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PII: S1084-9521(17)30289-6
DOI: http://dx.doi.org/doi:10.1016/j.semcdb.2017.07.011
Reference: YSCDB 2274

To appear in: *Seminars in Cell & Developmental Biology*

Received date: 7-6-2017
Accepted date: 7-7-2017

Please cite this article as: Engelking Luke J, Cantoria Mary Jo, Xu Yanchao, Liang Guosheng.Developmental and extrahepatic physiological functions of SREBP pathway genes in mice.*Seminars in Cell and Developmental Biology* http://dx.doi.org/10.1016/j.semcdb.2017.07.011

Developmental and extrahepatic physiological functions of SREBP pathway genes in mice

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Highlights

- SREBPs are membrane-bound transcription factors that control lipid biosynthesis.
- Physiological functions of SREBP pathway genes have been extensively studied in mice.
- Scap sustains cell division in intestine and in T cells by driving lipid synthesis.
- SREBP-1, SREBP-2, and Scap play varied roles in innate and adaptive immunity.
- SREBPs provide cholesterol synthesis essential for brain development and function.

Abstract: Sterol regulatory element-binding proteins (SREBPs), master transcriptional regulators of cholesterol and fatty acid synthesis, have been found to contribute to a diverse array of cellular processes. In this review, we focus on genetically engineered mice in which the activities of six components of the SREBP gene pathway, namely SREBP-1, SREBP-2, Scap, Insig-1, Insig-2, or Site-1 protease have been altered through gene knockout or transgenic approaches. In addition to the expected impacts on lipid metabolism, manipulation of these genes in mice is found to affect a wide array of developmental and physiologic processes ranging from interferon signaling in macrophages to synaptic transmission in the brain. The findings reviewed herein provide a blueprint to guide future studies defining the complex interactions between lipid biology and the physiologic processes of many distinct organ systems.