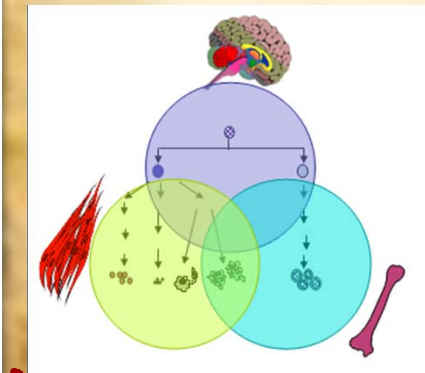


# Cancer - Mesenchymal stem Cell Axis: Issue of Safety

Pranela Rameshwar, Ph.D.



**Stem Cell: Repair Medicine**

**RUTGERS**

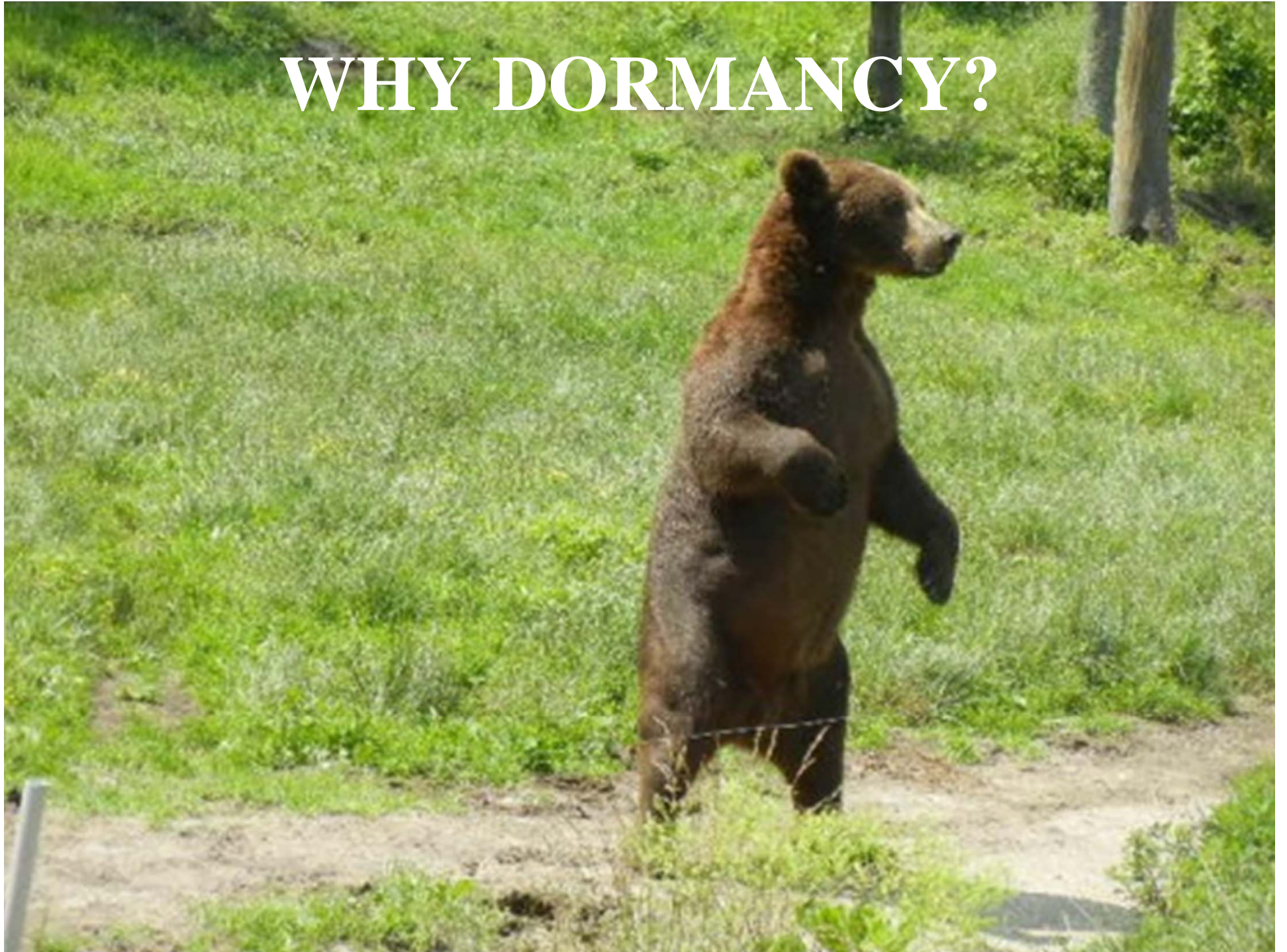
New Jersey Medical School

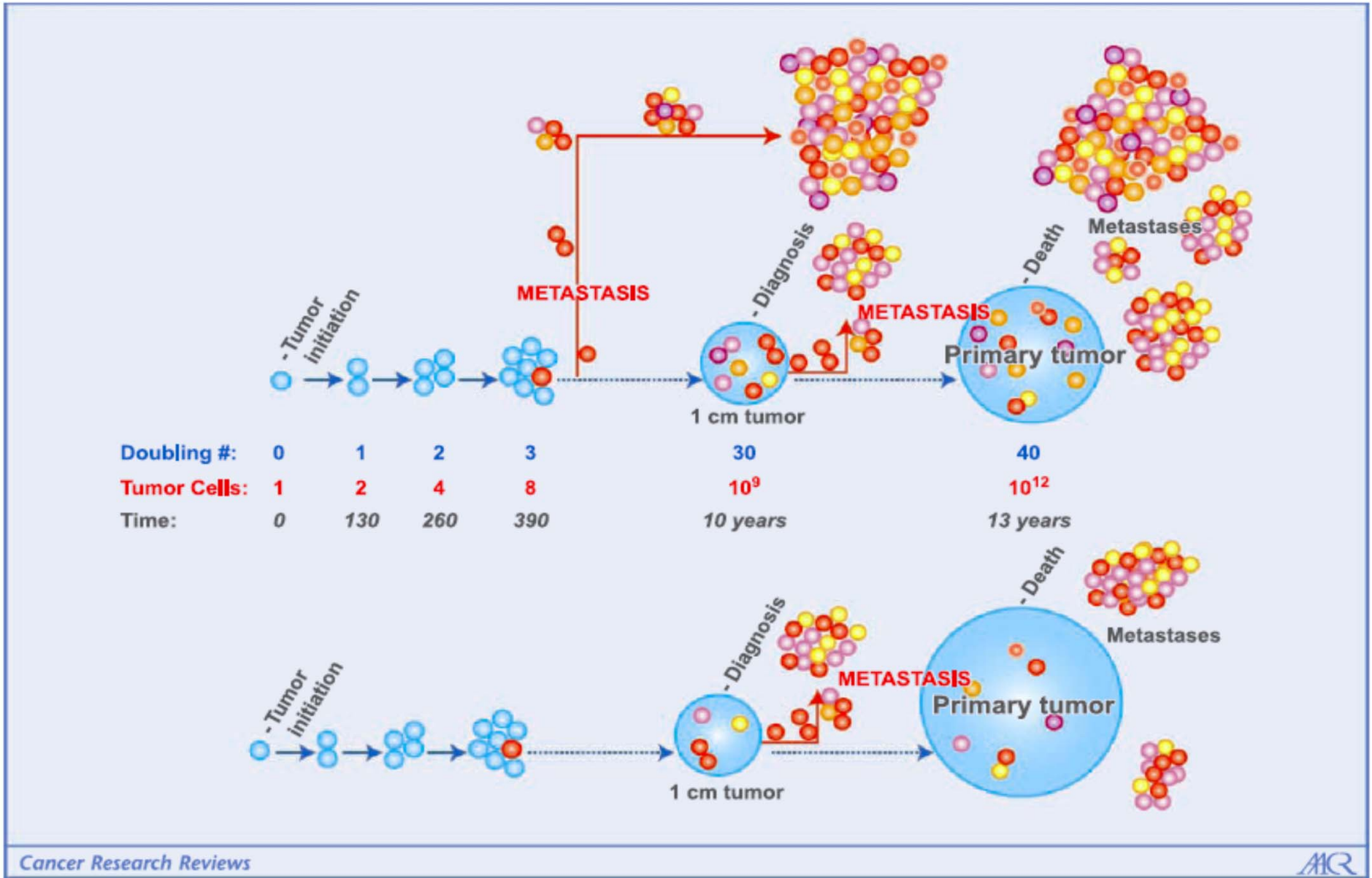




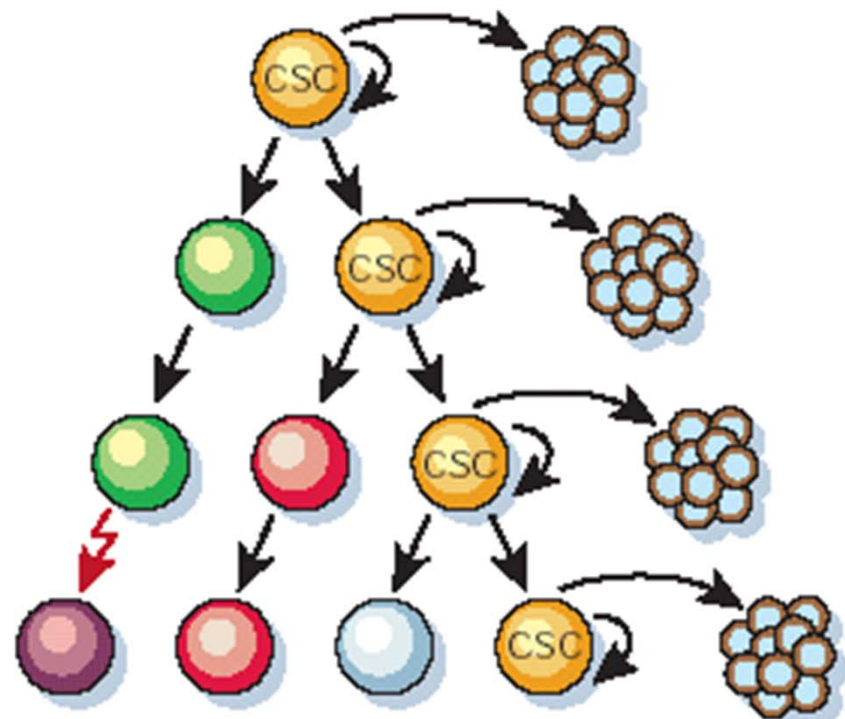
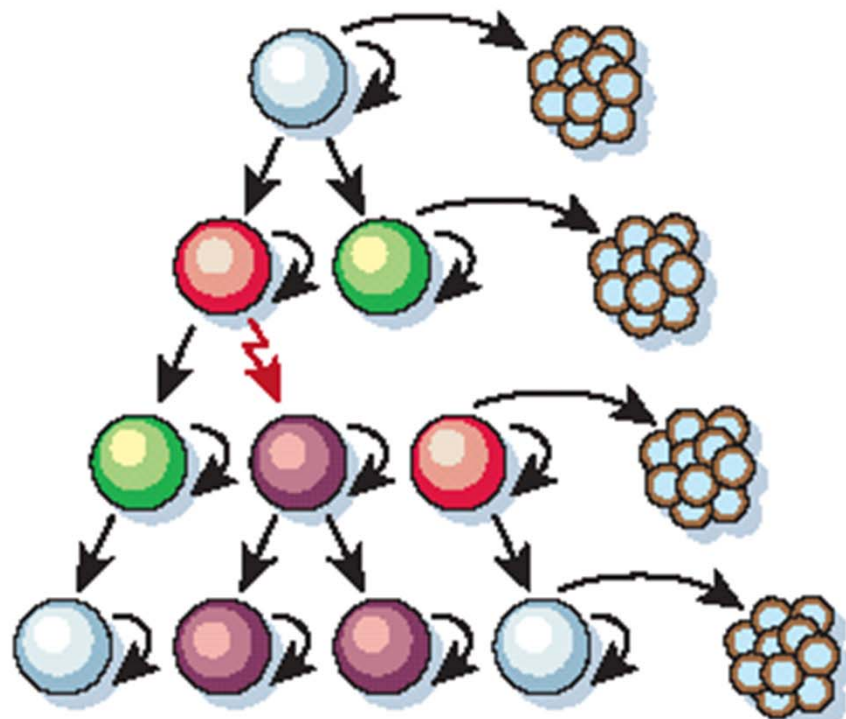
- **Breast Cancer**
  - Mesenchymal Stem Cell (MSCs)
    - Immune Response
- **Cancer Stem Cell (CSC)**
  - Interaction with MSC
  - Distinct immune response
- *In vivo*:
  - MSC:
    - Preparing for dormancy

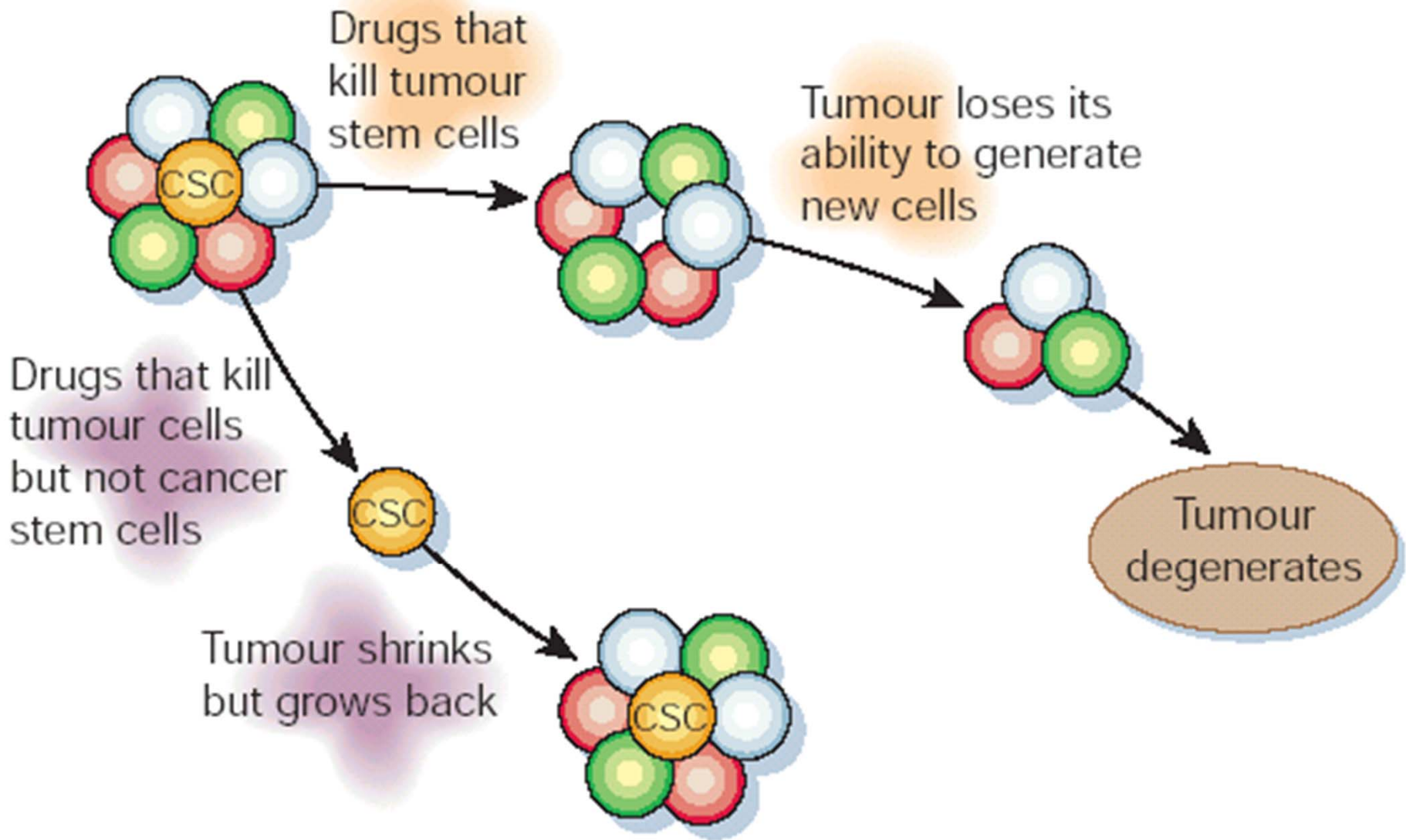
# WHY DORMANCY?



