

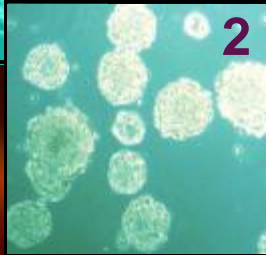
- The birth and death of dopamine neurons
- The core renewal / differentiation switch

**PARKINSON'S
DISEASE**

**HUMAN
GENETICS**

Differentiation of mouse and human ES cells to dopamine neurons

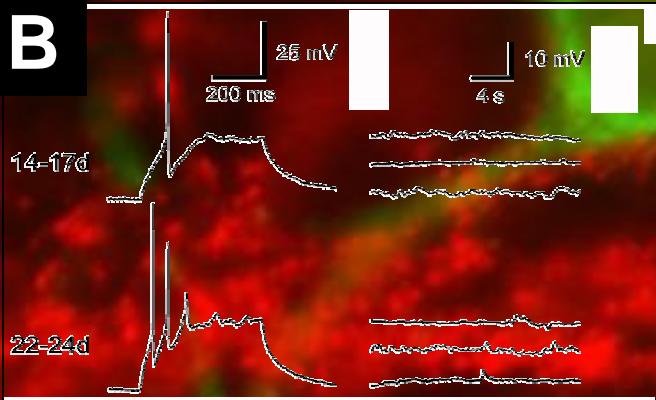
A



Synaptophysin / TH

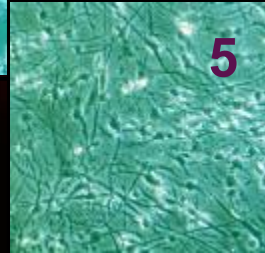
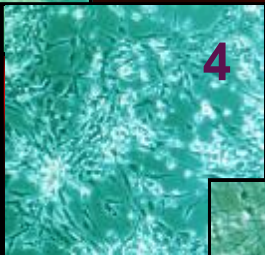
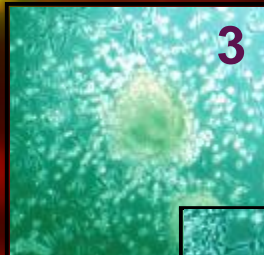
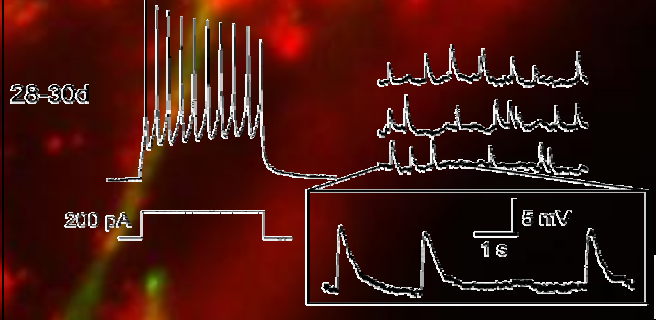
- Okabe et al., 1996
- Brustle et al., 1998
- Lee et al., 2000
- Lumelsky et al., 2001
- Kim et al., 2002

