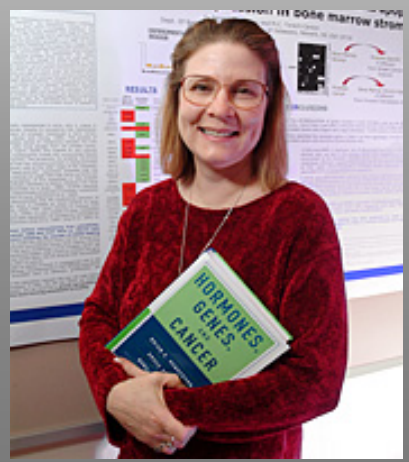
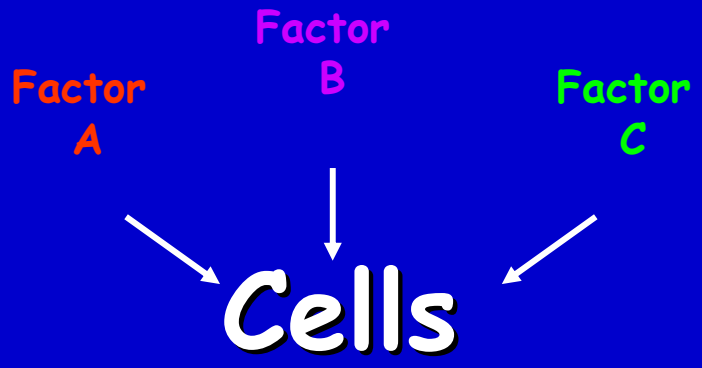
# Heparanase (Hpa1) Expression and its Function in Bone Development






Dr. Cindy Farach-Carson

Dr. Daniel Carson




Tissues

Organs

How does this relate to my "science project"?

Heparan Sulfate Proteoglycan (HSPG) [Sugar Protein]