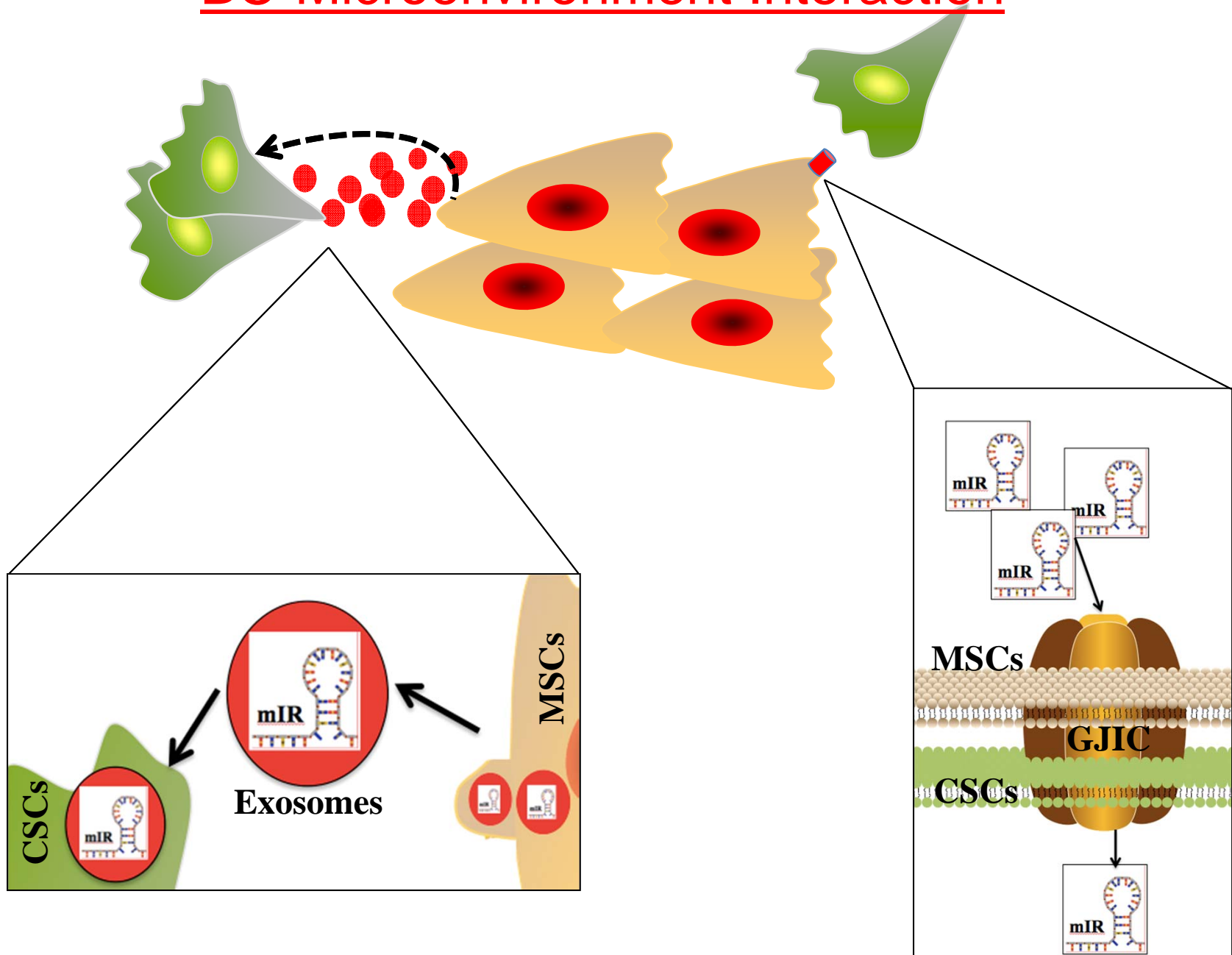


Talmage JE, *Cancer Res* 2007;67:11471





# BC-Microenvironment Interaction



**MESENCHYMAL STEM CELLS**



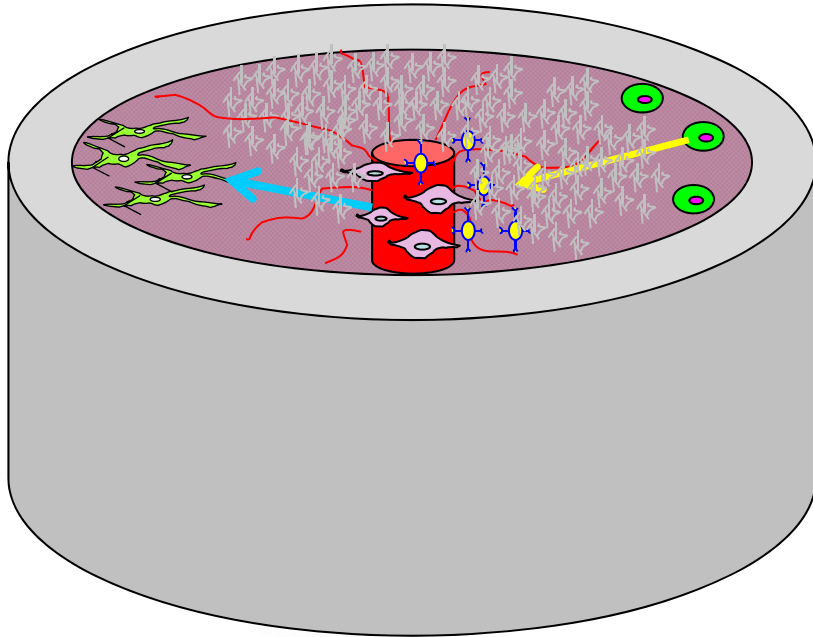


## Where are Mesenchymal Stem Cells?

- ▣ **BM**
  - Adult
  - Fetal
- ▣ First trimester fetal blood
- ▣ Fetal Liver
- ▣ Fetal Lung
- ▣ Umbilical Cord (Wharton Jelly)
- ▣ Fetal Membrane
- ▣ **Placenta**
- ▣ **ADIPOSE TISSUE**

## BM:

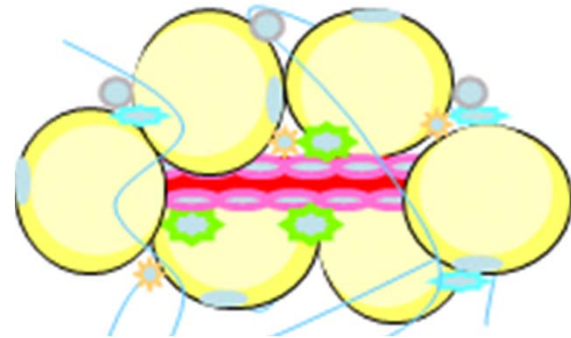
Endosteal vs. others

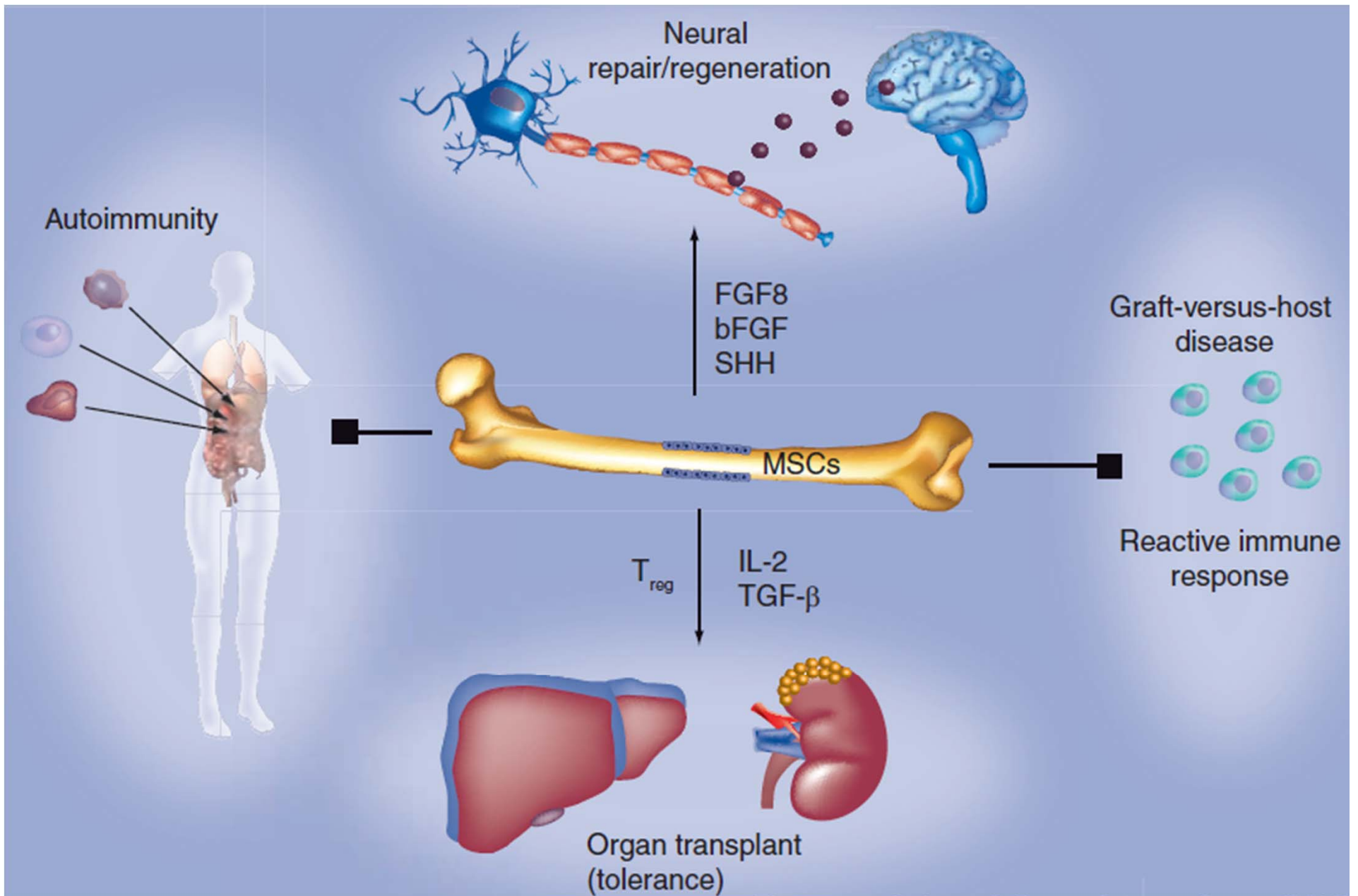


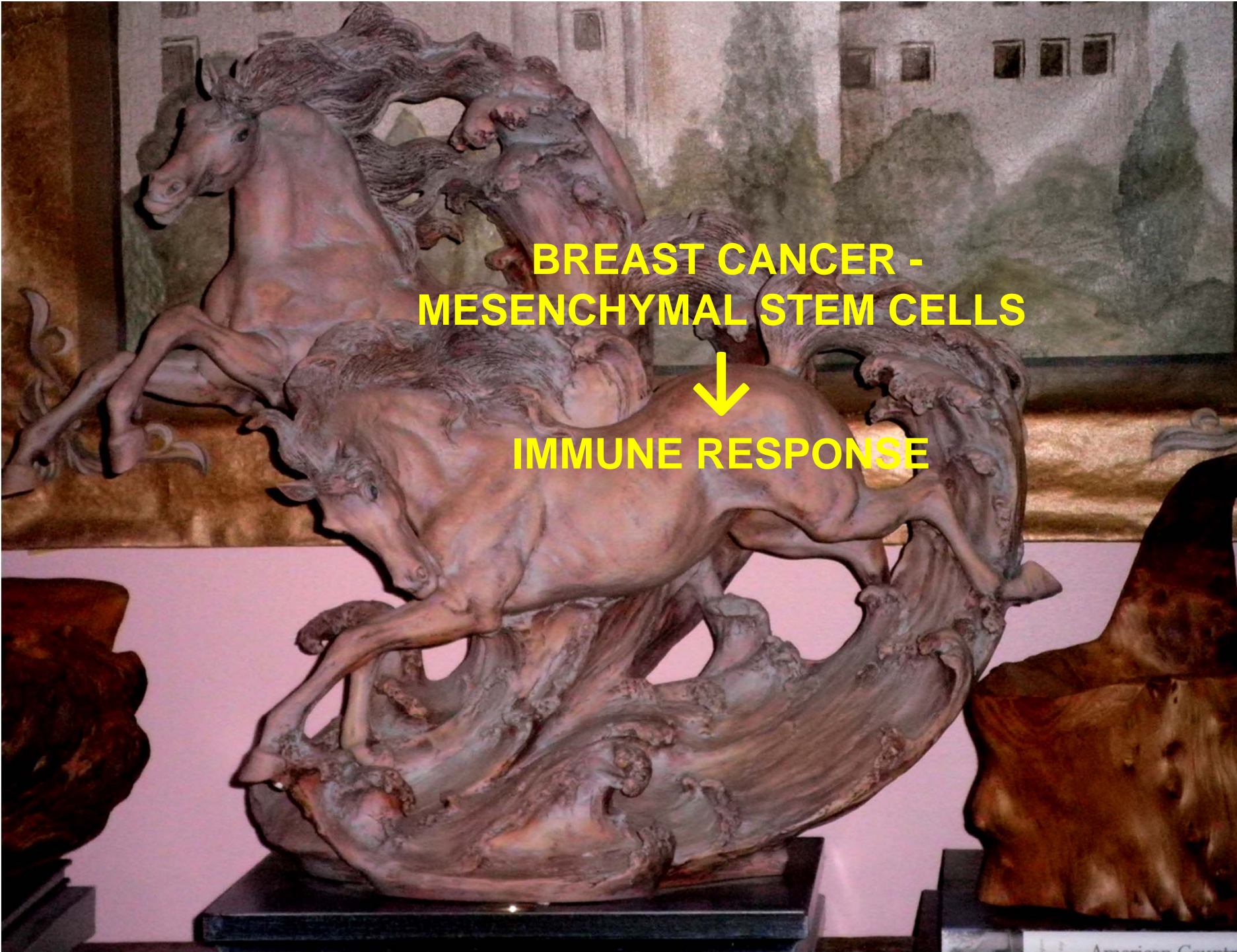
**PLACENTA**

## Adipose Tissue:

Vessel-contact vs.  
others



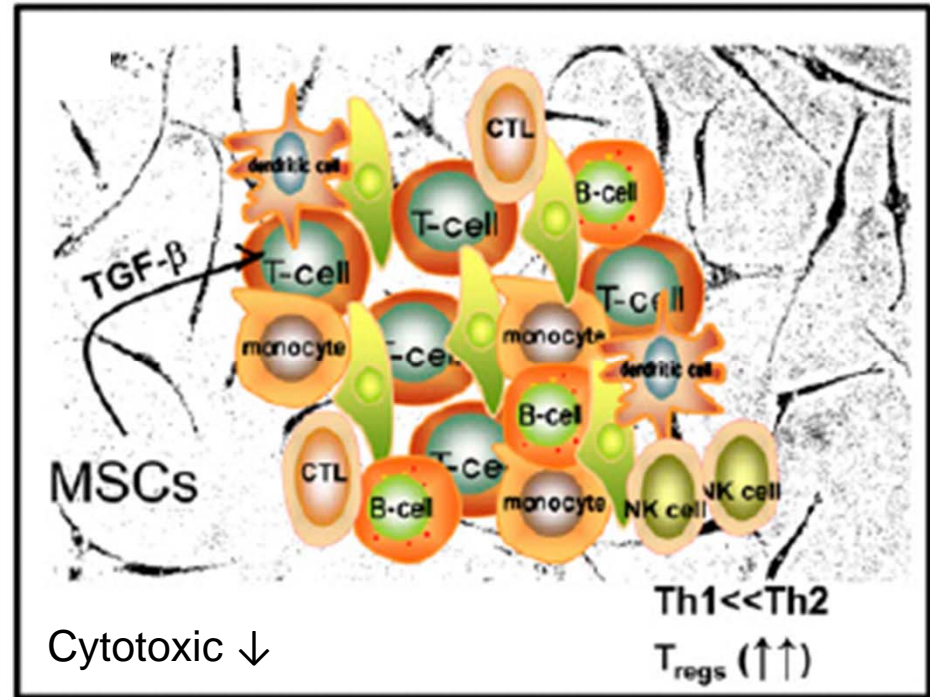
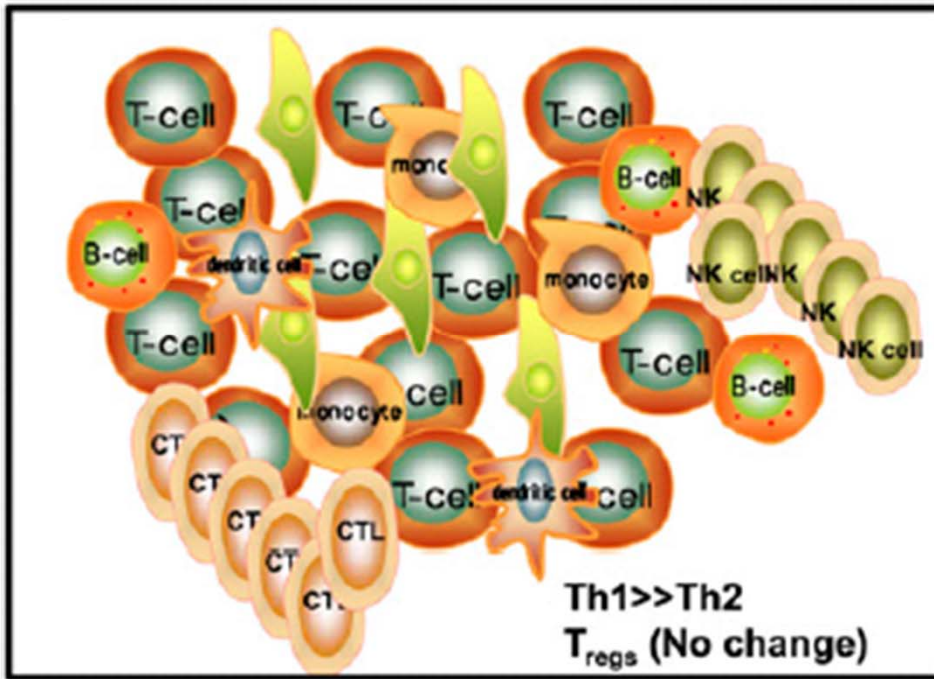


