselenium Salicylic Acid-Derivative Compounds in the Formalin Test in Mice

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Introduction: Among the current drugs available for pain relief, the acetylsalicylic acid is one of the most widely used. Compounds with similar structure have been studied in order to discover novel drugs with better analgesic and anti-inflammatory properties and therapeutic index. The purpose of this study was to investigate the possible antinociceptive and anti-inflammatory effects of organoselenium salicylic acid-derivative compounds [5-5’-diselanediylbis-2-hydroxybezoic acid (1A); 2-hydroxy-5-selenocyanatobenzoic acid (1B); 4-4’-diselanediylbis-2-hydroxybezoic acid (2A) and 2-hydroxy-4-selenocyanatobenzoic acid (2B)] in the formalin test, as well as potential alterations in the locomotor activity when assessed in the open-field test (OFT).

Material and Methods: Male Swiss adult mice (25-35g) were treated with the compounds (50mg/kg; per oral; p.o.) 30 and 60 min before the formalin test, comparing with the acetylsalicylic acid (ASA; 200 mg/kg; p.o.).

Results and Discussion: On the first phase of the formalin test, or neurogenic nociceptive phase, only the compounds 1B and 2B produced significant inhibition of the licking behavior [F(9,69)=4.147; p<0.001]. In addition, the compounds 1A, 1B, 2B and ASA decreased the time of the licking behavior on the second phase of the formalin test [F(9,69)=4.112; p<0.001], also called phase of inflammatory nociceptive phase. None of the compounds altered the number of crossings [F(9,69)=0.9784; p>0.05] or rearings [F(9,69)=1.002;p>0.05] in the OFT. Conclusions: Together, the results point to the antinociceptive and anti-inflammatory properties of the organoselenium salicylic acid-derivative compounds without presenting any locomotor disturbance. The compounds showed the following antinociceptive profile 1B>2B~1A>2A, suggestive of a structure-dependent relationship. This study indicates the potential significance of these compounds to the development of new clinical relevant drugs for the treatment of pain and inflammation disorders.

Keywords: antinociceptive effect, formalin test, salicylate, selenium.
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