Growth Factor and Receptor

Molecule for cleavage

**Heparanase** (an enzyme)

**Cells**

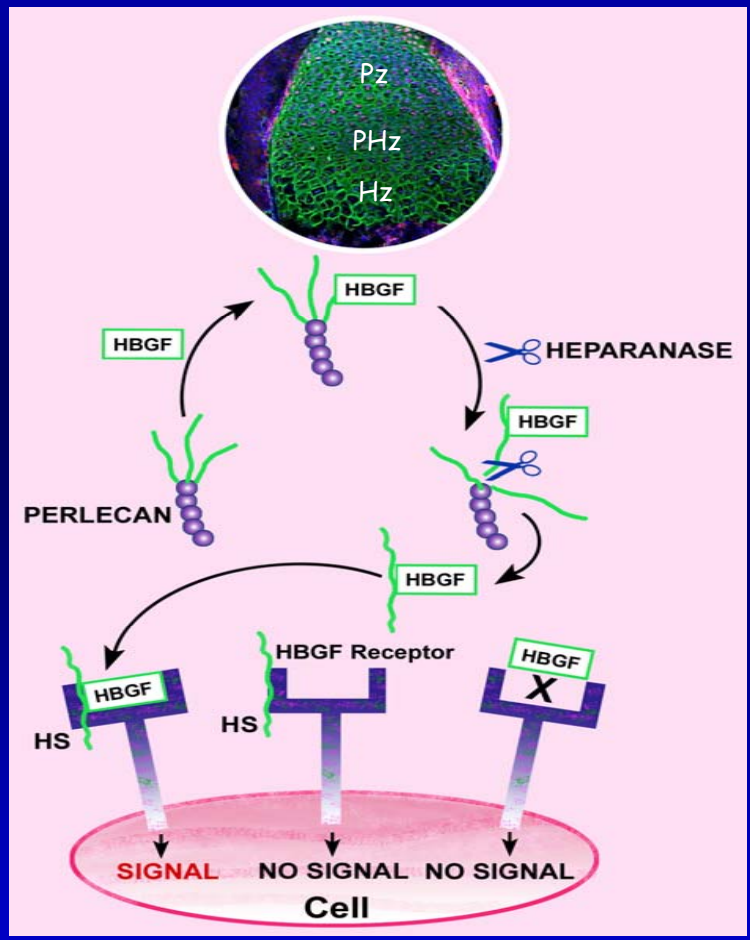
**Cartilage/Bone**

**Tissues**

**Organs**

# What molecules are important for bone development and growth?

## a trimolecular complex

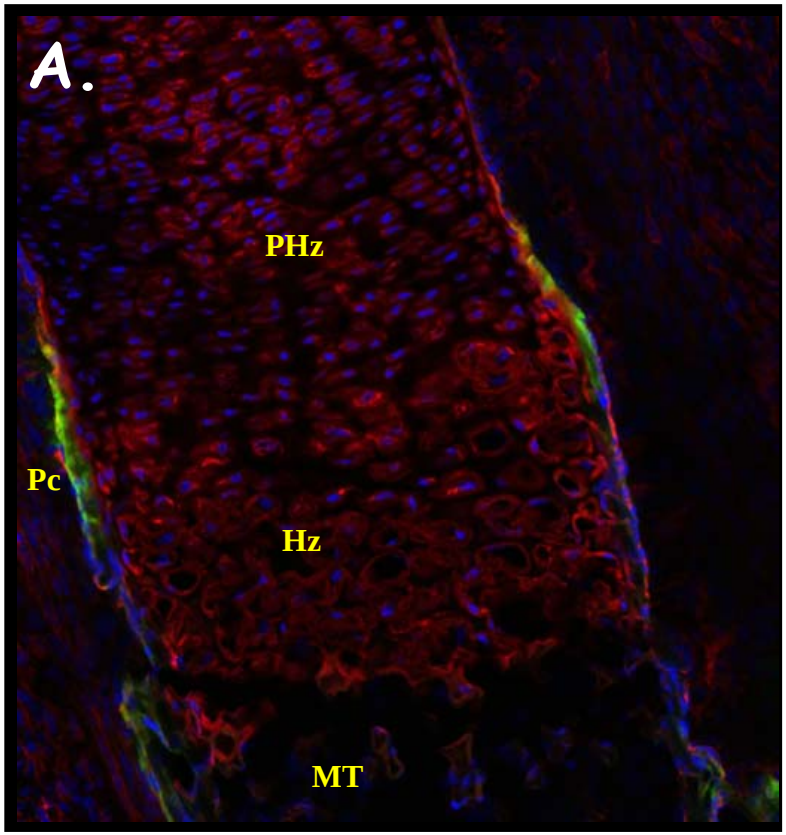



PZ = proliferative zone PHz= Prehypertrophic Zone
Hz= Hypertrophic Zone

Image modified from Miller et al., Differentiation (2003) 71:1-15

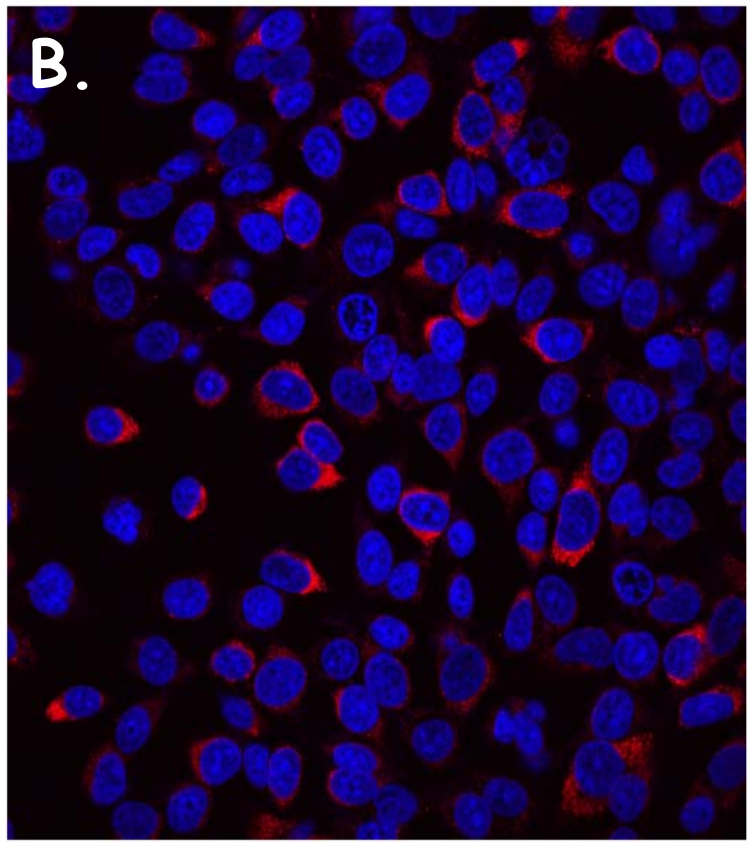
# Heparanase-1 (Hpa-1), a member of the trimolecular complex, expression in mouse limb and chondrocytes

