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Basic Study

Signal transducer and activator of transcription 3 promotes the Warburg effect might by inducing pyruvate kinase M2 phosphorylation in liver precancerous lesions

Bi YH *et al.* STAT3 promotes Warburg effect by p-PKM2

Abstract

BACKGROUND

Study shows that signal transducer and activator of transcription 3 (STAT3) can increase Warburg effect by stimulating hexokinase 2 in breast cancer and upregulate lactate dehydrogenase A and pyruvate dehydrogenase kinase 1 in myeloma. STAT3 and pyruvate kinase M2 (PKM2) can also be activated and enhance Warburg effect in hepatocellular carcinoma. Precancerous lesions are critical to human and rodent hepatocarcinogenesis. However, the underlying molecular mechanism of liver precancerous lesions remains unknown. We hypothesize that STAT3 promotes the Warburg effect might by upregulating p-PKM2 in liver precancerous lesions in rats.

AIM

To investigate the mechanism of Warburg effect in liver precancerous lesions

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## Pyruvate Kinase M2: Multiple Faces for Conferring Benefits on Cancer

...

[clincancerres.aacrjournals.org/content/18/20/5554](https://clincancerres.aacrjournals.org/content/18/20/5554) ▾ [翻译此页](#)作者: M Tamada - 2012 - 被引用次数: 148 - [相关文章](#)

2012年10月15日 - The **M2** splice isoform of **pyruvate kinase** (PKM2), an enzyme that catalyzes the ... of aerobic glycolysis (known as **the Warburg effect**) in cancer cells. ... molecule, which is a cell surface marker for cancer **stem cells**. ... is **phosphorylated** by tyrosine kinases and **promotes** the **conversion** of pyruvate to lactate.

## Pyruvate Kinase M2 - Clinical Cancer Research

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2012年10月15日 - sion to lactate and leads to **Warburg effect**, whereas high activity of both PKM2 and PKM1 **promotes conversion** to acetyl-CoA ... is expressed in the **liver**, kidney, and intestine, and the R ... **M2** is expressed in embryonic cells, adult **stem cells**, and .... **phosphorylation** of PKM2 **induces** the release of fructose-.

## PKM2 and cancer: The function of PKM2 beyond glycolysis - NCBI - NIH

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4774429/> ▾ [翻译此页](#)作者: G DONG - 2016 - 被引用次数: 66 - [相关文章](#)

2016年1月29日 - **Pyruvate kinase** muscle isozyme **M2** (PKM2) is a limiting glycolytic enzyme that ... This process was termed **the Warburg effect**, or aerobic glycolysis (2). .... The high-activity tetrameric **state promotes** the **conversion** of pyruvate to ... The activation of **STAT3** in **malignant** cancer **cells** is possibly one of the most ...

## The Multifarious Functions of Pyruvate Kinase M2 in Oral Cancer Cells

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6213602/> - [翻译此页](#)

作者: M Kurihara-Shimomura - 2018

2018年9月25日 - Expression of **pyruvate kinase** M1 (PKM1) and PKM2 in oral squamous **cell** carcinoma (OSCC) patients. .... of **malignancies** are associated with tumor- **promoting** effects of



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2018年9月25日 - **Pyruvate kinase** (PK) catalyzes the final step in glycolysis, and the transition from ... oral epithelial dysplasia (OED; **precancerous lesion**), respectively (Figure 1C,D ). .... with  $\beta$ -catenin, the **signal transducer** and **activator of transcription 3** (STAT3), ... In their model, cancer cells **promoted** the **Warburg effect** in ...

## Pyruvate kinase M2 affects liver cancer cell behavior through up ...

<https://www.ncbi.nlm.nih.gov/pubmed/25661370> ▼ 翻译此页

作者: T Dong - 2015 - 被引用次数: 23 - 相关文章

2014年12月19日 - **Pyruvate kinase M2** affects **liver** cancer cell behavior through up-regulation ... The **pyruvate kinase promotes** aerobic glycolysis, and the **pyruvate kinase M2** isoform ... the mechanism by which PKM2 contributes to the **Warburg effect**, and ... (**signal transducer** and **activator of transcription 3**) at Y705 (tyrosine ...

## PARP14 promotes the Warburg effect in hepatocellular carcinoma by ...

<https://www.ncbi.nlm.nih.gov/pubmed/26258887> ▼ 翻译此页

作者: V Iansante - 2015 - 被引用次数: 55 - 相关文章

2015年8月10日 - PARP14 **promotes** the **Warburg effect** in hepatocellular carcinoma by inhibiting JNK1-dependent PKM2 **phosphorylation** and **activation**. ... (2)Department of Medicine, Section of Inflammation and **Signal Transduction**, Imperial College, ... **pyruvate kinase M2** isoform (PKM2), a key regulator of the Warburg ...

## Frontiers | High Expression of Glycolytic Genes in Cirrhosis Correlates ...

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作者: NCW Lee - 2018 - 相关文章

2018年10月31日 - **Liver** cirrhosis is considered to be a key player in HCC ... We found that gene expression of glycolytic enzymes is up-regulated in **precancerous** cirrhotic livers and ... aldolase A (ALDOA) and **pyruvate kinase M2** (PKM2) may represent ... of SDHB in HCC **promote** the **Warburg** ...





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## High Expression of Glycolytic Genes in Cirrhosis Correlates With the ...

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作者: NCW Lee - 2018 - 相关文章

2018年10月31日 - **Liver** cirrhosis is considered to be a key player in HCC ... of glycolytic enzymes is up-regulated in **precancerous** cirrhotic livers and ... This metabolic phenomenon, known as the **Warburg effect** or .... **3-phosphate dehydrogenase**], PKM2 [**pyruvate kinase M2**]) was ..... ROS-dependent **signal transduction**.

## Tyrosine Kinase Signaling in Cancer Metabolism: PKM2 Paradox in ...

<https://www.ncbi.nlm.nih.gov/pubmed/30087897> - 翻译此页

作者: EK Wiese - 2018 - 被引用次数: 3 - 相关文章

2018年7月24日 - (3)Division of Oncology Research, Mayo Clinic, Rochester, MN, United States. The **Warburg Effect**, or aerobic glycolysis, is one of the major ... thus **promoting** increased glycolytic rate and tumor cell proliferation. Paradoxically however, tyrosine **phosphorylation** of **pyruvate kinase M2** isoform (PKM2) results ...

## [PDF] PKM2 affects the development of hepatocellular carcinoma

[www.ijcem.com/files/ijcem0022849.pdf](http://www.ijcem.com/files/ijcem0022849.pdf) ▼ 翻译此页

作者: R Zhao - 2016 - 被引用次数: 1 - 相关文章

2016年6月30日 - shows that **pyruvate kinase** isozyme splice variant 2 (PKM2) is highly ... the landscape of cancer management [3]. ... which is also known as the **Warburg effect** (aer- ... et al