

PubMed

U.S. National Library of Medicine
National Institutes of Health



Display Settings: Abstract

Radiother Oncol. 2011 Jun 23. [Epub ahead of print]

Ionizing radiation induces migration of glioblastoma cells by activating BK K(+) channels.

Steinle M, Palme D, Misovic M, Rudner J, Dittmann K, Lukowski R, Ruth P, Huber SM.

Department of Pharmacology, Toxicology and Clinical Pharmacy, University of Tübingen, Germany.

Abstract

BACKGROUND AND PURPOSE: Glioblastoma cells express high levels of Ca(2+)-activated BK K(+) channels which have been proposed to be indispensable for glioblastoma proliferation and migration. Since migration of glioblastoma cells is reportedly stimulated by ionizing radiation (IR), we tested for an IR-induced increase in BK channel activity and its effect on cell migration.

MATERIALS AND METHODS: T98G and U87MG cells were X-ray-irradiated with 0-2Gy, BK channel activity was assessed by patch-clamp recording, migration by trans-well migration assay, and activation of the Ca(2+)/calmodulin-dependent kinase II (CaMKII) by immunoblotting.

RESULTS: IR dose-dependently stimulated migration of glioblastoma cells which was sensitive to the BK channel inhibitor paxilline. Ca(2+)-permeabilization of T98G cells activated up to 350 BK channels per cells. Importantly, IR stimulated an increase in BK channel open probability but did not modify the total number of channels. Moreover, IR activated CaMKII in a paxilline-sensitive manner. Finally, inhibition of CaMKII by KN-93 abolished the IR-stimulated migration.

CONCLUSIONS: We conclude that IR stimulates BK channel activity which results in activation of CaMKII leading to enhanced glioblastoma cell migration.

Copyright © 2011 Elsevier Ireland Ltd. All rights reserved.

PMID: 21704404 [PubMed - as supplied by publisher]

LinkOut - more resources