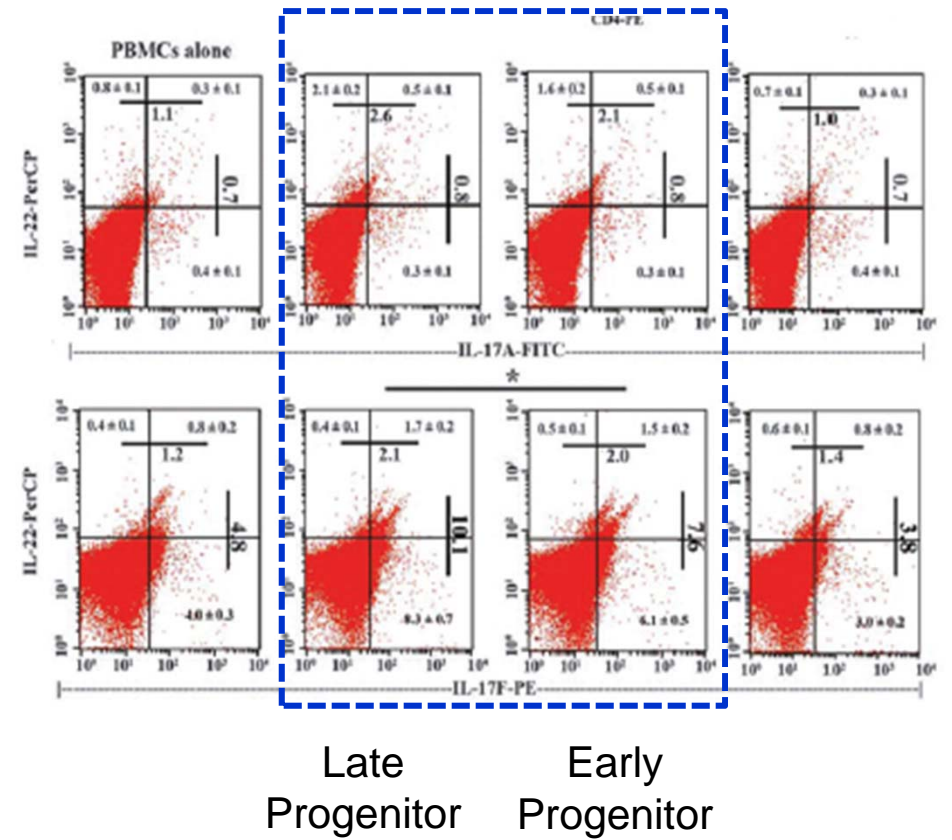
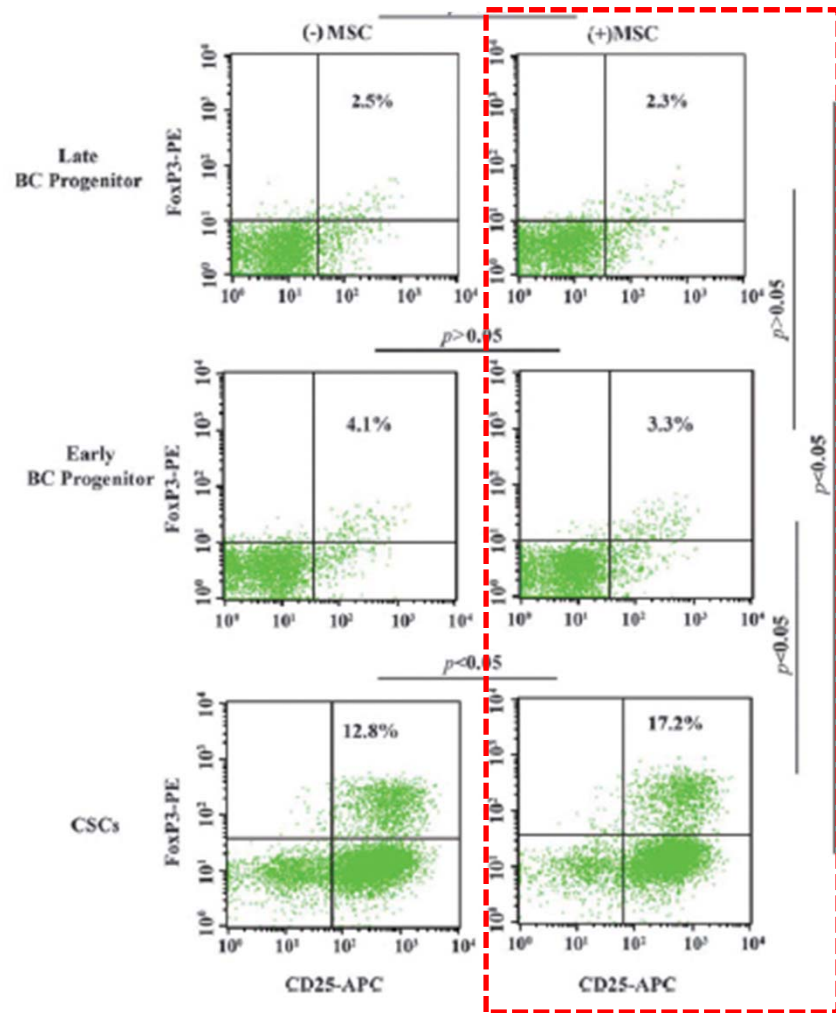


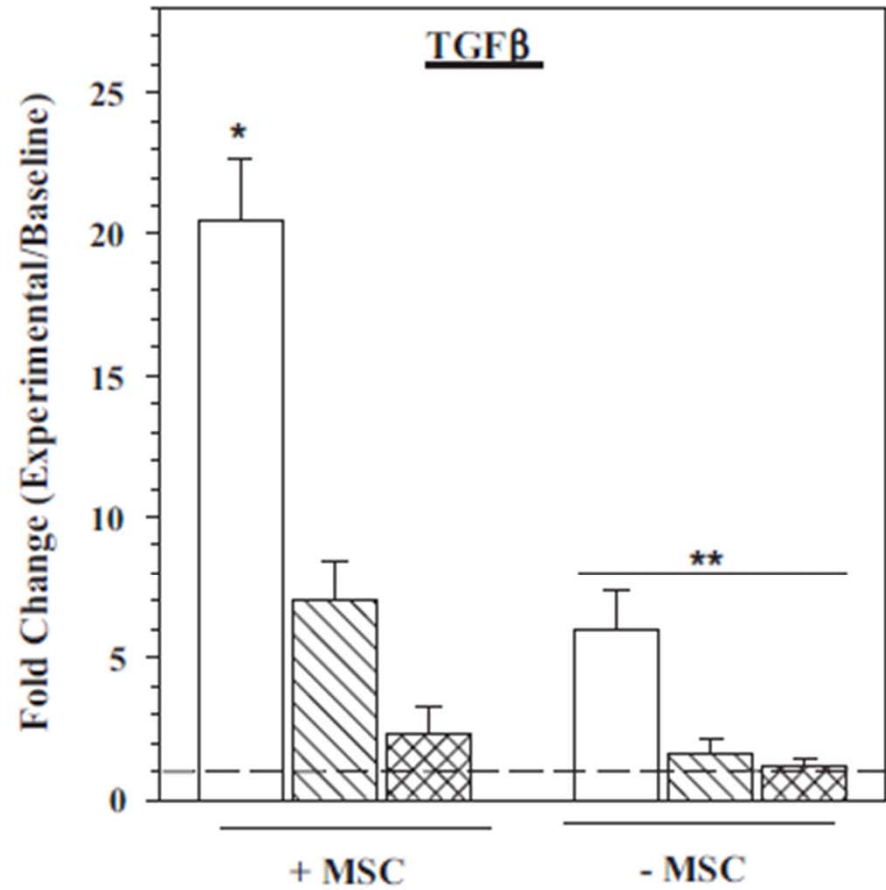
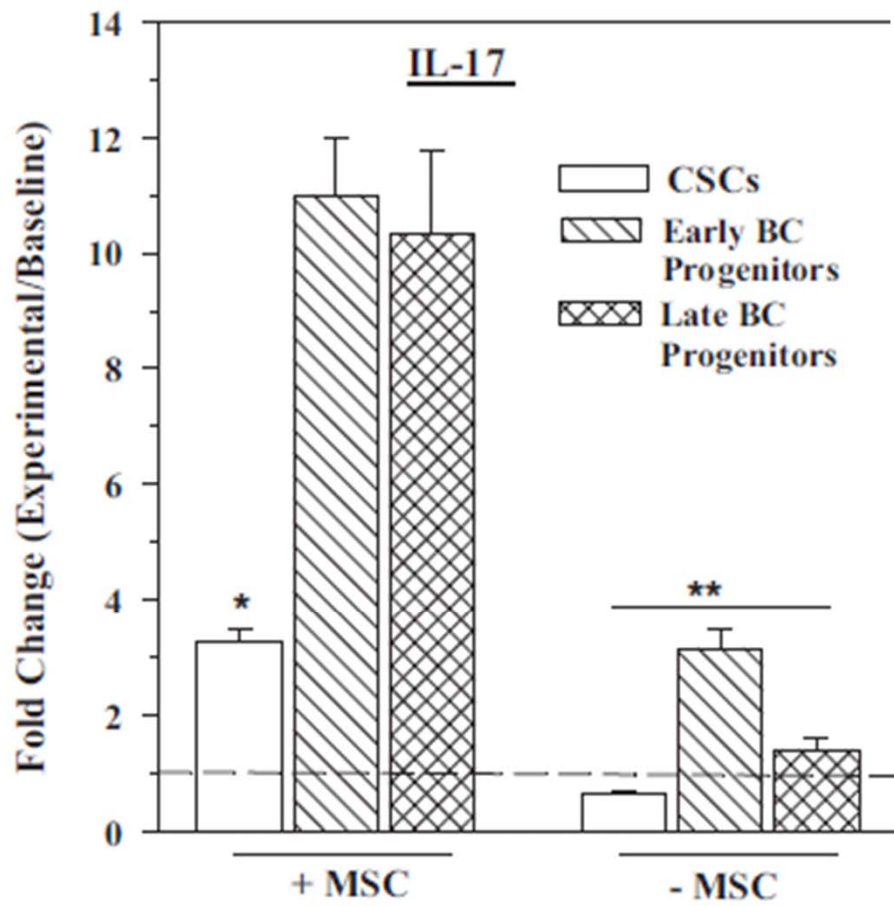
**BREAST CANCER -  
MESENCHYMAL STEM CELLS**