B

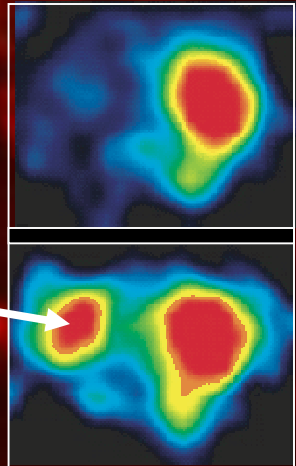


Stage 5 hES

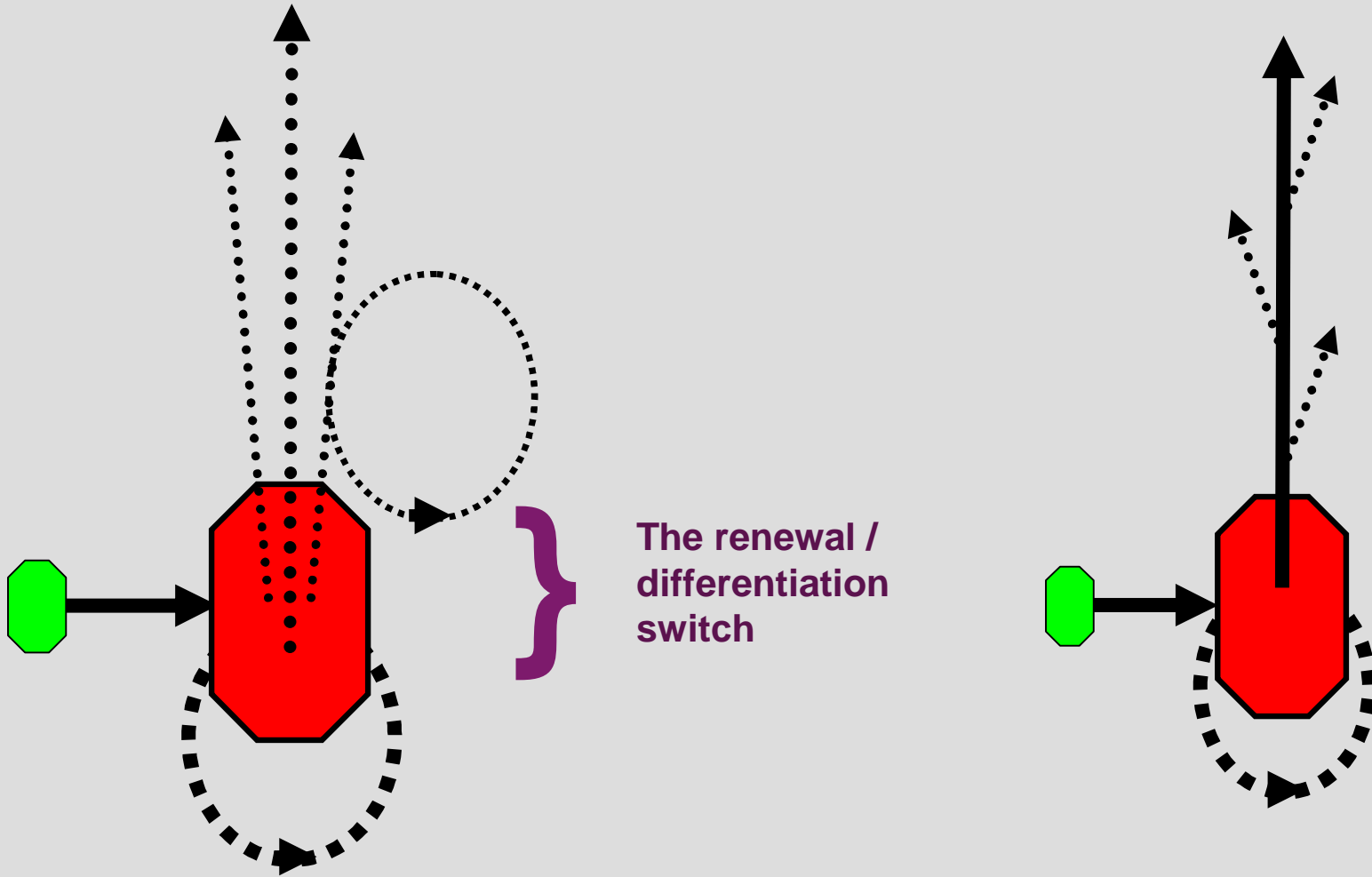
Kim et al.
