## Delayed implantation and Wnt-β-catenin signaling

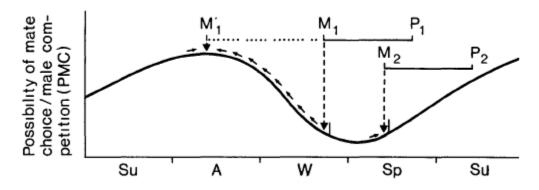
Meghan Bills
Biology of Reproduction
April 3<sup>rd</sup>, 2008

### **Delayed Implantation**

- Cessation of division at blastocyst stage
- Remains suspended in uterus lumen from days to months
- Seasonal- marine mammals
- Lactational
- Environmental

### Why utilize Delayed Implantation

- Respond to changes in environment
- To uncouple timing of mating and gestation



Sandell, M. 1990. The evolution of seasonal delayed implantation. The Quarterly Review of Biology. 65:23-42.

#### **Utilized by...**

- Mammals
  - Described in over 100 species
  - Most common in Carnivora esp:Mustelidae
  - marsupials
- Reptiles/Amphibians
- Fish

## **Mammals-Signaling Pathway**

- Changing light levels trigger release of LH and/or prolactin from pituitary gland
- Corpus luteum develops releasing progesterones and something unknown
- Both outer layer and inner cell mass of blastocyst begin dividing
- -Uterine environment changes and implantation occurs

# Inactivation of nuclear Wnt-β-catenin signaling limits blastocyst competency for implantation

Huirong Xie, Susanne Tranguch, Xiangxu Jia, Hao Zhang, Sanjoy K. Das, Sudhansu K. Dey, Calvin J. Kuo and Haibin Wang.

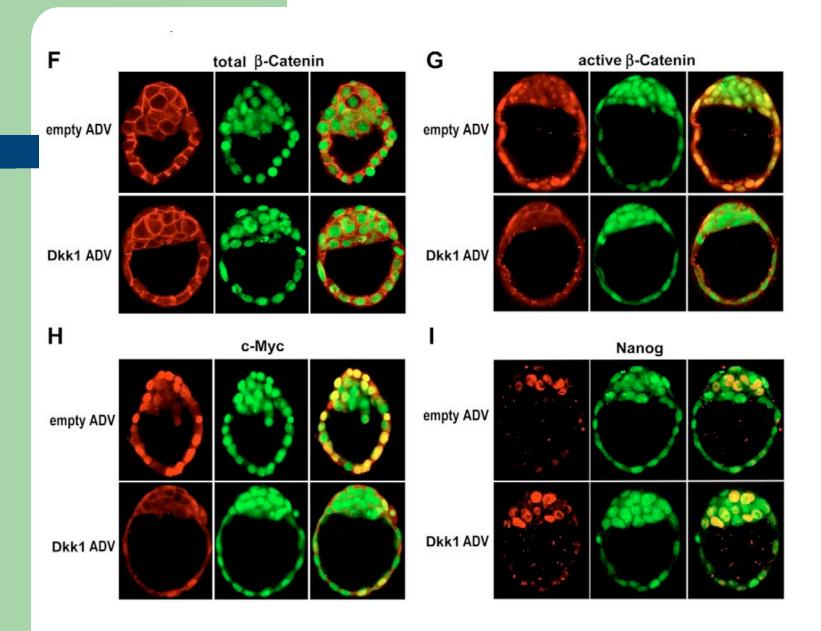
2008. Development. 135:717-727

### **Wnt Pathway**

- Family of genes with highly conserved signaling proteins
- Well known for involvement in embryogenesis and cancer.
- Role in synchronizing blastocyst activation and uterine receptivity not well understood.

#### Mouse Models

- Assess silencing of canonical Wnt signaling in pregnant mice.
- Implantation was assessed on day five of pregnancy.
- Trophoblast stem cell culture was used to assess various Wnt family protein components



- Demonstrates that silencing Wnt-β-catenin signaling :
  - does not affect development of embryo into blastocyst.
  - does block competency to implant.
  - does not inhibit development of inner cell mass
  - may affect blastocyst development after implantation.

#### Therefore:

- Wnt signaling is one of what are probably many pathways involved in blastocyst delay.
- The trigger to initiate and end delay still unknown.
- The effect of external influences: endocrine disruptors, decreased nutrition, global warming, etc... unknown.