ChREBP activates metabolic gene expression

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This is just an excerpt of a full-length report for this pathway. To access the complete report, please download it at the Reactome Textbook.

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Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

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Literature references


Reactome database release: 82

This document contains 1 pathway and 6 reactions (see Table of Contents)
ChREBP activates metabolic gene expression

**Stable identifier:** R-HSA-163765

**Compartments:** nucleoplasm, cytosol, endoplasmic reticulum membrane

ChREBP (Carbohydrate Response Element Binding Protein) is a large multidomain protein containing a nuclear localization signal near its amino terminus, polyproline domains, a basic helix-loop-helix-leucine zipper domain, and a leucine-zipper-like domain (Uyeda et al., 2002). Its dephosphorylation in response to molecular signals associated with the well-fed state allows it to enter the nucleus, interact with MLX protein, and bind to ChRE DNA sequence motifs near Acetyl-CoA carboxylase, Fatty acid synthase, and Pyruvate kinase (L isoform) genes (Ishi et al.2004). This sequence of events is outlined schematically in the picture below (adapted from Kawaguchi et al. (2001) - copyright (2001) National Academy of Sciences, U.S.A.).

**Literature references**


**Editions**

2005-05-13 Authored Gopinathrao, G.
Formation of ChREBP:MLX heterodimer

- **Location:** ChREBP activates metabolic gene expression
- **Stable identifier:** R-HSA-163666
- **Type:** binding
- **Compartments:** nucleoplasm
- **Inferred from:** Formation of mChREBP:mMlx complex (Mus musculus)

At the beginning of this reaction, 1 molecule of 'ChREBP protein', and 1 molecule of 'MLX protein' are present. At the end of this reaction, 1 molecule of 'ChREBP:MLX' is present.

This reaction takes place in the 'nucleus'.

**Followed by:** Transcriptional activation of Acetyl-CoA carboxylase by ChREBP:MLX, Transcriptional activation of FAS monomer gene by ChREBP:MLX, Transcriptional activation of pyruvate kinase gene by ChREBP:MLX, Transcriptional activation of Citrate lyase monomer gene by ChREBP:MLX, Transcriptional activation of GP-acyl transferase gene by ChREBP:MLX
Transcriptional activation of pyruvate kinase gene by ChREBP:MLX

Location: ChREBP activates metabolic gene expression

Stable identifier: R-HSA-163669

Type: omitted

Compartments: nucleoplasm, cytosol

Inferred from: Transcriptional activation of pyruvate kinase L isoform gene by mChREBP:mMLX (Mus musculus)

At the end of this reaction, 1 molecule of 'pyruvate kinase, liver and RBC' is present.

This reaction takes place in the 'nucleus'.

Preceded by: Formation of ChREBP:MLX heterodimer
Transcriptional activation of Citrate lyase monomer gene by ChREBP:MLX

**Location:** ChREBP activates metabolic gene expression

**Stable identifier:** R-HSA-163770

**Type:** omitted

**Compartments:** nucleoplasm, cytosol

At the end of this reaction, 1 molecule of 'citrate lyase monomer' is present.

This reaction takes place in the 'nucleus'.

**Preceded by:** Formation of ChREBP:MLX heterodimer

**Literature references**

Transcriptional activation of FAS monomer gene by ChREBP:MLX

Location: ChREBP activates metabolic gene expression

Stable identifier: R-HSA-163733

Type: omitted

Compartments: nucleoplasm, cytosol

At the end of this reaction, 1 molecule of 'Fatty acid synthase ' is present.

This reaction takes place in the 'nucleus' (Ma et al. 2005, Havula et al. 2012).

Preceded by: Formation of ChREBP:MLX heterodimer

Literature references


Transcriptional activation of Acetyl-CoA carboxylase by ChREBP:MLX

**Location:** ChREBP activates metabolic gene expression

**Stable identifier:** R-HSA-163743

**Type:** omitted

**Compartments:** nucleoplasm, cytosol

At the end of this reaction, 1 molecule of Acetyl-CoA carboxylase 2 is present.

This reaction takes place in the 'nucleus' (Ma et al. 2006).

**Preceded by:** Formation of ChREBP:MLX heterodimer

**Literature references**

Transcriptional activation of GP-acyl transferase gene by ChREBP:MLX

Location: ChREBP activates metabolic gene expression

Stable identifier: R-HSA-163748

Type: omitted

Compartments: endoplasmic reticulum membrane, nucleoplasm

At the end of this reaction, 1 molecule of '1-acyl-sn-glycerol-3-phosphate acyltransferase alpha ' is present.

This reaction takes place in the 'nucleus' (Ma et al.2007).

Preceded by: Formation of ChREBP:MLX heterodimer

Literature references

# Table of Contents

**Introduction**  
1

- **ChREBP activates metabolic gene expression**  
  2

  - **Formation of ChREBP:MLX heterodimer**  
  3

  - **Transcriptional activation of pyruvate kinase gene by ChREBP:MLX**  
  4

  - **Transcriptional activation of Citrate lyase monomer gene by ChREBP:MLX**  
  5

  - **Transcriptional activation of FAS monomer gene by ChREBP:MLX**  
  6

  - **Transcriptional activation of Acetyl-CoA carboxylase by ChREBP:MLX**  
  7

  - **Transcriptional activation of GP-acyl transferase gene by ChREBP:MLX**  
  8

**Table of Contents**  
9