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Basic Study

Ca²⁺/calmodulin-dependent protein kinase II regulates colon cancer proliferation and migration *via* ERK1/2 and p38 pathways

Wei Chen, Ping An, Xiao-Jing Quan, Jun Zhang, Zhong-Yin Zhou, Li-Ping Zou, He-Sheng Luo

Abstract

AIM

To investigate the role of calmodulin-dependent protein kinase II (CaMKII) in colon cancer growth, migration and invasion.

Match Overview

1	Internet 56 words crawled on 10-Jul-2016 www.jbc.org	2%
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[The emerging role of CaMKII in cancer](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4494900/)<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4494900/>

29 Apr 2015 ... **Ca²⁺/calmodulin-dependent protein kinase II** (CaMKII) is a ... expressed in several cancers such as lung [5], breast [6], prostate [7] and **colon cancer** [8]. CaMKII promoted the cell **proliferation** via direct activation of nuclear ... **pathways** such as extracellular signal-regulated kinase 1/2 (Erk1/2), protein ...

[Metformin blocks migration and invasion of tumour cells by inhibition ...](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2936028/)<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2936028/>

Metformin decreased the PMA-induced **Ca²⁺** influx. ... cells via **Ca²⁺**-dependent PKC α /ERK and JNK/AP-1-signalling **pathways**. ... growth of cells derived from breast cancer, **colon cancer**, prostate cancer and gliomas Cell cycle-dependent activity change of **Ca²⁺/calmodulin-dependent protein kinase II** in NIH 3T3 cells.

[Regulation of MAPKs by growth factors and receptor tyrosine kinases](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2758354/)<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2758354/>

10 Jan 2007 ... Two cellular outcomes of growth factor action, namely proliferation and ... such as **proliferation**, **migration** and differentiation, are **regulated** by ... the activation of calcium/calmodulin-dependent protein kinases and On the other hand, activation of the PI3K/Akt **pathway**, in human **colon cancer** cell lines, ...

[SKF-96365 activates cytoprotective autophagy to delay apoptosis in ...](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5240807/)<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5240807/>

20 Jan 2016 ... Keywords: SKF-96365, Autophagy, Apoptosis, **Colorectal cancer**, CaMKII. Go to: ... functions, such as cell **proliferation**, cell death and enzymatic activity. ... Additionally, we found that the calcium/calmodulin-dependent protein kinase IIy is **regulated** by a **pathway** that involves increased **Ca²⁺** influx via the ...

[Regulation of Autophagy by Kinases](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3757434/)<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3757434/>

9 Jun 2011 ... **Protein kinases** are integral to the autophagy process. **regulated** 6-thioguanine-induced autophagy in **colorectal cancer** cells [57]. ... ERK controls cell

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[The emerging role of CaMKII in cancer - NCBI - NIH](#)

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[A role for Ca2+/calmodulin-dependent protein kinase II in the ...](#)

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A role for [Ca2+/calmodulin-dependent protein kinase II](#) in the ... produced an increase in extracellular signal-regulated kinase 1/2 ([ERK1/2](#)) activity that was ...

[VEGF-Induced Retinal Angiogenic Signaling Is Critically Dependent ...](#)

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The effects of the [Ca²⁺/calmodulin-dependent protein kinase II](#) (CaMKII) inhibitor ... ² VEGF exerts its biological effects on endothelial cells through two major ... [[Ca²⁺](#)]_i signal, [migration](#), [proliferation](#), and sprouting angiogenesis in human Activation of the PLC-IP3 [Ca²⁺](#) Signaling [Pathway Regulates](#) VEGF-Induced ...

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[Regulation of MAPKs by growth factors and receptor tyrosine kinases](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2758354/)<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2758354/>

10 Jan 2007 ... We concentrate on the four linear mitogen-activated **protein kinase** ... such as **proliferation**, **migration** and differentiation, are **regulated** by ... **Ca²⁺** initiates the activation of calcium/calmodulin-dependent activation of the PI3K/Akt **pathway**, in human **colon cancer** cell lines, may (ii) Ret/GDNF-receptor.

[Signalling pathways regulating the invasive differentiation of human ...](http://www.placentajournal.org/article/S0143-4004(04)00302-9/fulltext)[www.placentajournal.org/article/S0143-4004\(04\)00302-9/fulltext](http://www.placentajournal.org/article/S0143-4004(04)00302-9/fulltext)

Cellular signalling is controlled by protein kinases via sequential steps of ... stages including **proliferation**, differentiation and **migration/invasion** need to be In the placenta, expression of **ERK1** and **ERK2** was detected in villous CTBs, but Wnt **pathway through Ca²⁺/calmodulin-dependent protein kinase II** or **JNK** [[102], ...

[\[PDF\] Regulation of Autophagy by Kinases - MDPI](http://www.mdpi.com/2072-6694/3/2/2630/pdf)www.mdpi.com/2072-6694/3/2/2630/pdf

9 Jun 2011 ... Keywords: autophagy; **protein kinase**; mTOR; p70S6K; AMPK; PI3K; Akt; MAPK; PKC **ERK1** (p44) and **ERK2** (p42) are **two** isoforms of ERK that are activated ... controls cell **proliferation**, **migration**, differentiation and cell death [92]. ... **cancer** cells via induction of mitophagy. 5.2. **p38** **p38** MAPK family ...

[Ca2+/calmodulin-dependent protein kinase and Organism ... - Brenda](#)