Unpublished data



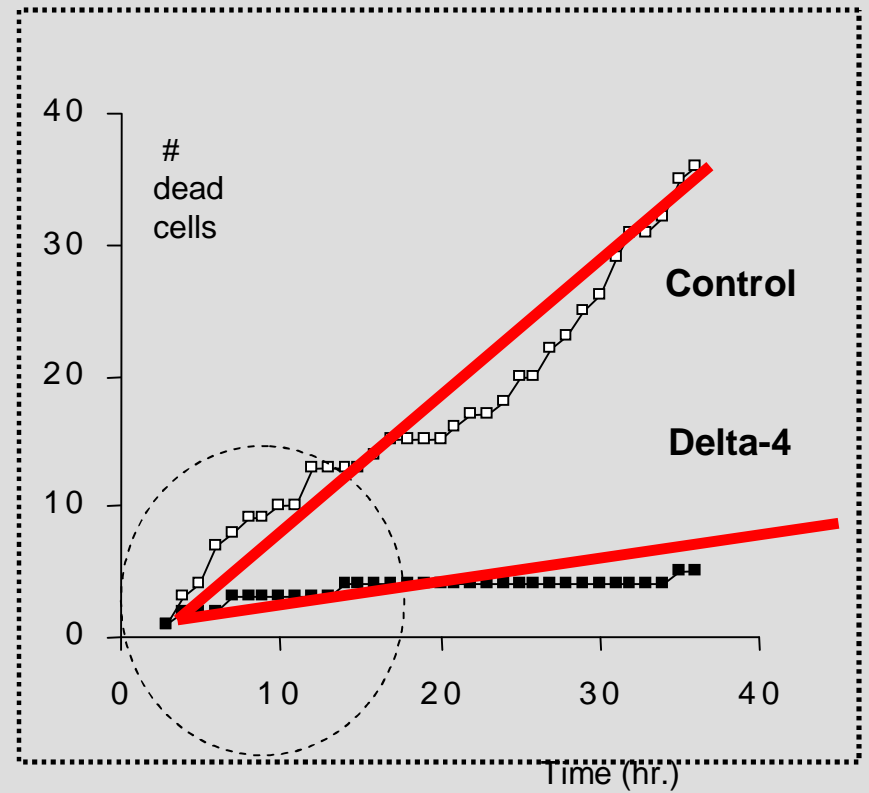
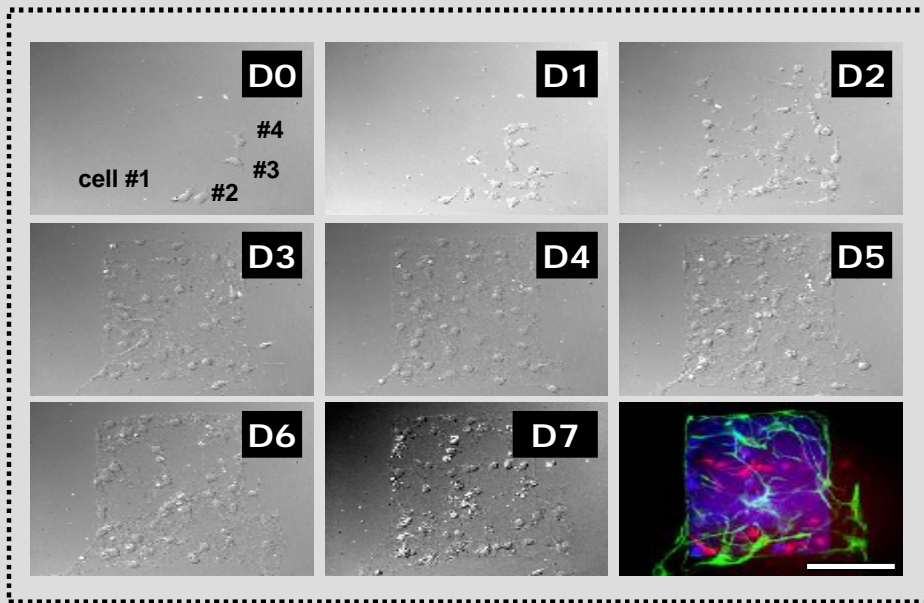
Graft



