BMC Pharmacology

Meeting abstract

3,5-Di-*t*-butyl catechol (DTCAT) as an activator of the human skeletal muscle ryanodine receptor Ca^{2+} channel and its evaluation as a test substance for the assessment of susceptibility to malignant hyperthermia

Caterina Lacava[2], Andrea Michalek-Sauberer[1], Birgit Kraft[1], Giampietro Sgaragli[2], Elisabeth Sipos[1], Carmen Höller[1], Hans-Georg Kress[1], Fabio Fusi[2] and Lukas G Weigl*[1]

Address: [1]Department of Special Anaesthesia and Pain Control, Medical University of Vienna, 1090 Vienna, Austria and [2]Department of Neuroscience, University of Siena, 53100 Siena, Italy

Email: Lukas G Weigl* - lukas.weigl@meduniwien.ac.at

* Corresponding author

from 15th Scientific Symposium of the Austrian Pharmacological Society (APHAR) Joint meeting with the Hungarian Society of Experimental and Clinical Pharmacology (MFT) and the Slovenian Pharmacological Society (SDF)
Graz, Austria. 19-21 November 2009

Published: 12 November 2009

BMC Pharmacology 2009, **9**(Suppl 2):A22 doi:10.1186/1471-2210-9-S2-A22

This abstract is available from: http://www.biomedcentral.com/1471-2210/9/S2/A22

Introduction

3,5-Di-*t*-butyl catechol (DTCAT) has been shown to release Ca^{2+} from rat skeletal muscle sarcoplasmic reticulum (SR) vesicles, which makes it a possible candidate for use as a substitute for halothane or caffeine in the *in vitro* contracture test (IVCT) for the assessment of susceptibility to malignant hyperthermia (MHS).

Methods

To characterize the effect of DTCAT at the cellular level, Ca^{2+} release experiments were performed on cultured, human skeletal muscle cells using the fluorescent Ca^{2+} indicator fura2-AM. DTCAT was also used for the first time in the IVCT to induce contractures in human skeletal muscle bundles obtained from individuals diagnosed susceptible (MHS), normal (MHN) or equivocal (MHE); these effects were compared to those elicited by the standard test substances caffeine and halothane.

Results

In single cultured skeletal muscle cells, DTCAT released Ca^{2+} from intracellular stores with a higher potency when compared to caffeine. This effect, however, was unspecific, since the release of Ca^{2+} from stores other than the SR was evident, as well as a Ca^{2+} influx, possibly triggered by depletion of intracellular Ca^{2+} stores. DTCAT induced contractures in skeletal muscle bundles in a concentration-dependent manner with an EC_{50} value of 160 ± 91 μM. However, the reaction to DTCAT in muscles from MHS individuals was similar to reactions to DTCAT in MHE or MHN muscles.

Conclusion

Due to its low specificity in inducing the release of Ca^{2+} from SR stores and the additional activation of Ca^{2+} influx, DTCAT is not an appropriate test substance for the diagnosis of MH.