**IMMUNE RESPONSE**





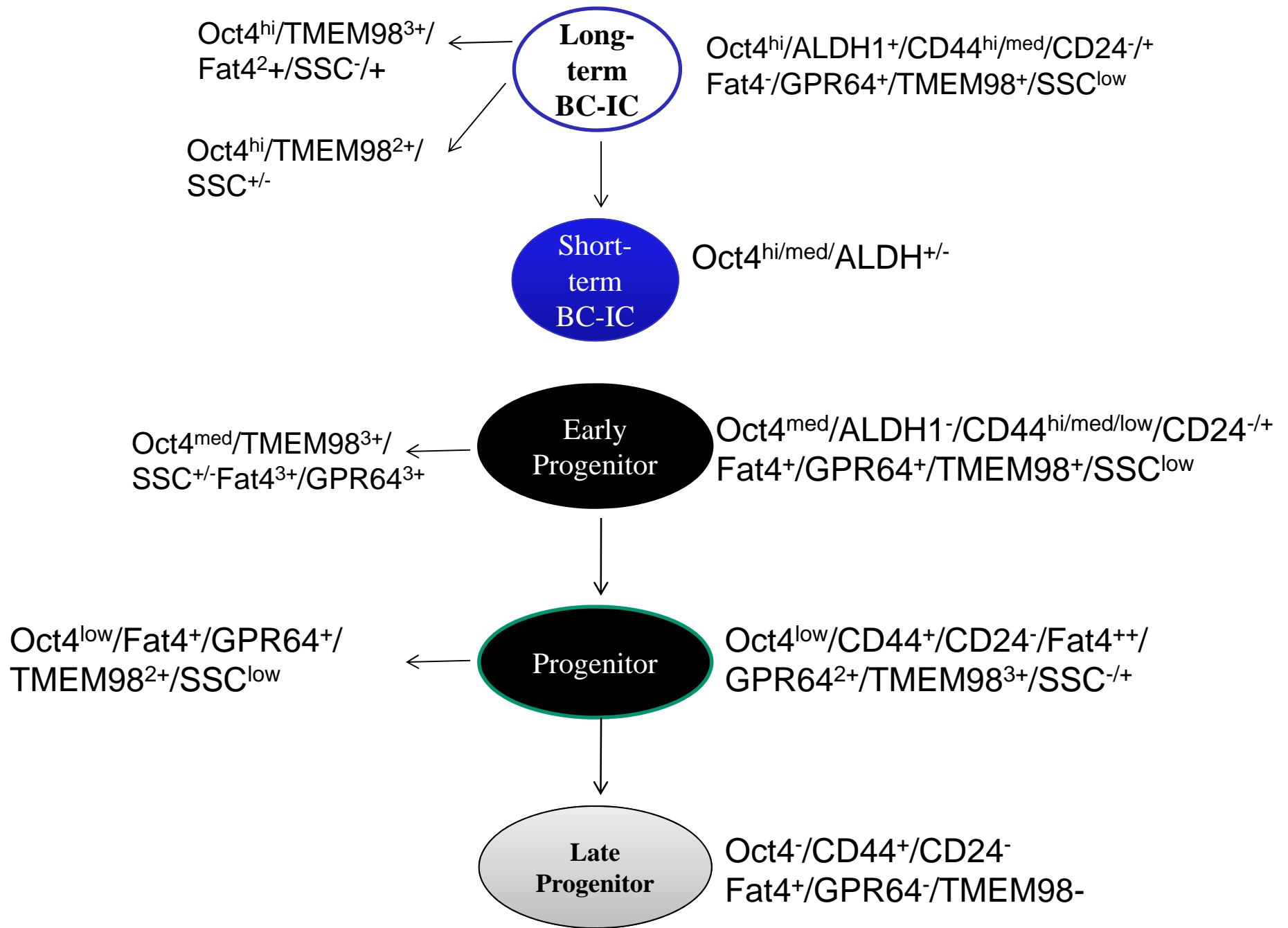


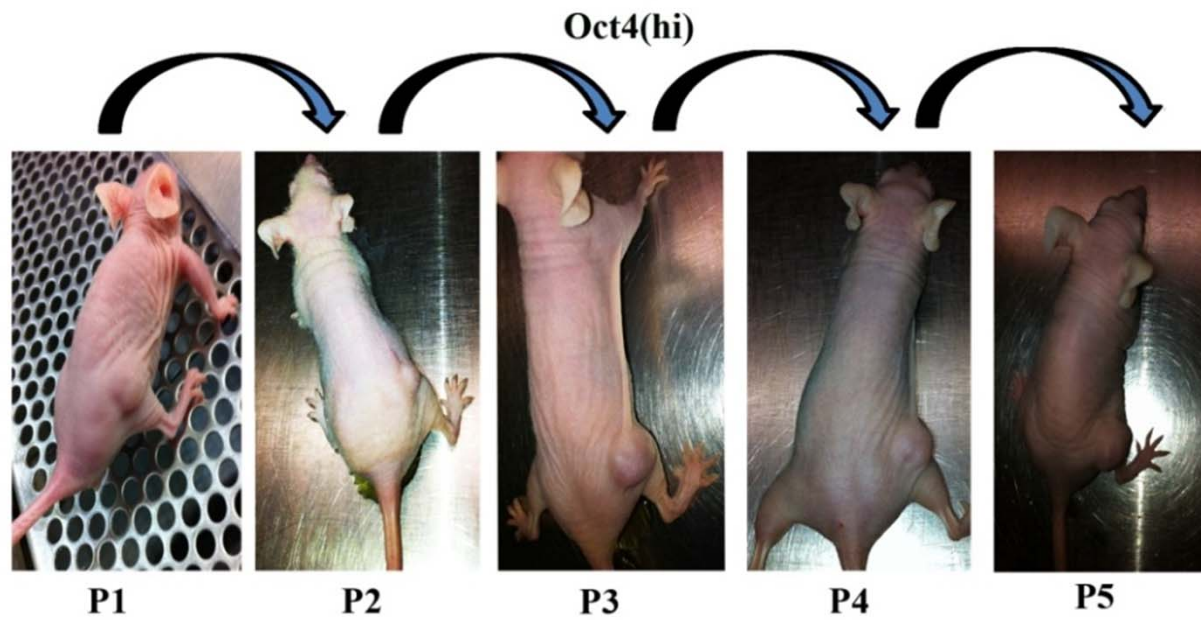


**ARE ALL CANCER CELLS EQUAL?**

PNAS 2009

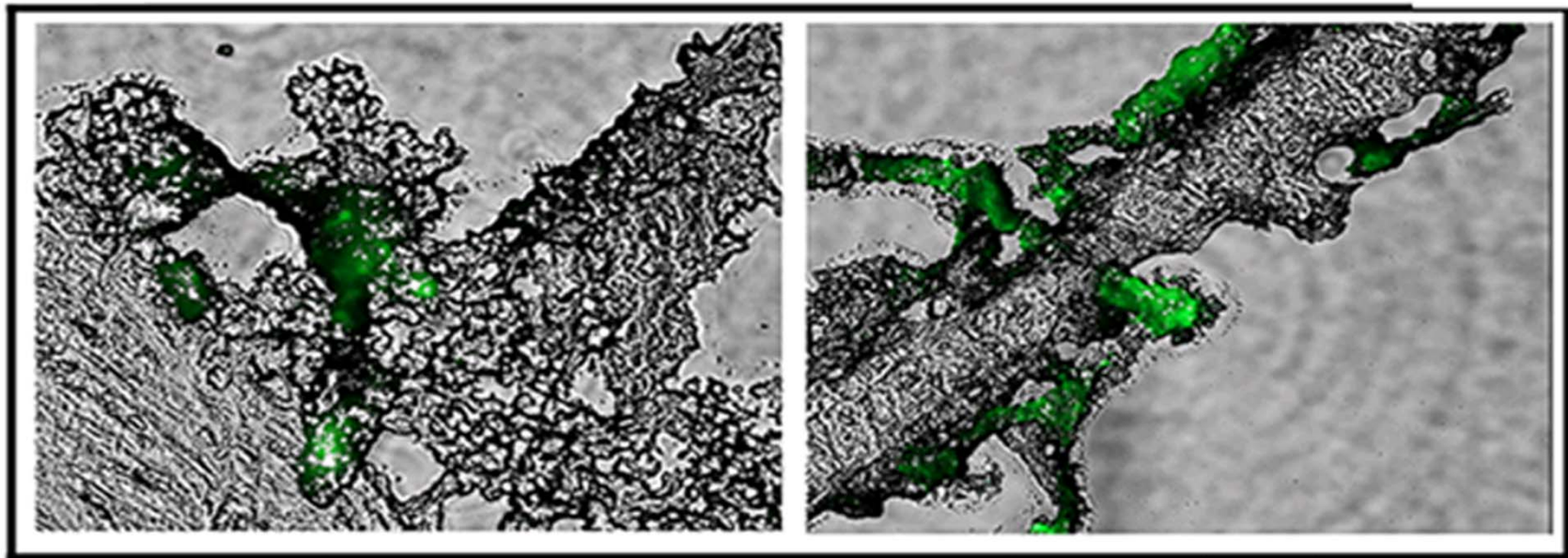






**Mouse 1**

**Mouse 2**

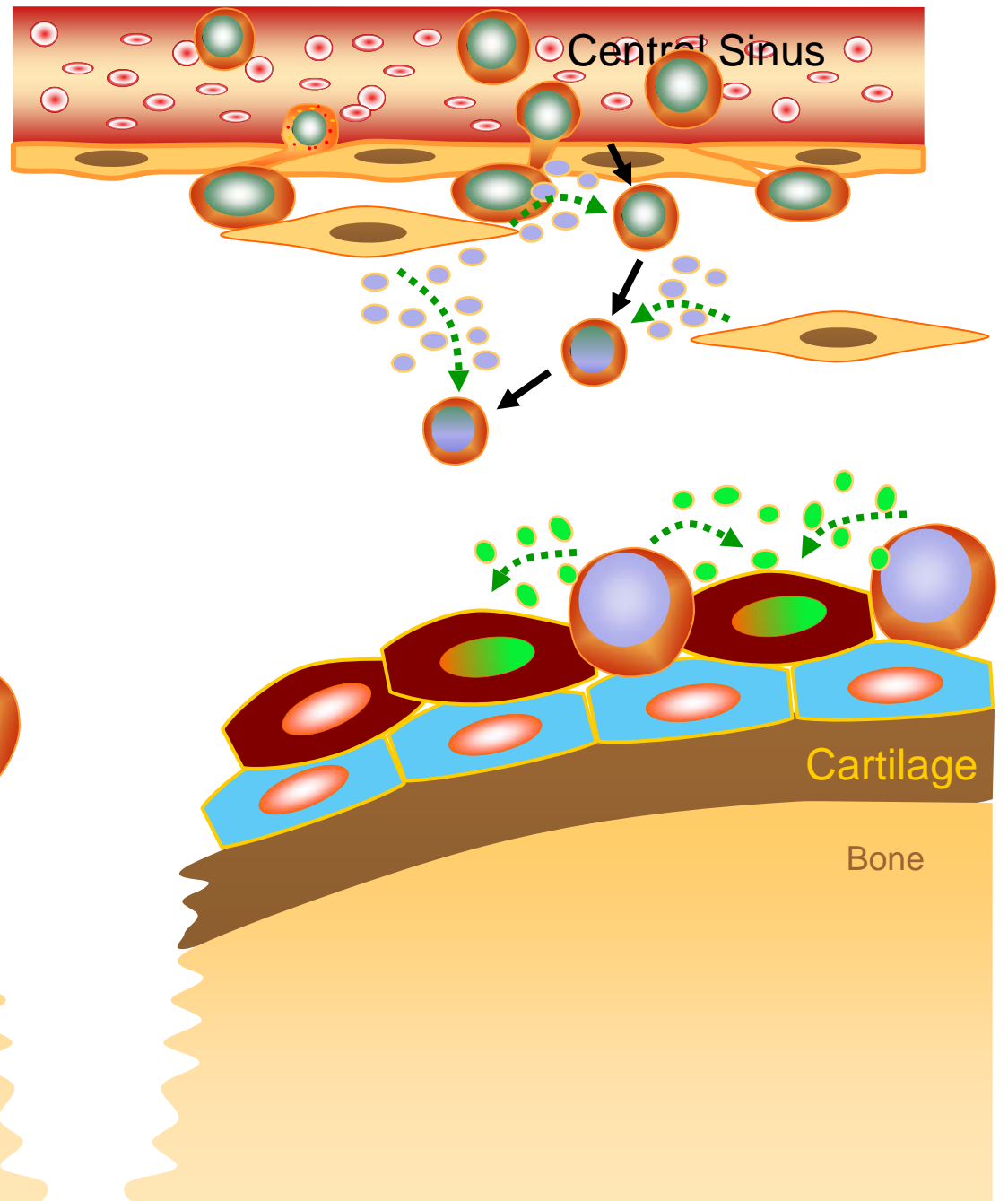
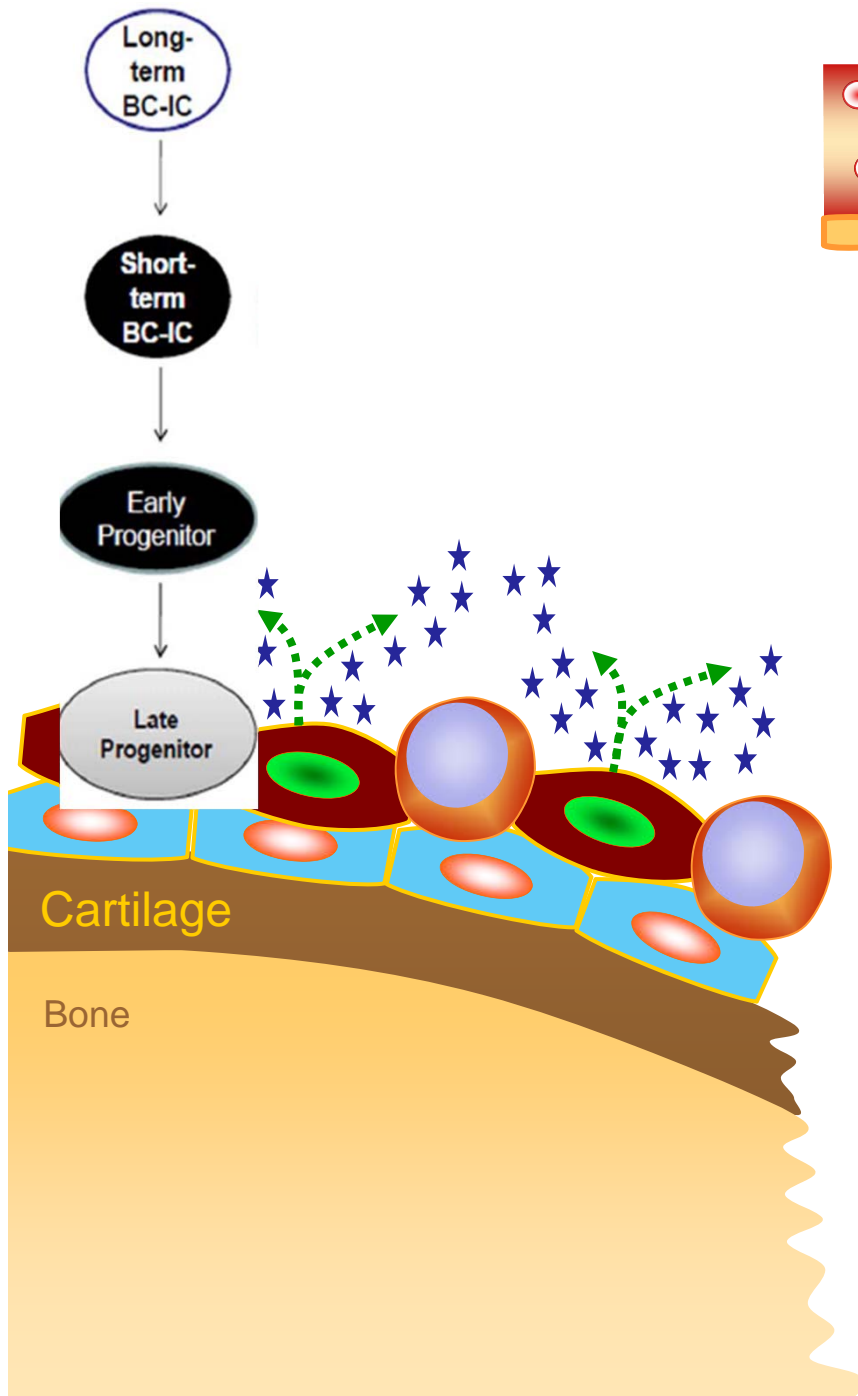


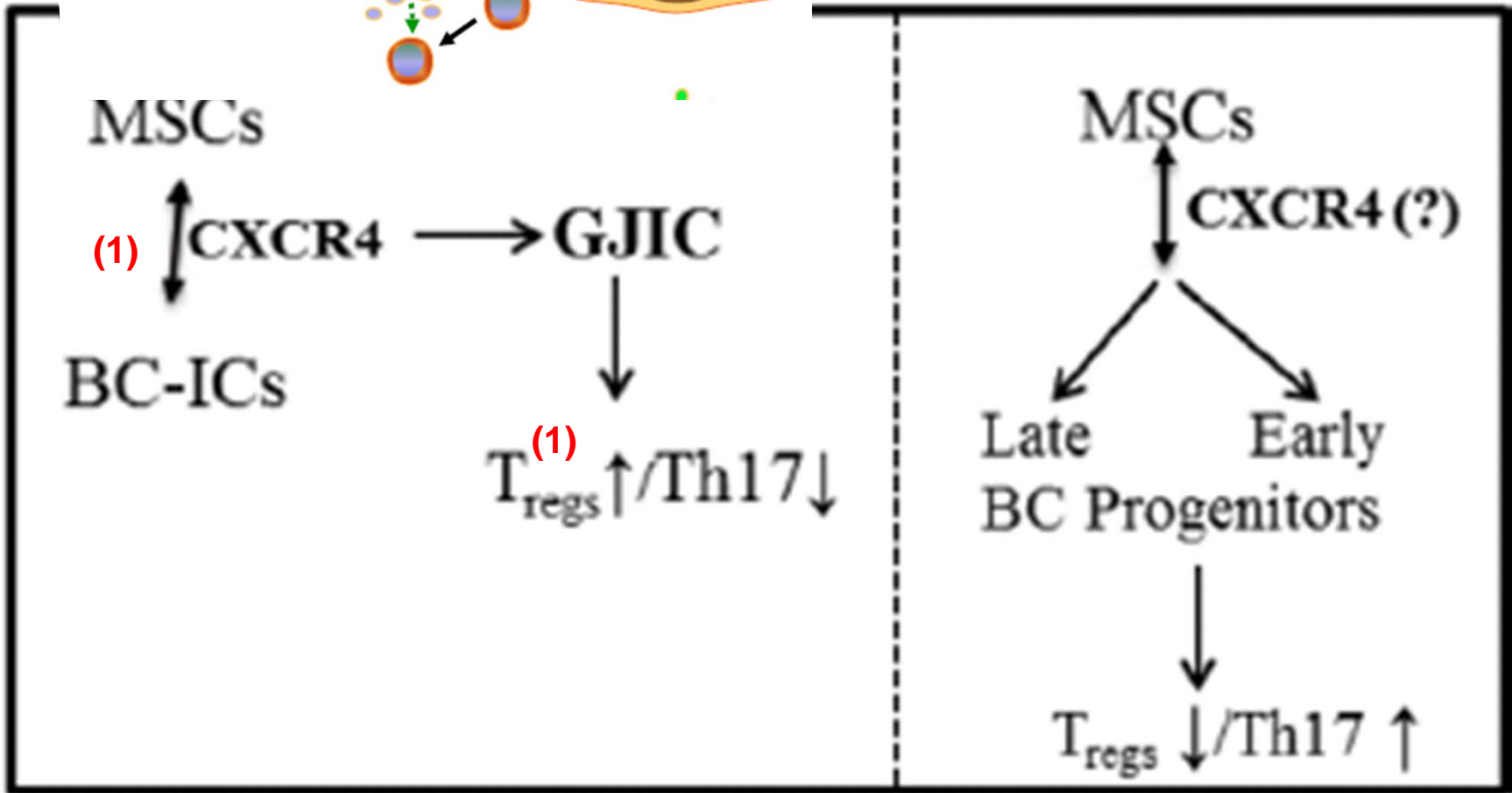
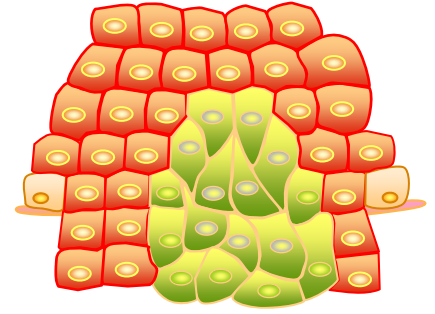
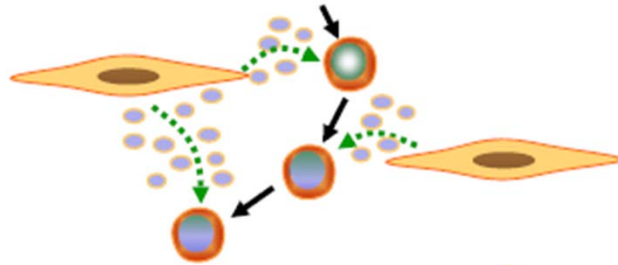
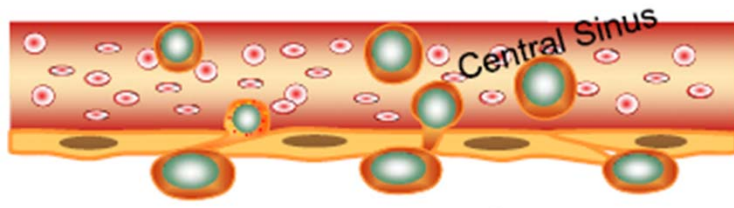
**WORKING HYPOTHESIS**