Survival / Self-renewal Fate choice > Tissue Form & Function



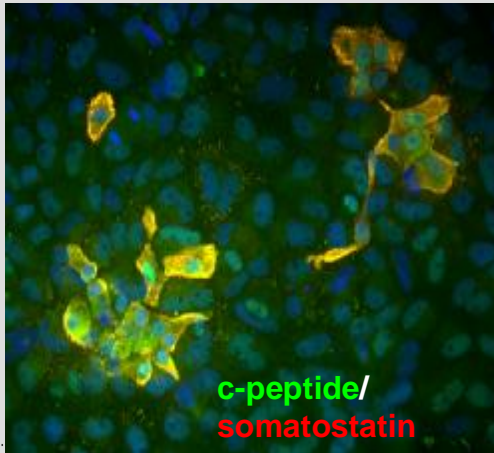
Self-renewal and fate choice



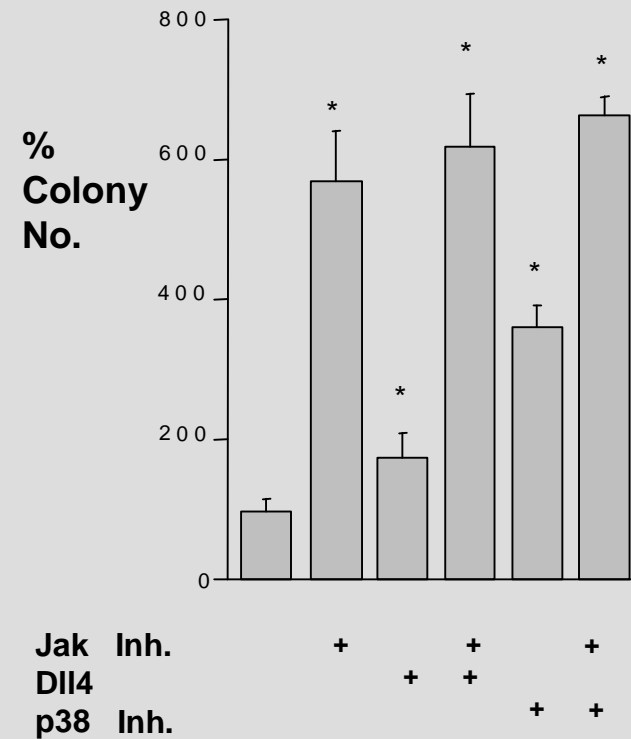
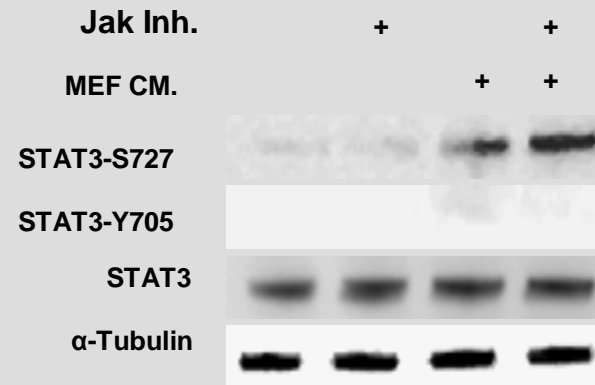
A general self-renewal/differentiation switch

