Study and retina allotransplantation of porcine ciliary epithelium (CE)-derived cells

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Statements

with the thesis

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of

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1. Retinal development in pig morphologically and histologically parallels retinal development in humans (this Thesis, Chapter 2).
2. A small proportion of cells from the newborn pig CE can proliferate and give rise to sphere cultures *in vitro* under controlled culture conditions (MacNeil et al., Stem Cells. 2007 Oct;25(10):2430-2438; this Thesis, Chapter 3).
3. Porcine CE-derived spheres in culture have mixed epithelial and neural properties and possess limited self-renewal potential (this Thesis, Chapters 3 and 5).
4. Under differentiating conditions *in vitro*, porcine CE-derived cells can express markers of mature retinal cells (MacNeil et al., Stem Cells. 2007 Oct;25(10):2430-2438; this Thesis, Chapters 3 and 5).
5. *In vivo* in the young pig retina, allotransplanted CE-derived cells migrate from the site of injection and express markers of mature retinal cells, including photoreceptors and RPE (this Thesis, Chapter 5).
6. Two distinct cell populations located in the adult mammalian CE and at the retinal margin are maintained quiescent by cell extrinsic signaling mechanisms, but can be stimulated to proliferate and generate new neurons *in vitro* and *in vivo* (Bhatia et al., Exp Eye Res. 2009 Sep;89(3):373-382; Close et al., Development. 2005 Jul;132(13):3015-3026; this Thesis, Chapters 3 and 5)
7. Inducing stem cell properties in mammalian Müller or CE cells *in situ* to repopulate the retina following cell loss could be a reasonable approach only if the number of functioning photoreceptor cells produced was significantly enhanced (Tackenberg et al., Mol Vis. 2009 Sep 17;15:1886-1896).
8. It has long been believed that fate is “locked” in retinal postmitotic cells. However, recent data suggest that developing retinal cells and some mature cells maintain a certain degree of plasticity even after cell cycle exit (Ng et al., J Neurosci. 2011 Aug 3;31(31):11118-11125).
9. Marketing at approximately $294,000/patient/year of the FDA-approved drug Kalydeco® for cystic fibrosis makes one hope that policies are set in place with the new US National Health Care Act and by public healthcare systems worldwide to ensure wide access to this treatment, not only to advance patient care, but also to narrow the gap between the rich and the poor.
10. News articles that oversimplify and discount accuracy for the sake of clarity, not only produce lousy information, but also miss the opportunity to educate the public in science and technology, and give them the tools to make informed choices in their every day life.

Leiden, September 27th, 2012