MUZEUM

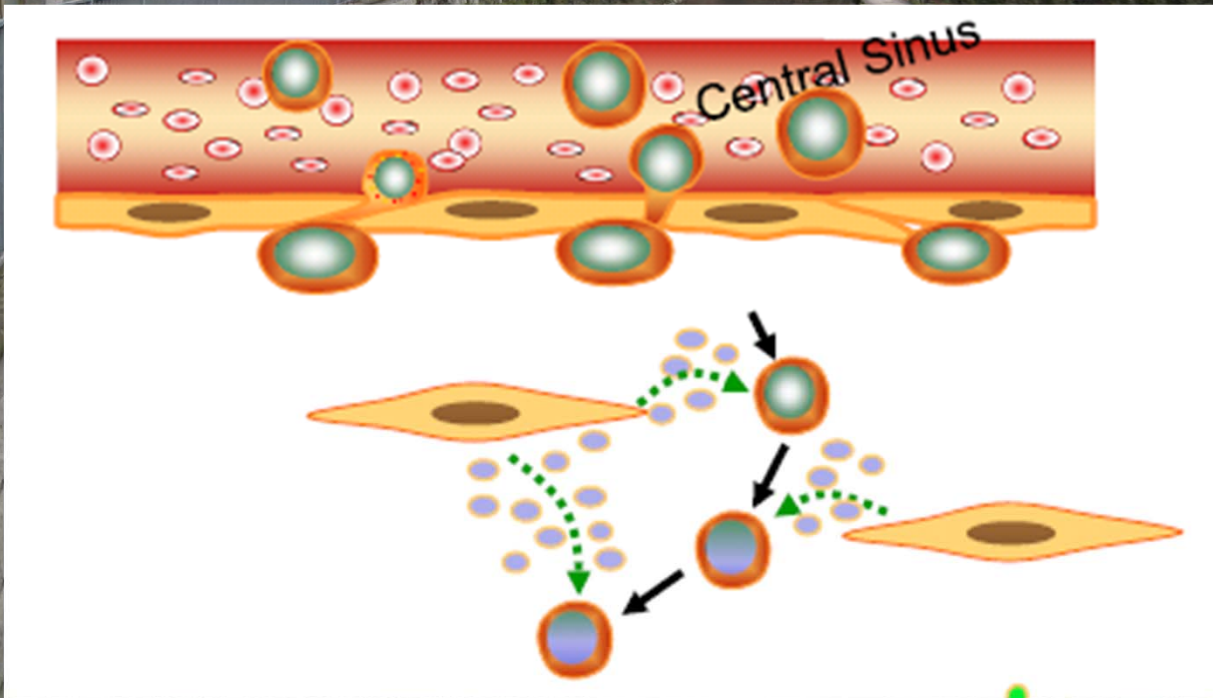
MARIII SKŁODOWSKIEI

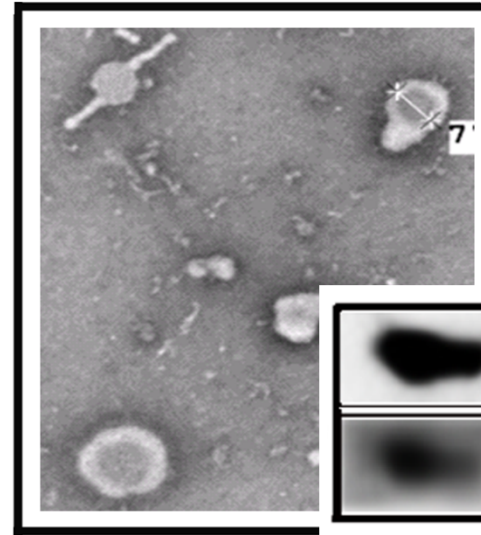
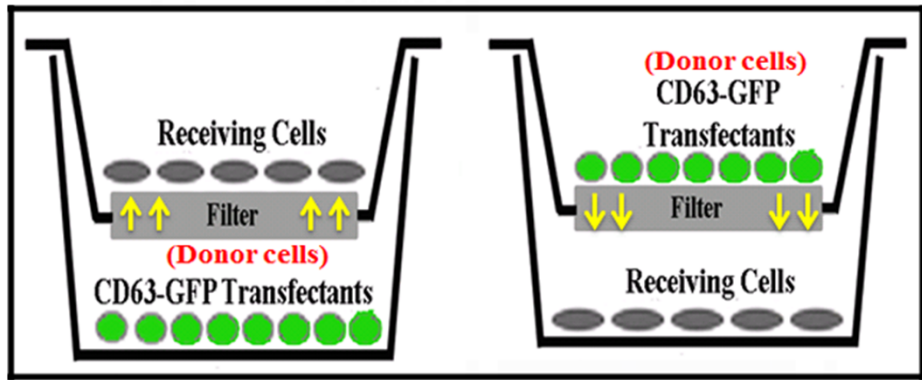
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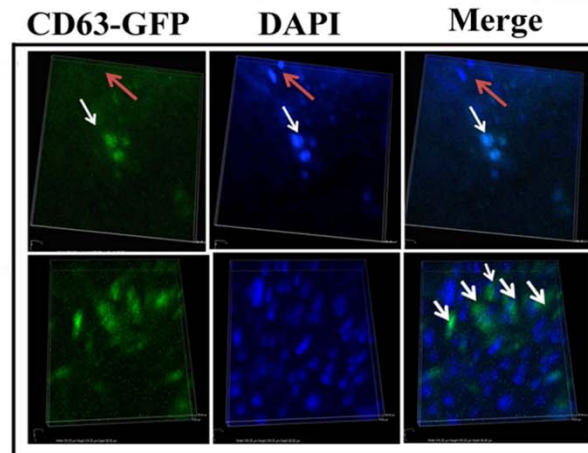
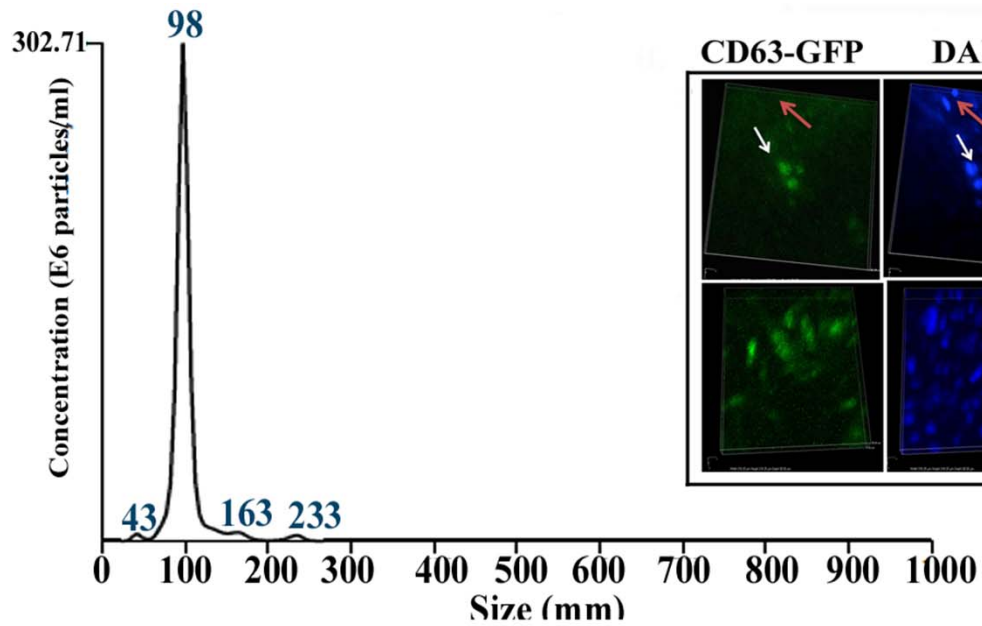


# MSCs: PRIMED VS. NAÏVE: Exosomes as mediators



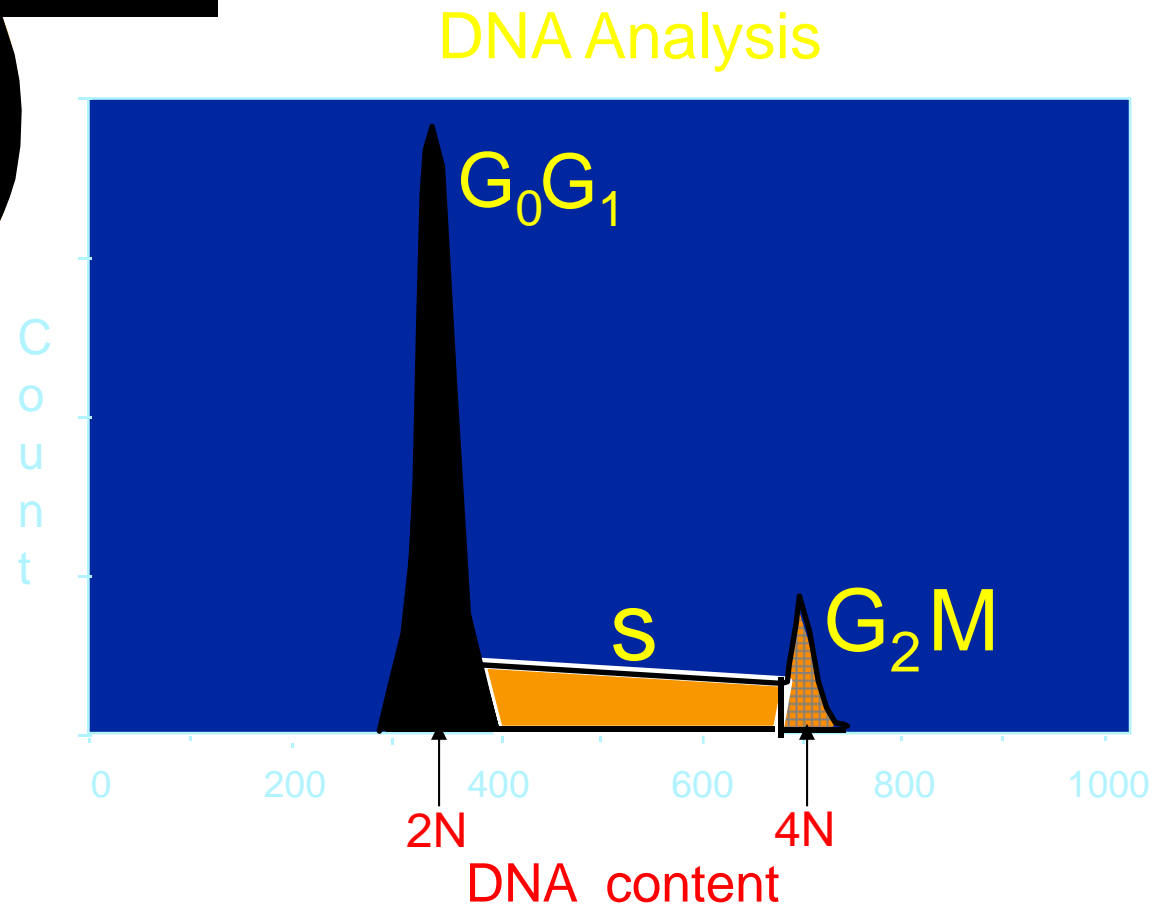
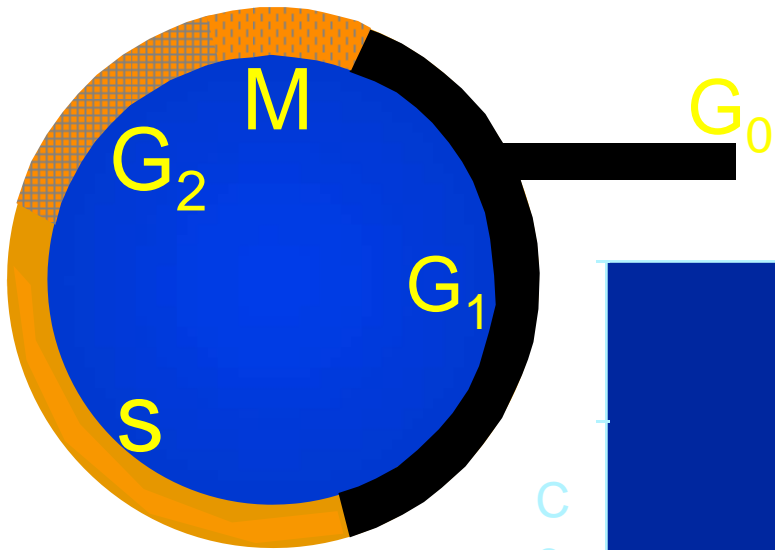


**CD63**  
**CD81**



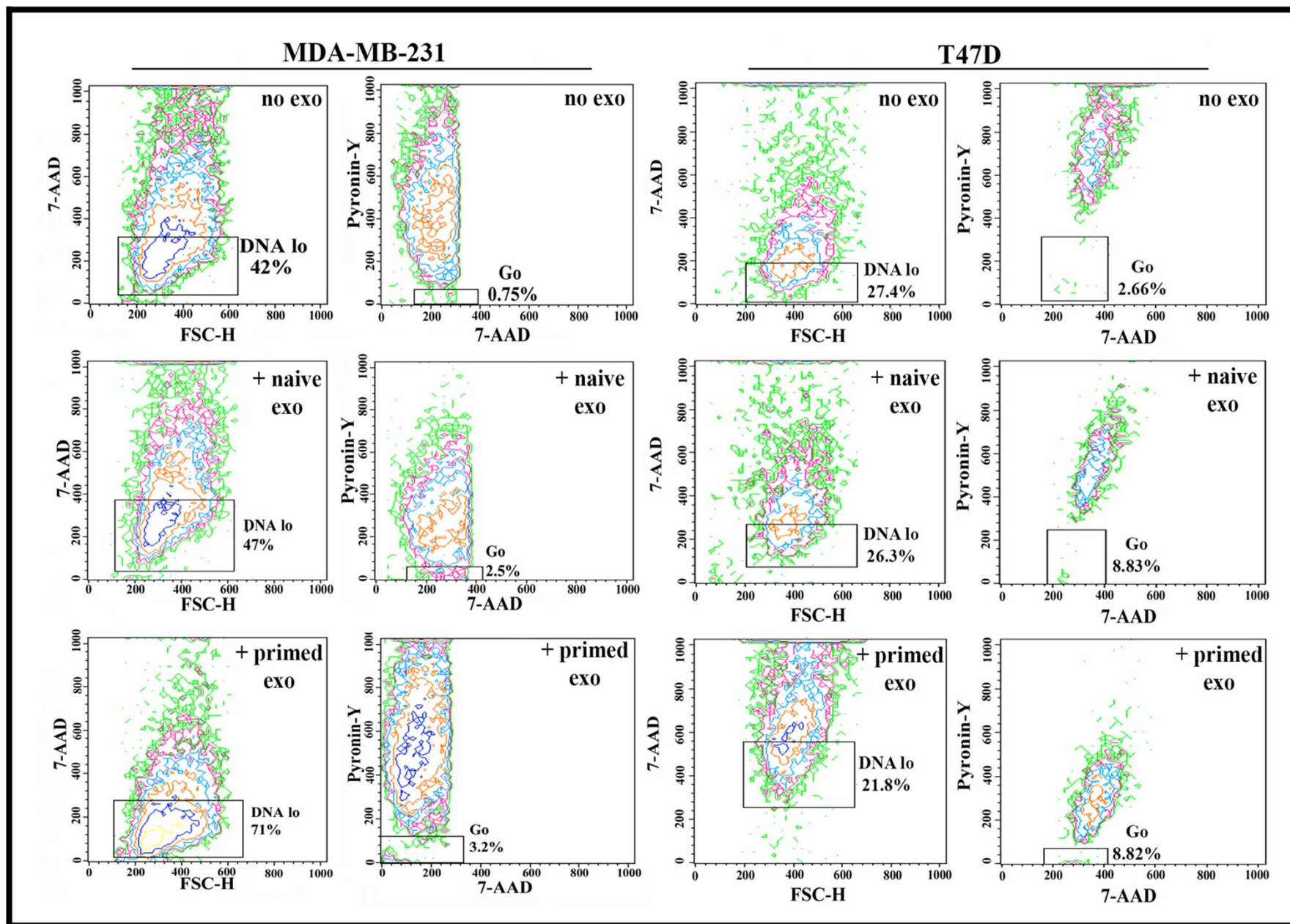
↑ Receiving Cells/Upper well  
↓ Receiving Cells/Lower well

# Cell Cycle

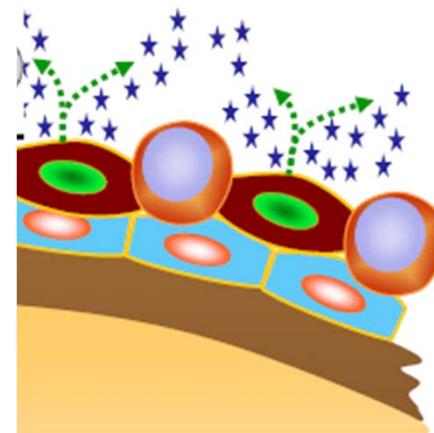
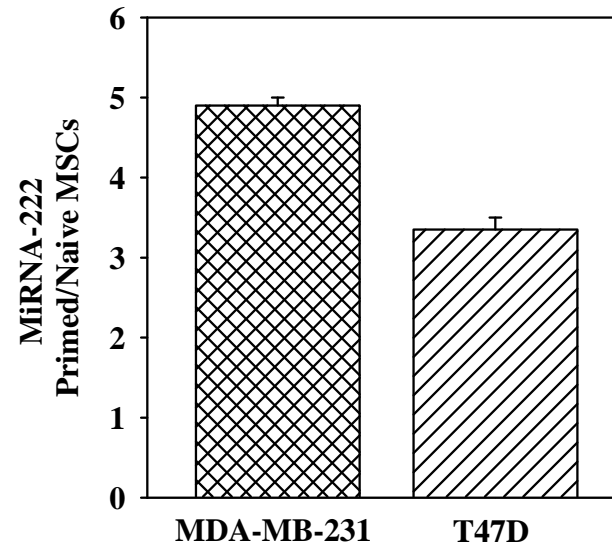
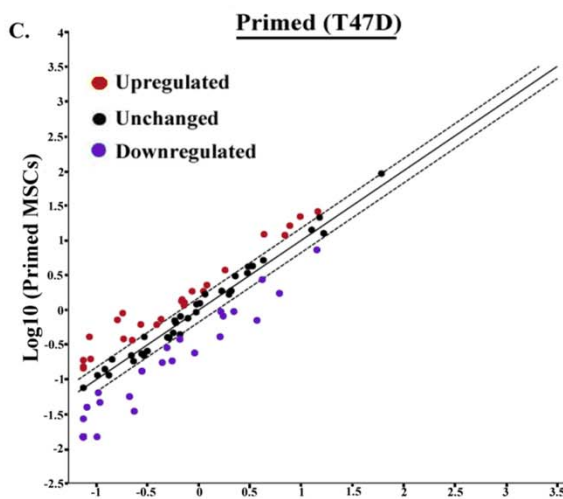
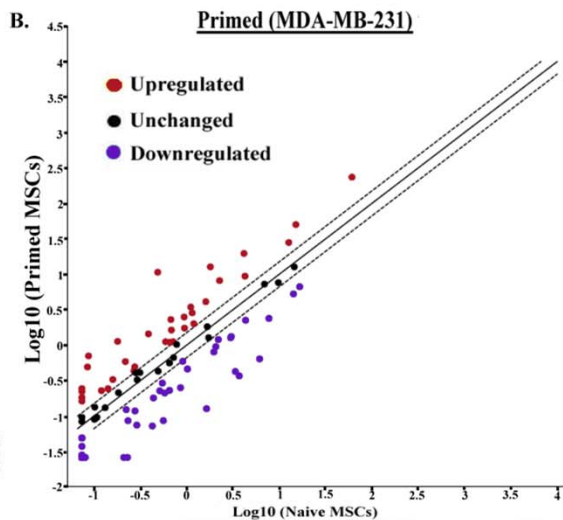
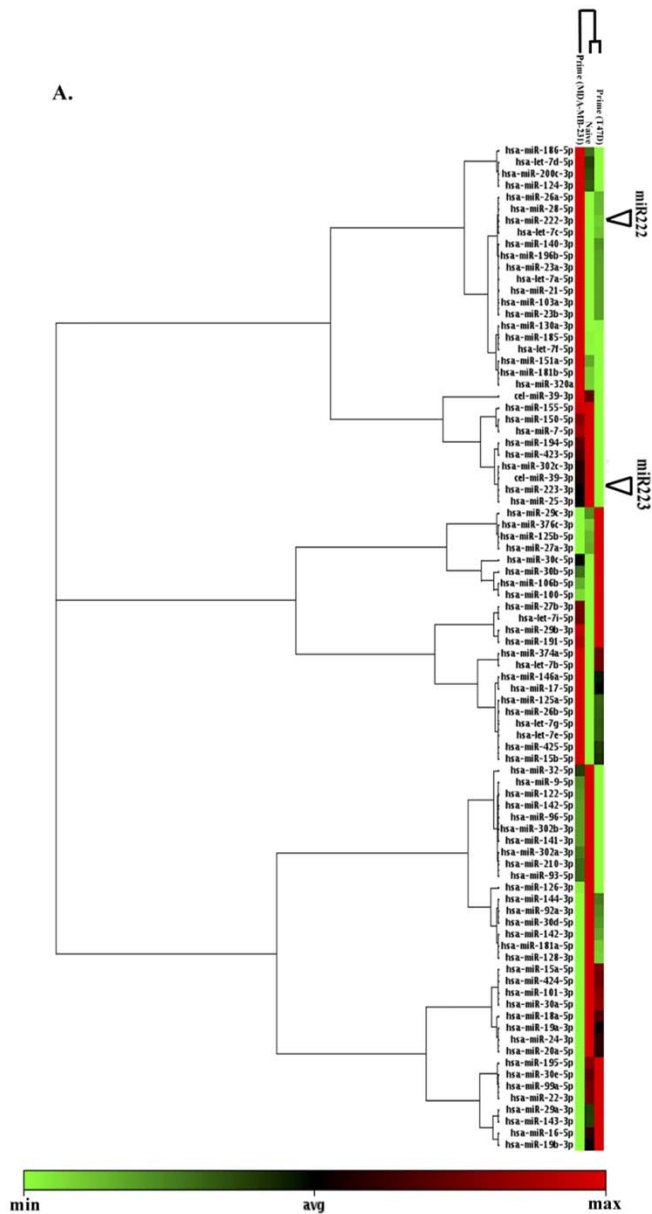