Nature, 2006

Pancreatic endocrine precursors



human ES cells

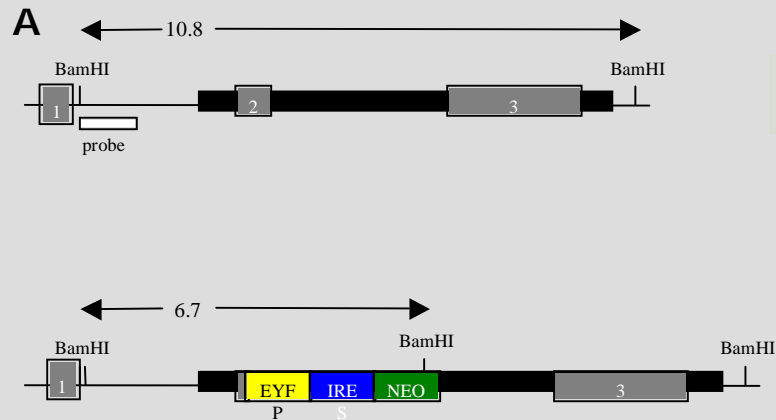


Generation of a p21-YFP human ES cell line

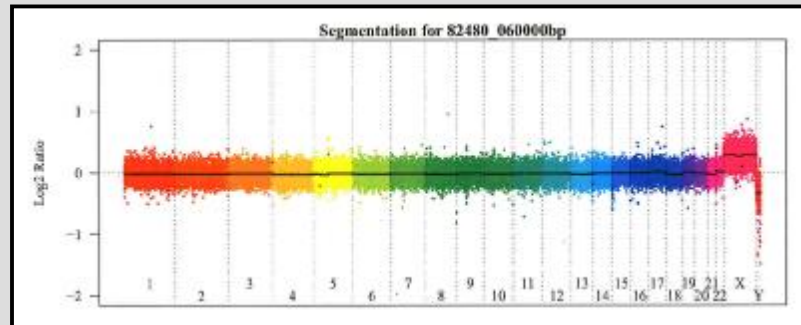
Kye-Yoon Park, Kevin Chen and colleagues at the NIH-SCF

