

developing retina. These results exclude a common mechanism for M/L-cone maturation: they either transdifferentiate from S-cones or may develop independently.

The experiments have been supported by the following grants: Hungarian Scientific Research Fund (OTKA #T-042524, #F-61717).

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The effect of TGF- β 1 and high glucose on the development of insulin cells in the chick pancreas

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Numerous factors are believed to affect the proliferation and differentiation of β -cells, which are responsible for secreting insulin in the pancreas. A means of enhancing β -cell proliferation in the pancreas would prove invaluable in the treatment of insulin-dependant diabetes. TGF- β 1 is thought to decrease the proportion of β -cells with respect to α -cells, while glucose is thought to enhance β -cell proportions in rats (De Gasparo et al. 1978). However, recent studies have shown that chick pancreatic cells may respond differently to glucose by showing a reduction in β -cell proportions (Kramer and Alison 2005). Long-term exposure to glucose has also been shown to have an apparent inhibitory effect on β -cells (Rawdon and Andrew 1997). The aim of the study was to test the effect of TGF- β 1, a potent cell proliferation inhibitor, on the proportion of β -cells in embryonic chick dorsal pancreatic buds *in vitro*, with short-term exposure to high levels of glucose in Ham's F12.ITS medium. Five-day old chick dorsal pancreatic buds were cultured in serum-free medium for 7 days. Growth factor-reduced Matrigel was used as the extracellular matrix for culturing the explants as it contains reduced levels of growth factors, including TGF- β 1. Ham's F12.ITS with or without TGF- β 1 was used as the medium in which the explants were cultured to test the response of the developing β -cells to TGF- β 1. A group of explants were also cultured in Ham's F12.ITS with high levels of glucose to test the effect of TGF- β 1 on developing β -cells in the presence of glucose. A fourth group of explants were cultured in a high glucose-containing medium without added TGF- β 1. Explants cultured on growth factor-reduced Matrigel with Ham's F12.ITS showed a much higher proportion of β -cells to α -cells compared to explants cultured on growth factor-reduced Matrigel with Ham's F12.ITS and added TGF- β 1. TGF- β 1 decreased the proportion of β -cells to α -cells, as expected (Rawdon and Andrew 1998; Kramer and Alison 2005). However, the addition of high levels of glucose to the medium for short periods of time increased β -cell proportions only in the presence of TGF- β . The study showed that TGF- β 1 decreased the proportions of β -cells in the chick dorsal pancreatic bud. Glucose, however appeared to only partially rescue β -cells in the avian developing pancreas in the presence of TGF- β 1.

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