

P025 The influence of nutrient supply on the growth of intervertebral disc cells

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The influence of nutrient supply on intervertebral disc cell behaviour is poorly understood, despite the fact that increased levels of proliferation, apoptosis and cell senescence have been reported in pathological human discs. We have examined the effects of serum (20% vs 0% FCS), glucose (~3 vs 0g/L) and oxygen (~21% vs 1%) supply on bovine disc cells cultured in monolayers (to induce proliferation) or in alginate.

In monolayers, serum deprivation inhibited cell proliferation and increased the expression of senescence associated β -galactosidase (SA- β -gal). Serum-deprived disc cells also adopted a stellate morphology. Glucose and oxygen deprivation had no effect on SA- β -Gal expression. Cells cultured in the presence of serum and without glucose proliferated most rapidly, independently of oxygen levels. Disc cell viability was unaffected in monolayers over short time periods. In contrast, cell viability was significantly decreased in alginate cultures deprived of serum, but not glucose or oxygen. SA- β -Gal expression also was increased in serum-deprived alginate cultures, but was unaffected by glucose or oxygen levels. Cell clusters formed in alginate in the presence of serum and absence of glucose only, independently of oxygen levels. These *in vitro* studies mimic the *in vivo* situation in humans and suggest that serum-derived factors have a major influence on intervertebral disc cells.