*In vivo*




**RED**: Perlecan **GREEN**: Hpa-1
**BLUE**:Nuclei

*In vitro*

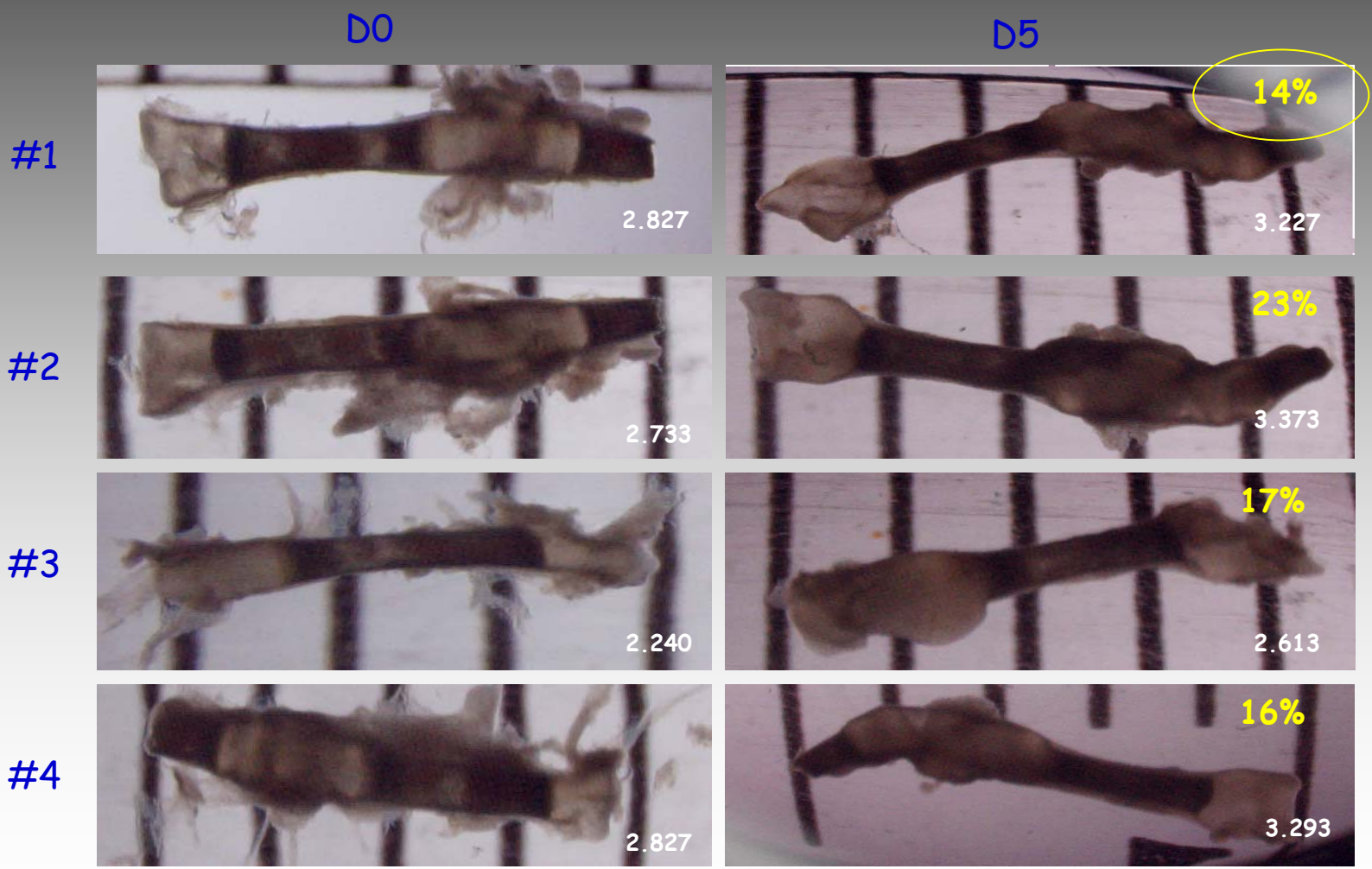



**RED**: Hpa-1 **BLUE**:Nuclei

# *Hypothesis*

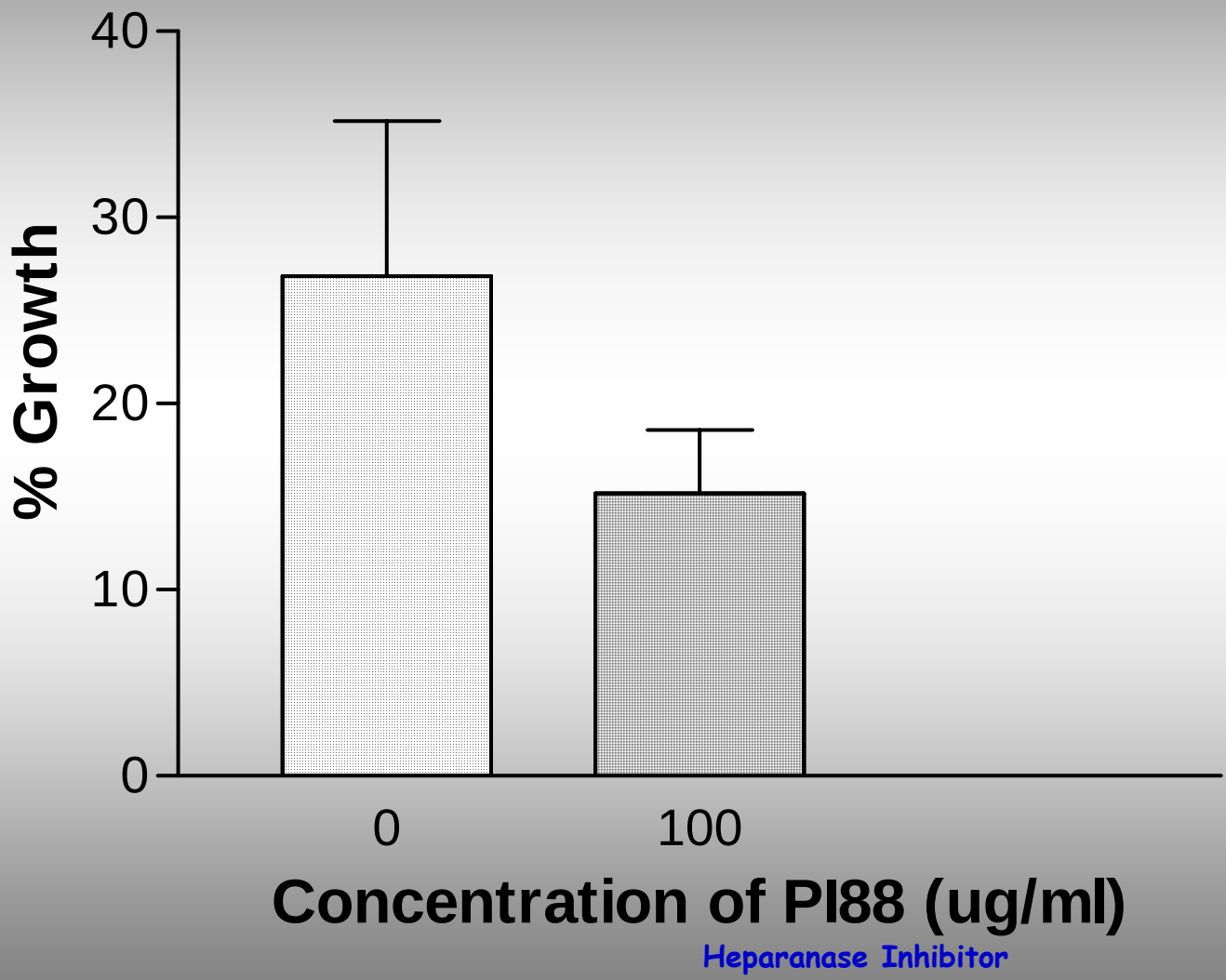
Hspe-1 expression during limb development facilitates delivery of HBGFs (i.e. FGFs, BMPs, Ihh) that regulate tissue growth and maturation.

# Sample of long bones microdissected from mouse toes




Mean 17.5 +/- 3.9

# The effects of a heparanase inhibitor on long bone growth



# So what do I study and why should you care…

I study the **role of heparanase in bone growth**.

My research will provide information for tissue engineers when determining the necessary molecules to coat biodegradable scaffolds to assist with tissue regeneration during bone fractures and degradation.