Cell line UC-O6 at passage 63

Vector p21-EYFP-IRES-Neo

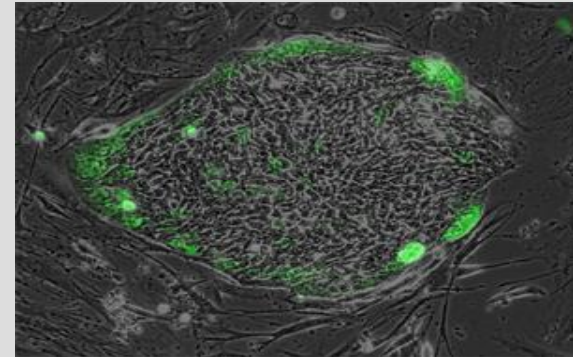


B



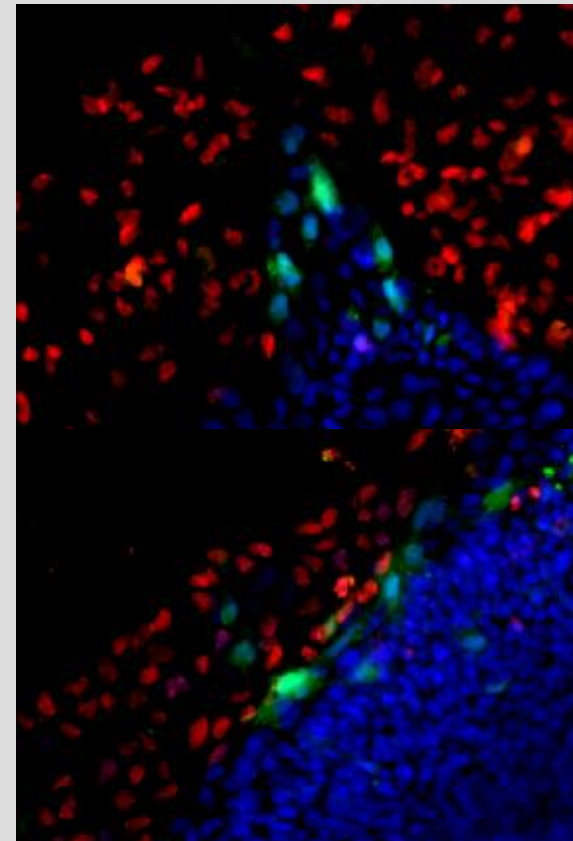
C

p21-YFP
in live
undifferentiated
ES cells

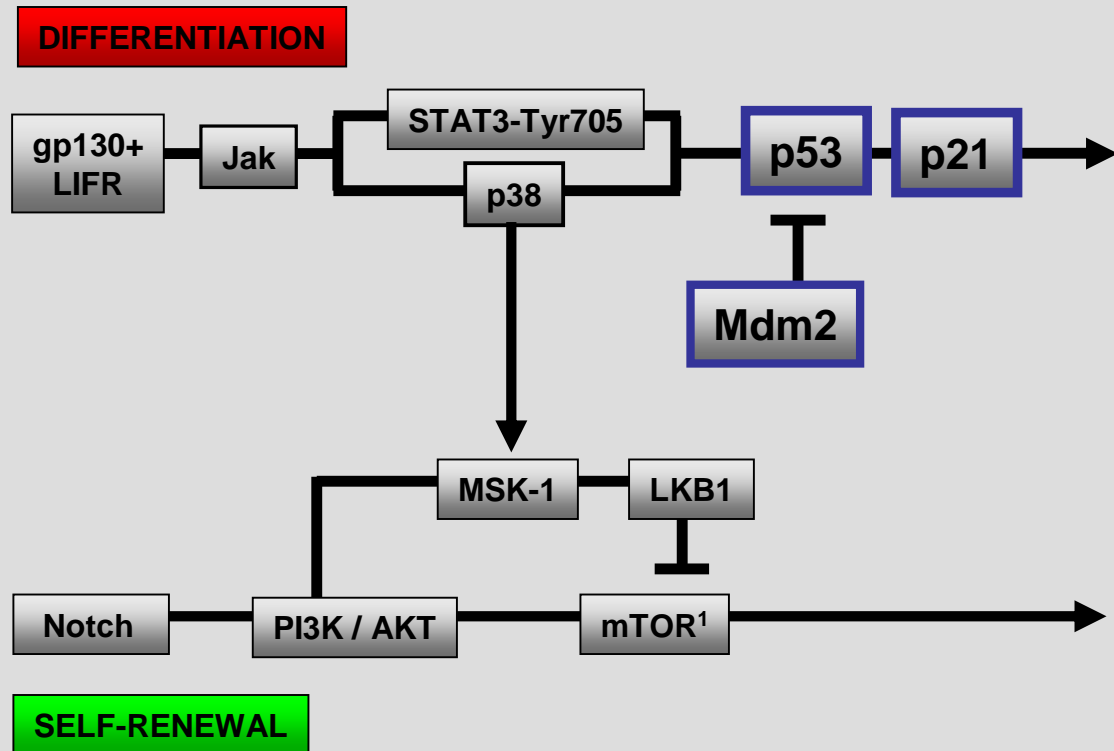
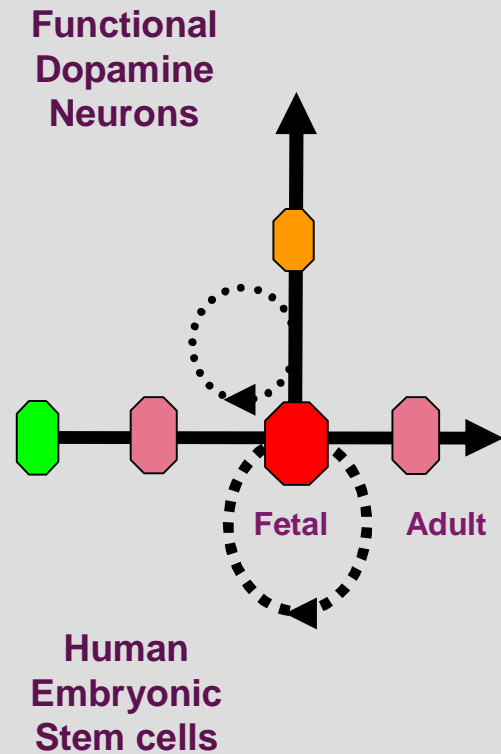


D

p21-YFP
Sox17
Oct4
in the switch
from differentiated
to undifferentiated
ES cells



Clinically relevant tests currently exist to assess new human ES cell lines



Laboratory of Molecular Biology,
NINDS

Human Stem Cell Facility
NIH

The self-renewal/differentiation switch in neural stem cells

