AperTO - Archivio Istituzionale Open Access dell'Università di Torino

Abstract LB-366: Everolimus (EV) potentiates Sorafenib (SOR)activity in osteosarcoma (OS) preclinical models: a combination targeting the crosstalk between ERK1/2 and mTORC1/2 signaling pathways

This is the author's manuscript

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1695389> since 2019-03-25T14:40:48Z

Published version:

DOI:10.1158/1538-7445.AM2012-LB-366

Terms of use:

Open Access

Anyone can freely access the full text of works made available as "Open Access". Works made available under a Creative Commons license can be used according to the terms and conditions of said license. Use of all other works requires consent of the right holder (author or publisher) if not exempted from copyright protection by the applicable law.

(Article begins on next page)

Cancer Research

Search...

[Advanced Search](#)[Home](#)[About](#)[Articles](#)[For Authors](#)[Alerts](#)[News](#)

Experimental and Molecular Therapeutics

Abstract LB-366: Everolimus (EV) potentiates Sorafenib (SOR) activity in osteosarcoma (OS) preclinical models: a combination targeting the crosstalk between ERK1/2 and mTORC1/2 signaling pathways

Ymera Pignochino, Carmine Dell'Aglio, Marco Basiricò, Federica Capozzi, Loredana Tarraran, Marco Soster, Serena Marchiò, Stefania Bruno, Loretta Gammaitoni, Dario Sangiolo, Lorenzo D'ambrosio, Piero Picci, Massimo Aglietta, and Giovanni Grignani

DOI: 10.1158/1538-7445.AM2012-LB-366 Published April 2012

[Article](#)[Info & Metrics](#)

Proceedings: AACR 103rd Annual Meeting 2012-- Mar 31-Apr 4, 2012; Chicago, IL

Abstract

OS is the most frequent primary bone tumor in children and young adults. The mammalian Target of Rapamycin (mTOR) and the Extracellular Regulated Kinases (ERK)1/2 pathways have been shown to cooperate in survival advantage of OS. Inhibition of this signaling can be a rational pharmacological strategy to impinge on OS progression. This study pursued the dual blockage of ERK1/2 and mTOR pathways by combining the multikinase inhibitor SOR with the rapamycin analog EV. The synergistic anti-proliferative effect was found against 5 out of 7 OS cell lines (combination index < 1, based on Chou-Talalay method). The inhibition of OS colony growth, due to cell cycle arrest and apoptosis induction was obtained. Mechanistically SOR alone, but EV, inhibited phospho-ERK1/2. EV and SOR as single

April 2012
Volume 72,
Issue 8
Supplement
[Table of Contents](#)
[Index by Author](#)

Search this issue

[Sign up for alerts](#)[© Permissions](#)[! Article Alerts](#)[✉ Email Article](#)[🌐 Citation Tools](#)[↪ Share](#)[🐦 Tweet](#) [Jump to section](#) [Article](#)

agent induced the down-regulation of P-S6, P-4EBP. EV alone induced an increase in phospho-AKT as a consequence of the release of negative feed back by MTORC1 on MTORC2. Nonetheless, the combined treatment completely abrogated both ERK1/2 and MTORC1/2. The crosstalk among these pathways was interrupted by AMPK activation due to sorafenib-induced ROS burst and MTORC2 disassembling. The anti-tumoral activity and the inhibition of angiogenesis and metastasis in vivo were demonstrated against OS xenografts in NOD/SCID mice and in chicken chorioallantoic membrane model. A 28 daily oral gavage of mice (6/group) with SOR 5mg/kg, EV 1mg/kg, or their combination reduced tumor growth to 34%, 46%, and 29% of control slowing down cell proliferation and inducing apoptosis. In vivo model of OS metastasis obtained by e.v injection of OS cells confirmed the high metastatic potential of human OS consistently with the clinical experience. However, daily treatment of mice induced a significant reduction in number and size of lung metastases (foci area 65%, 74% and 29% of control obtained after 14 daily SOR, EV, and combined treatment). Anti-migratory effect was evidenced in 7 OS cell lines and was attributable to SRC/FAK/ERM pathway inhibition. HUVEC branching morphogenesis inhibition and reduction of blood vessel density in xenografts confirmed a strong potentiation of anti-angiogenic activity of drug combination. These results straighten our understanding of the networking nature of oncogenic signal transduction circuits in OS, therefore sustaining the rational for testing combination of sorafenib and everolimus in clinical setting.

Citation Format: {Authors}. {Abstract title} [abstract].

In: Proceedings of the 103rd Annual Meeting of the American Association for Cancer Research; 2012 Mar 31-Apr 4; Chicago, IL. Philadelphia (PA): AACR; Cancer Res 2012;72(8 Suppl):Abstract nr LB-366.
doi:1538-7445.AM2012-LB-366

©2012 American Association for Cancer Research

▼ [Related Articles](#)

No related articles found.

[Google Scholar](#)

► [Cited By...](#)

► [More in this TOC Section](#)