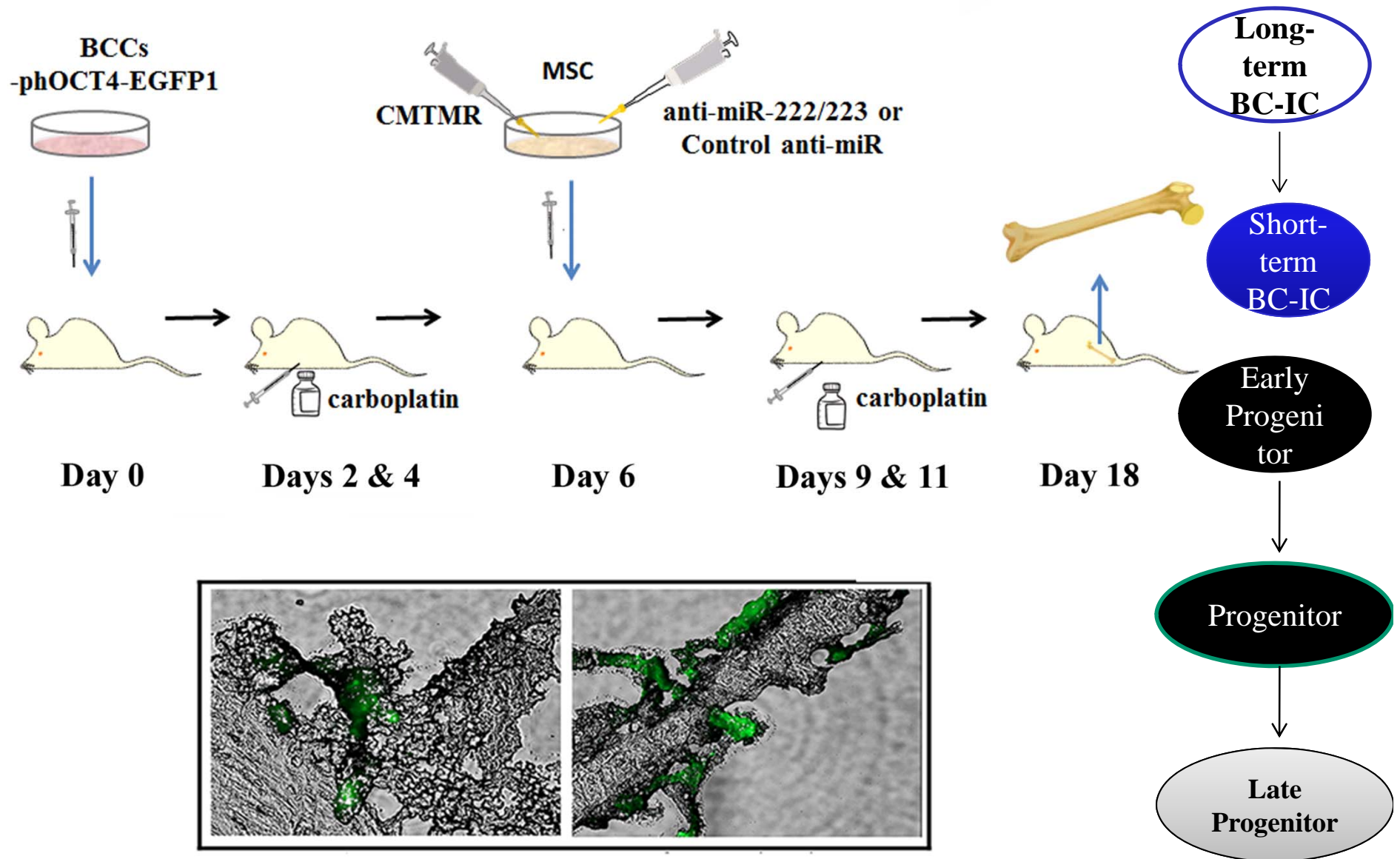
# Exosomes mostly from Primed MSCs change cycling of BCCs



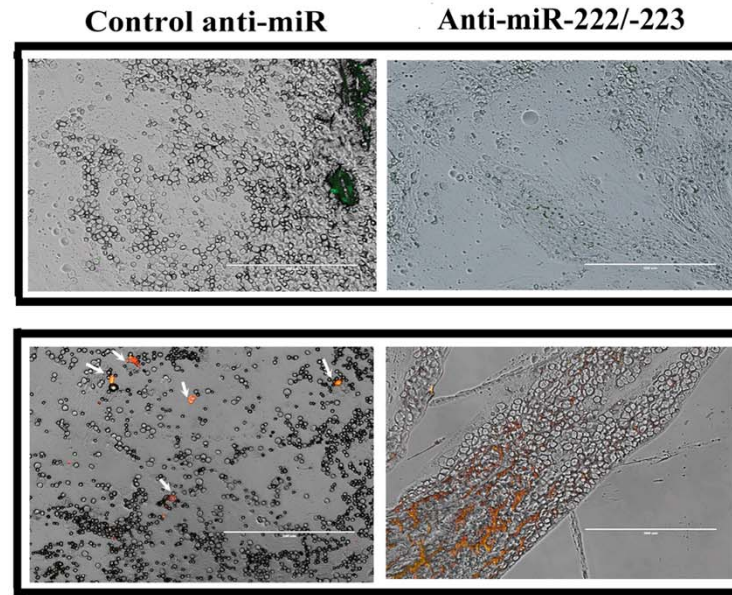
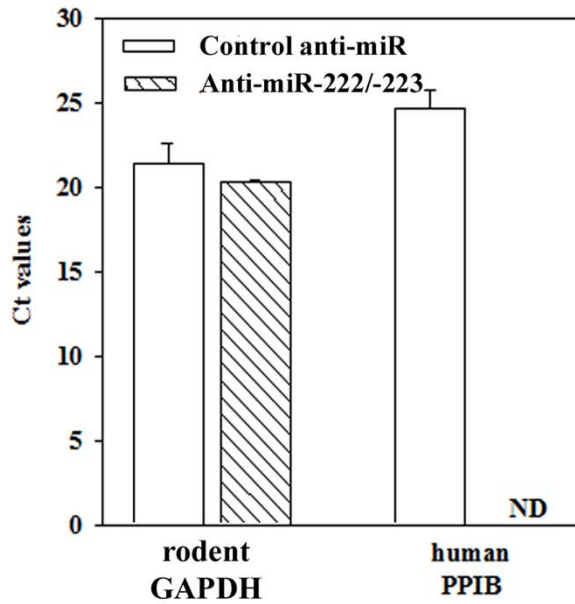
# MiRNA: Differences between Naive and Primed MSCs



Cancer Res 2011

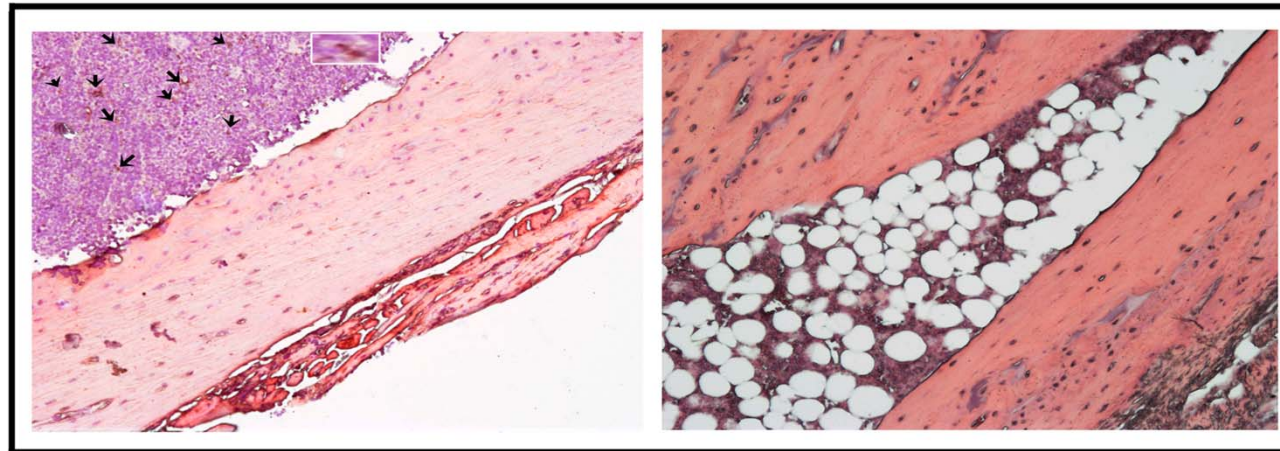


# Anti-miR222/-223 chemosensitize Dormant BCCs



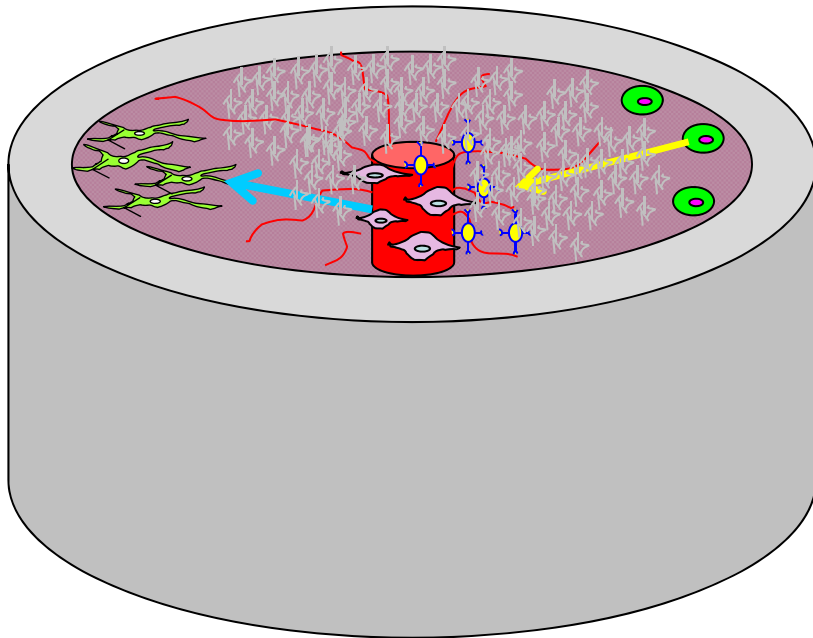
Control anti-miR

Anti-miR222/223

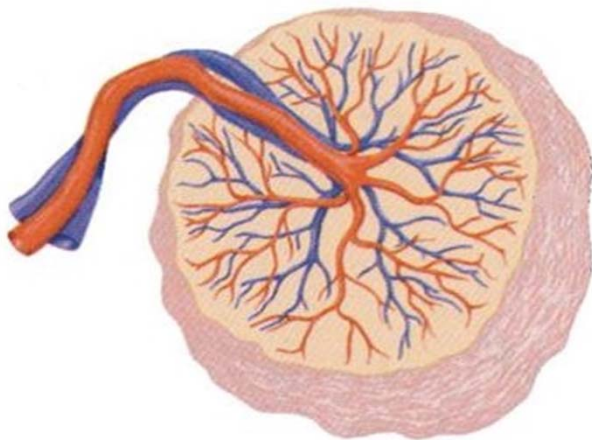


BM:

Endosteal vs. others

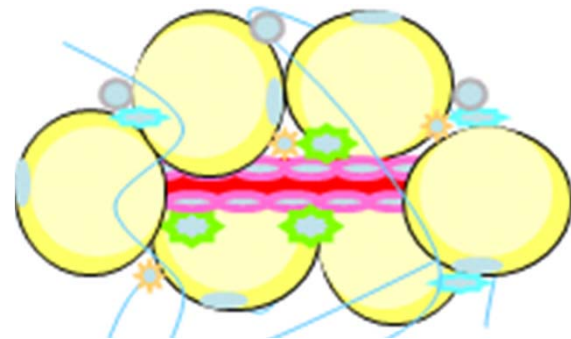
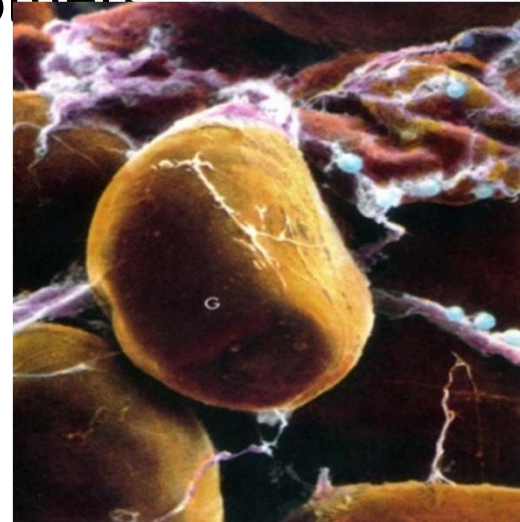


