Sir2B regulates cell-cell adhesion

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Sirtuin interacts with many regulatory proteins involved in energy homeostasis. There are 5 Sirtuins, Sir2A to Sir2E, in the Dictyostelium database. We have previously reported that Sir2D regulates adenylate cyclase (aca) expression through the interaction with a transcription factor MybB. The developmental impairment of RNAi-mediated Sir2D knockdown cells was similar to that of the cells treated with nicotinamide, a Sirtuin inhibitor, except of the impairment of aggregate formation at 24 h, suggesting that another Sirtuins may be involved in early Dictyostelium development. When cells were pre-cultured at high density a day before development, development upon starvation was accelerated with an increased expression of aca. Because Sir2D and Sir2B expressions among 5 Sirtuins were also increased at 4 h after starvation, we focused to study Sir2B function. When Sir2B was expressed as GFP fusion, GFP-Sir2B showed a punctate expression near cell surface. The timing of streaming formation of GFP-Sir2B expressed cells was the same as that of control cells, but enhanced cell-cell adhesion without swirling was observed during development. TgrB1 expression among adhesion molecules was increased at 6 and 8 h after starvation. RNAi-mediated Sir2B knockdown cells was generated and found that condensed aggregate formation was delayed. When Sir2B knockdown cells were developed on agar, arrested loose aggregates after 24 h were observed. The result suggests that Sir2B regulates cell-cell adhesion during aggregates formation.