

Regulation of metabolism and growth by Notch signalling

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Glycolytic switch is a characteristic feature of rapidly proliferating cells, like cells during development and during immune response or cancer cells, as well as of stem cells. Notch signalling is known to stimulate cell growth and division in various contexts and it is also needed for stem cell maintenance and for cell specification during immune response. Whether Notch regulates metabolic genes during these processes and whether they represent direct transcriptional Notch targets is not known. We show that genes mediating cellular metabolic changes similar to Warburg effect are direct transcriptional targets of Notch signalling. A short pulse of Notch activity is able to elicit long lasting metabolic effects that is not dependent on the level of expression of the Notch receptor. Notch mediated metabolic shift helps to stimulate tissue growth during development and during Notch induced hyperplasia. Notch is active in other cells that undergo glycolytic switch and the direct regulation of metabolic genes may be a common mechanism that helps Notch to exert its effects in these tissues.