**PLACENTA**

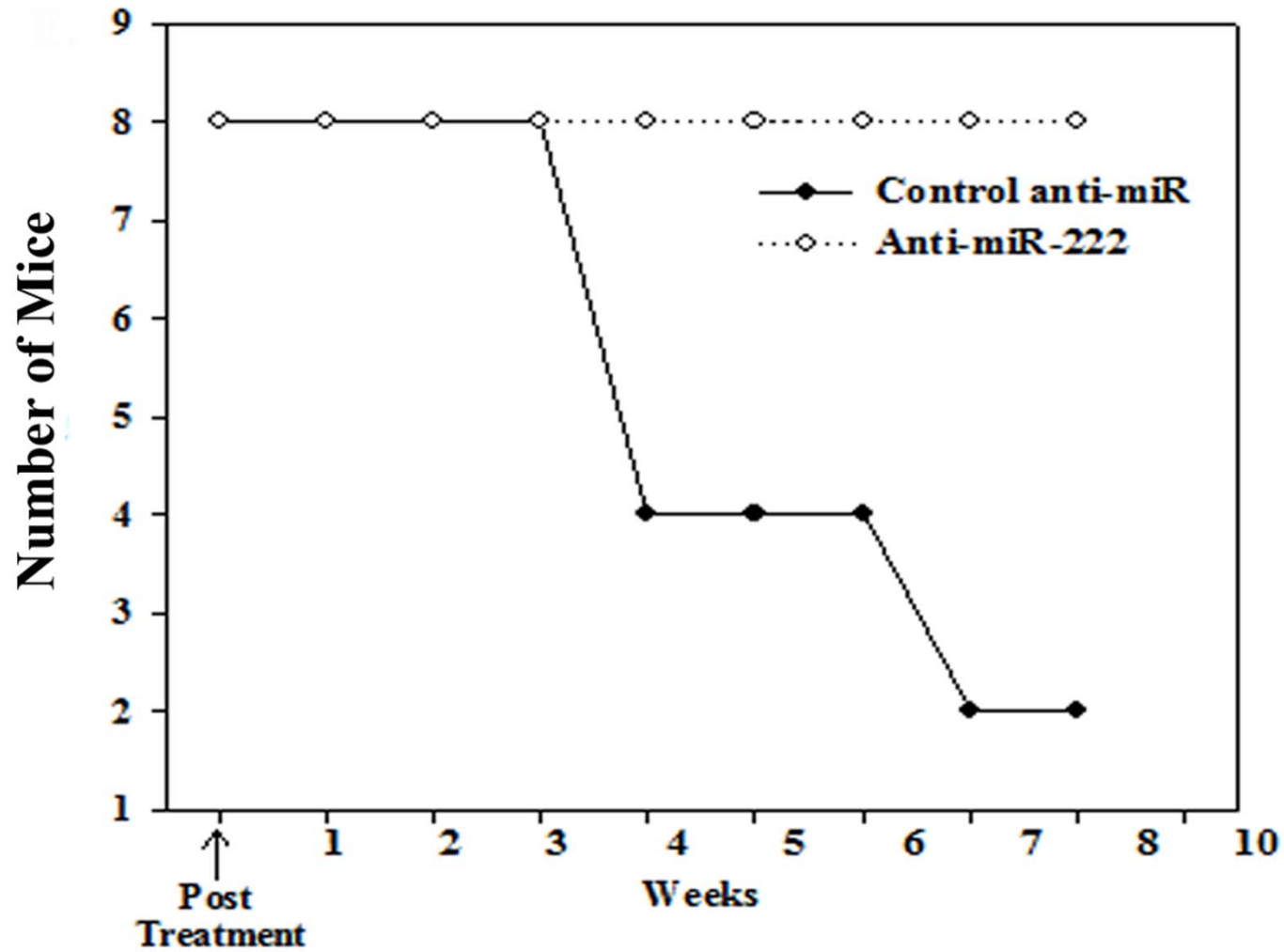


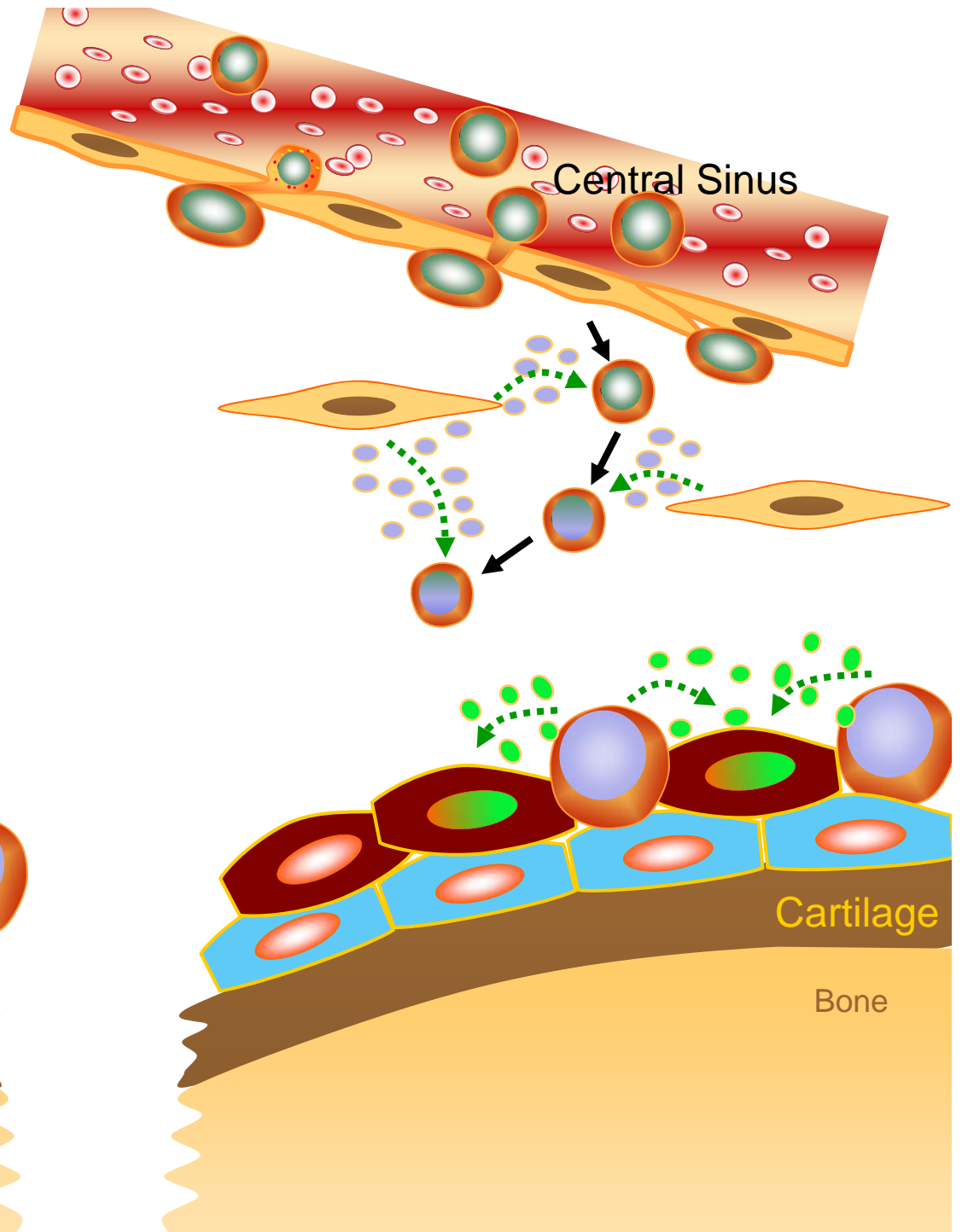
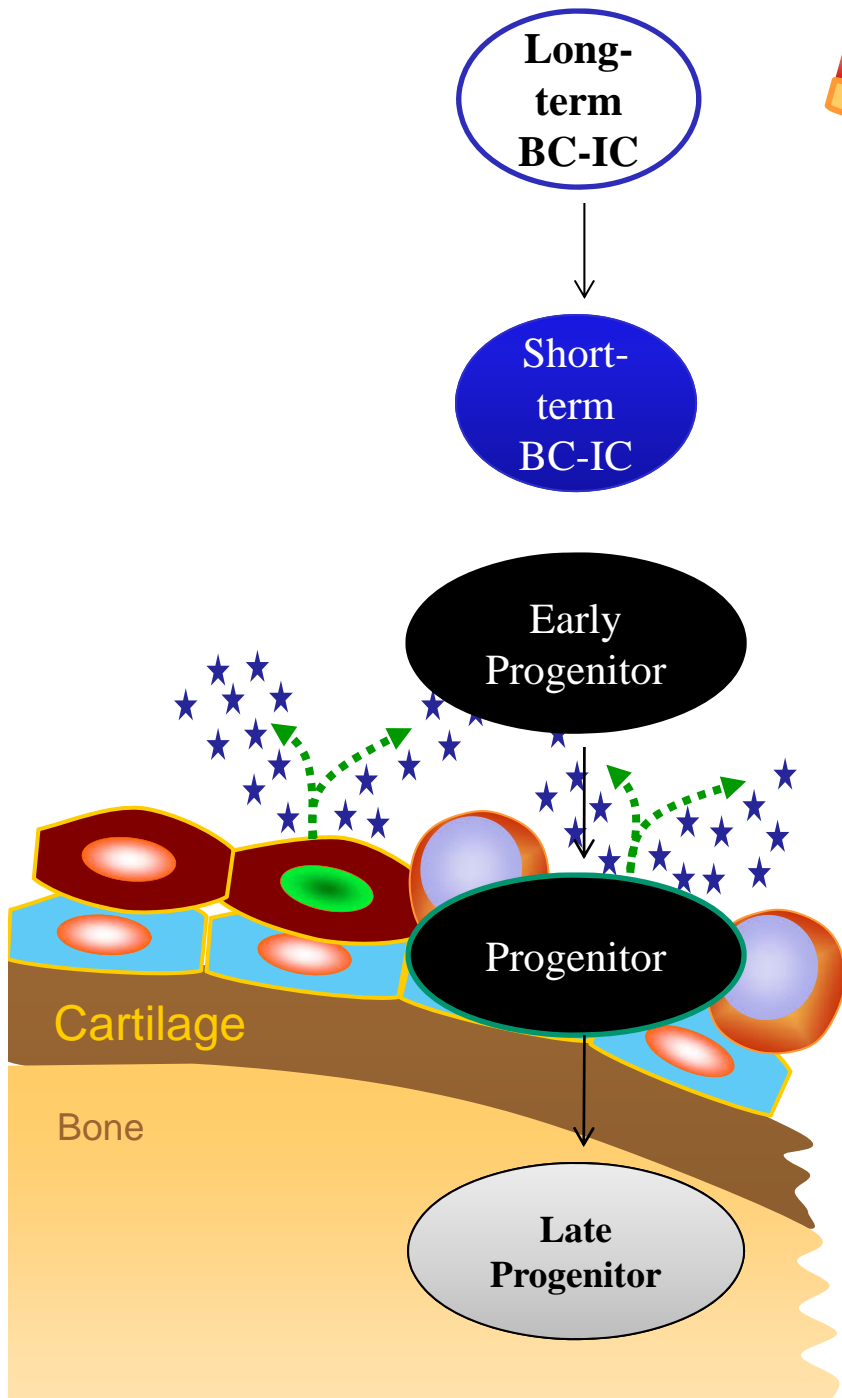
Adipose Tissue:

Vessel-contact vs.  
others



# Anti-miR-222/-223 and reduced chemo prolonged the survival of mice





# ASSIGNED PAPER

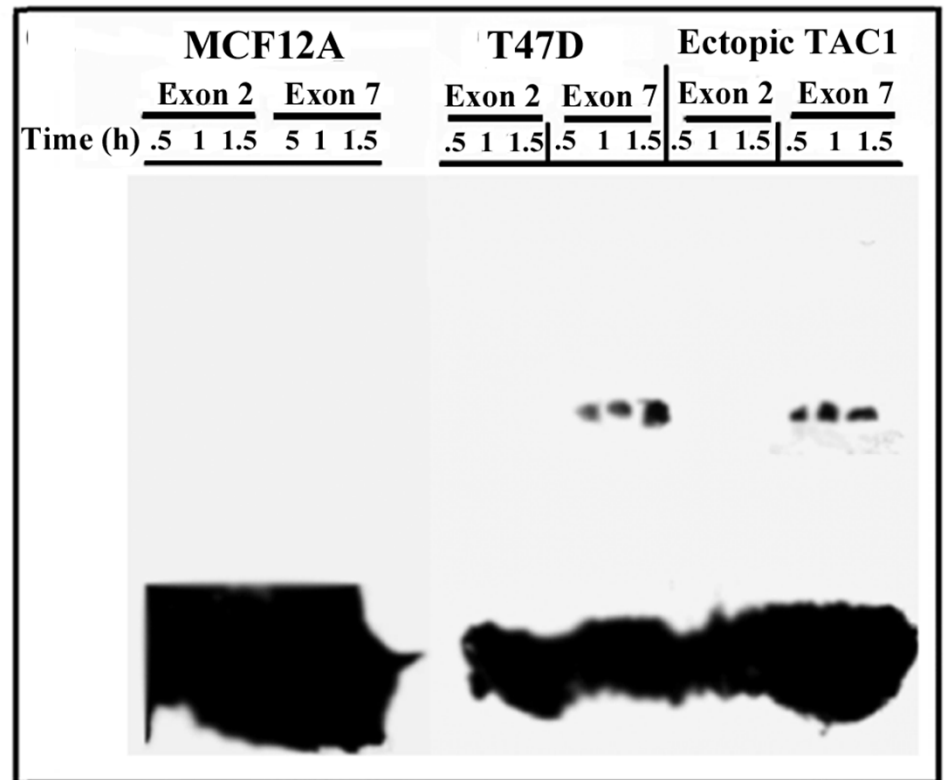
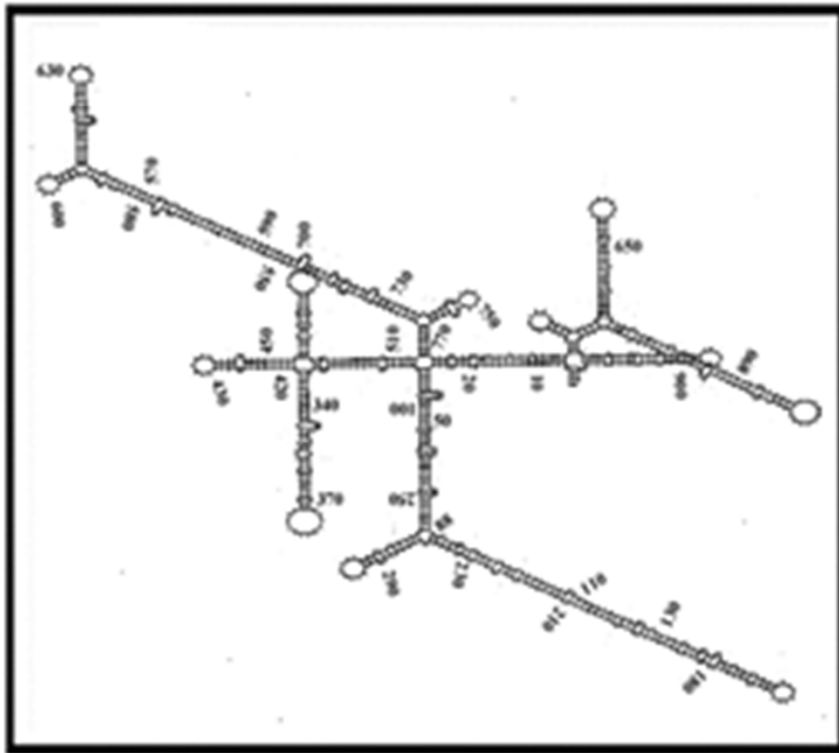
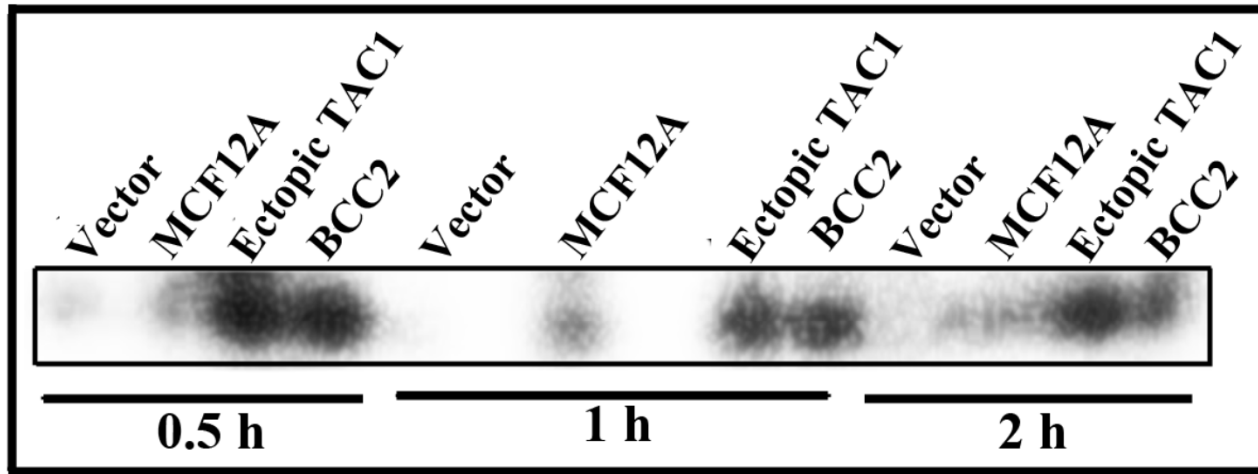


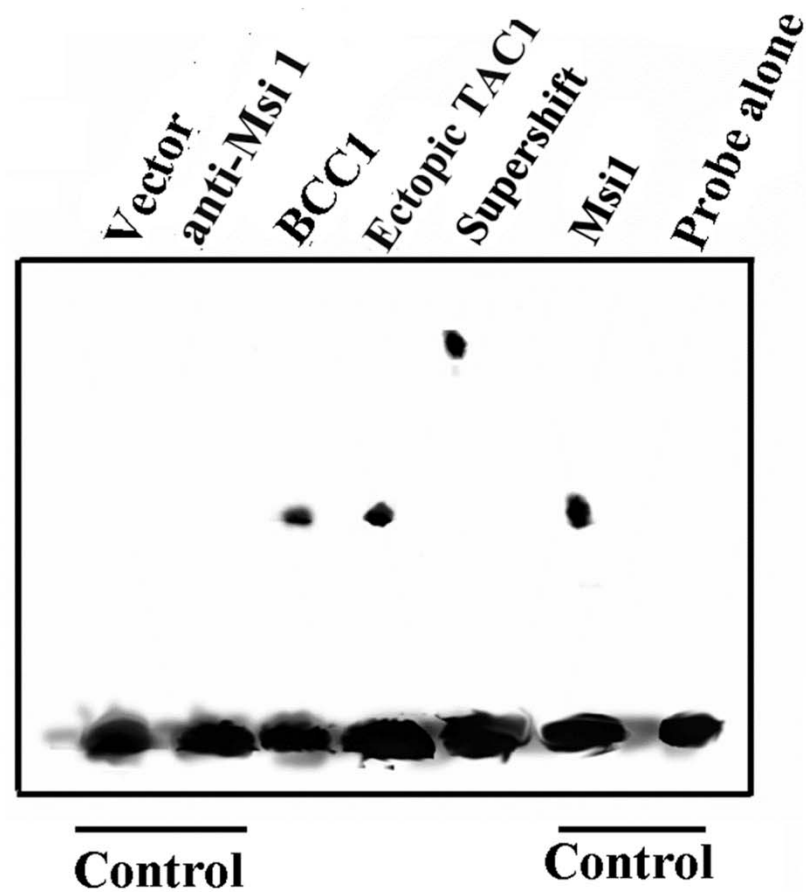
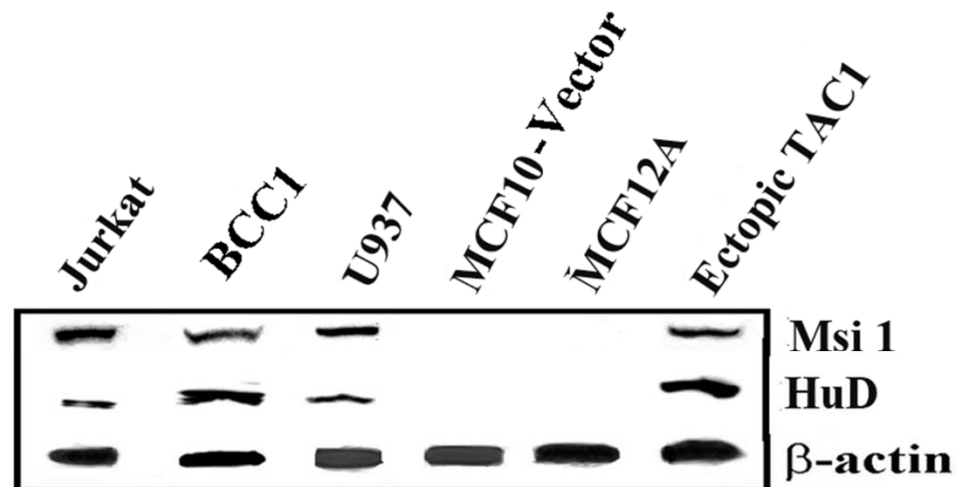
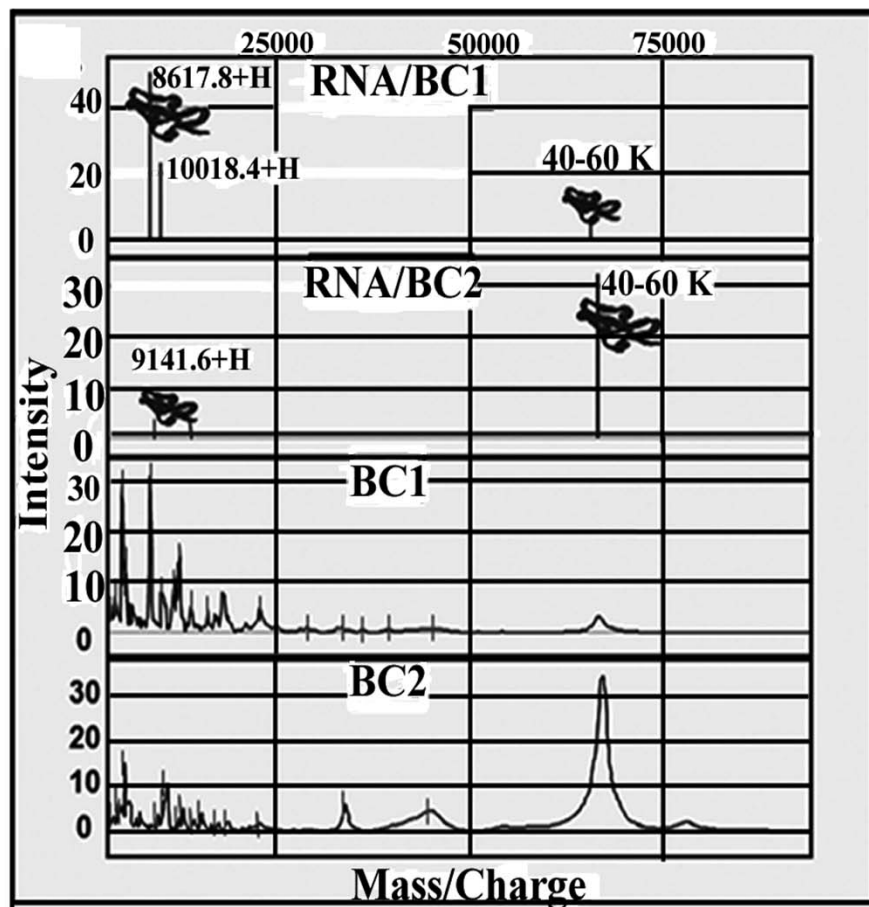


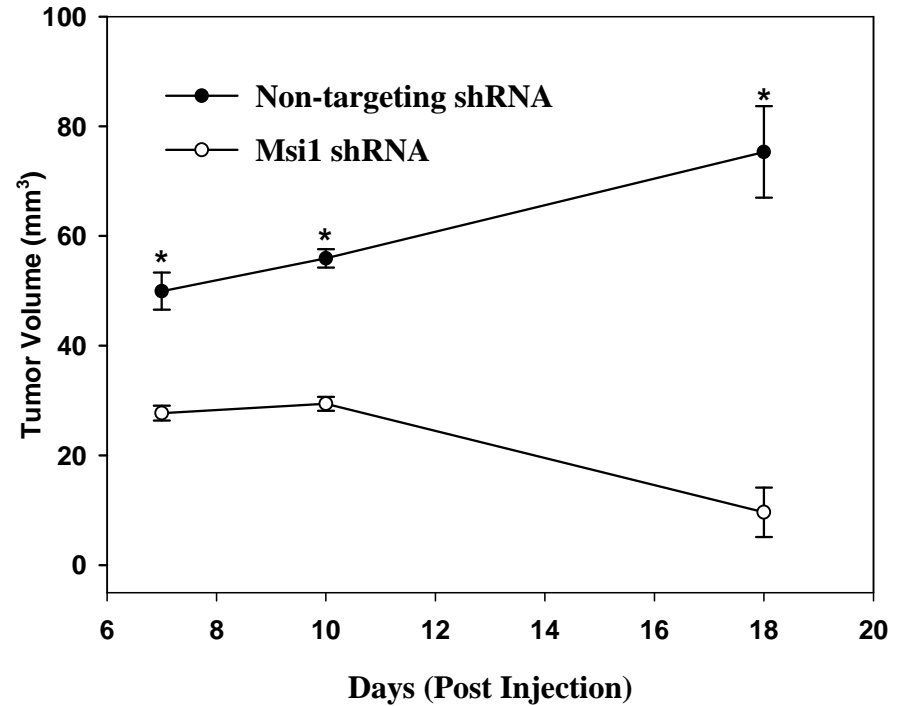
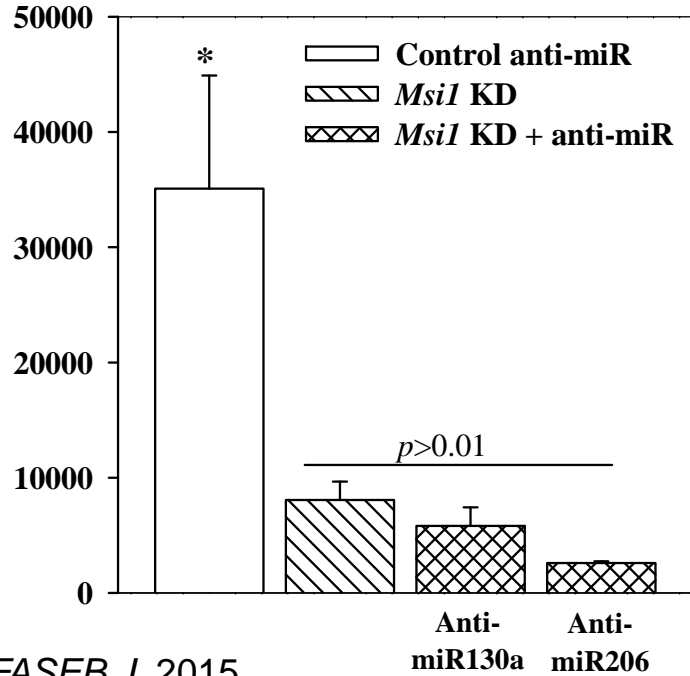
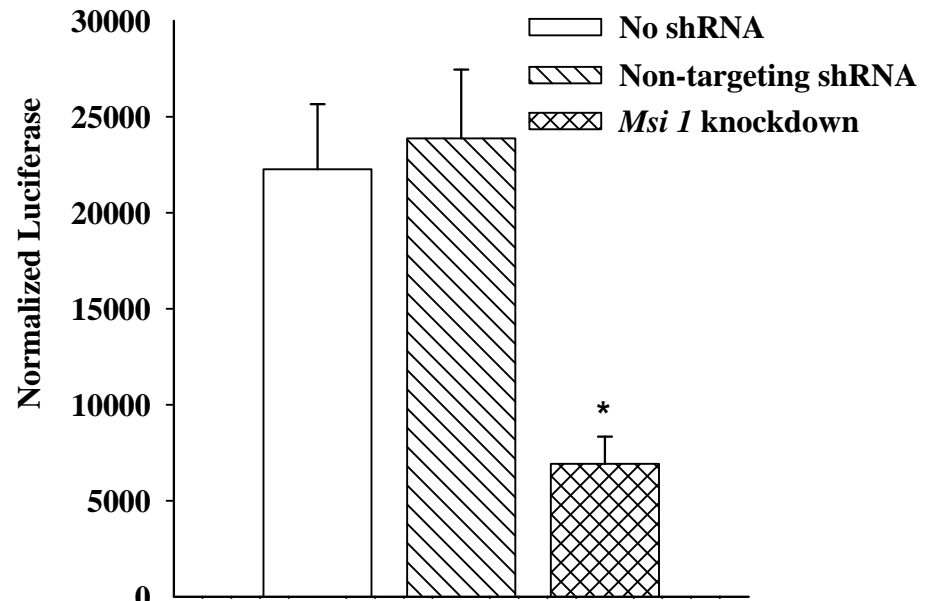
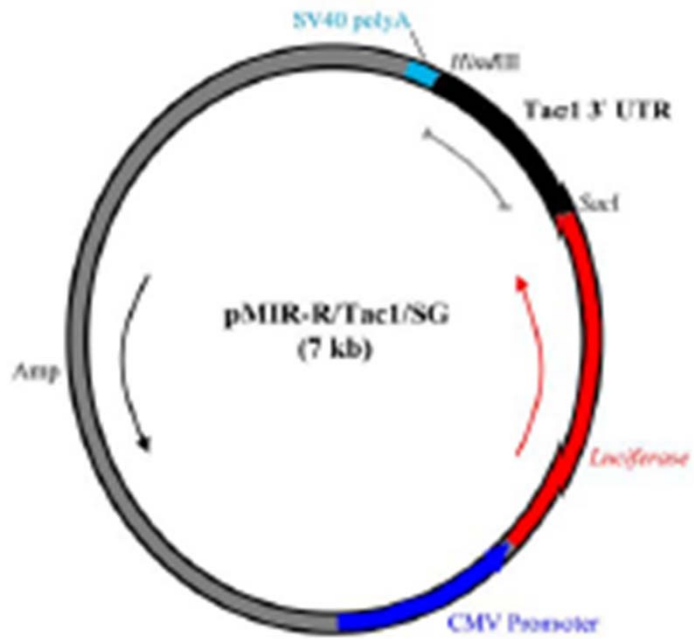


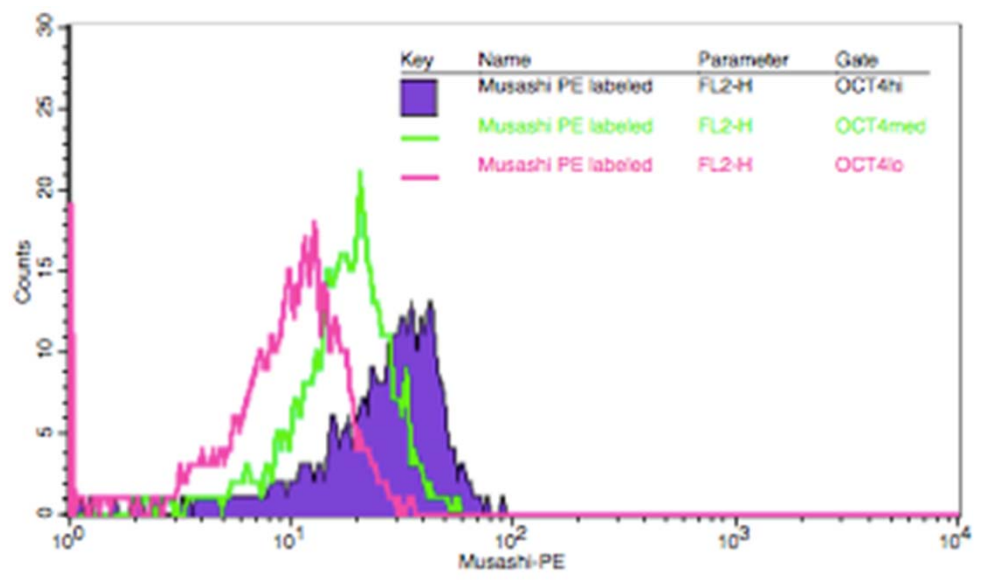
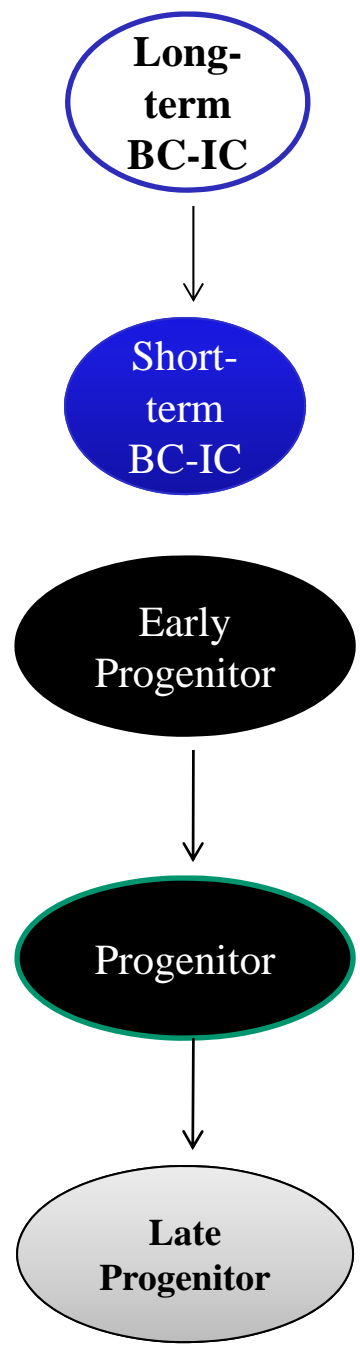
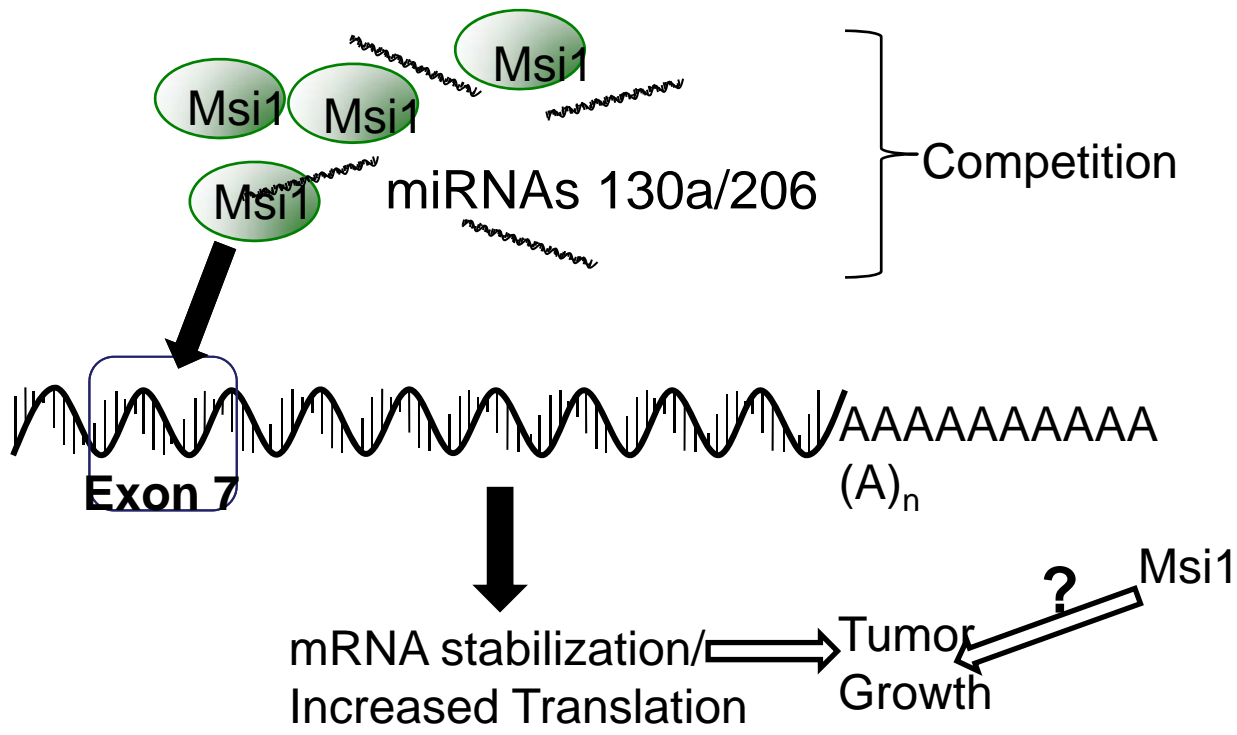
# Link: Assigned Paper – Overall Research

- TAC1 gene:
  - Oncogenic
  - Is this link to CSC?

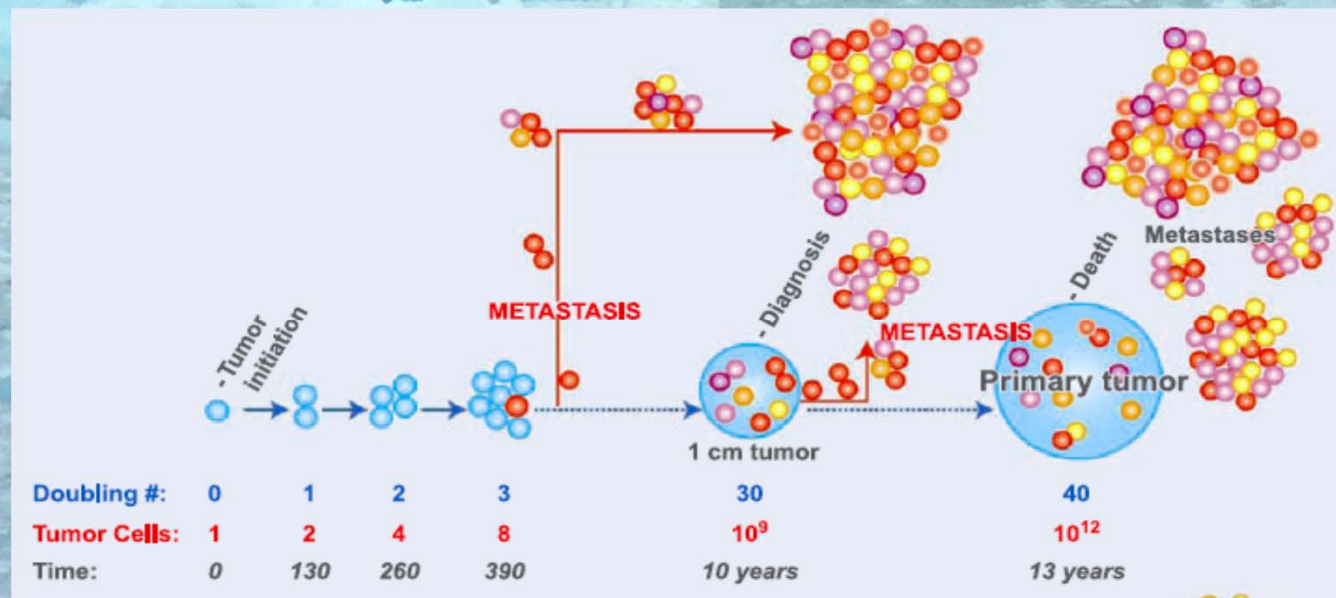








# IMPLICATIONS FOR STEM CELL THERAPY?



# THANK YOU

