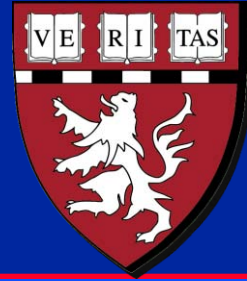




**Massachusetts Institute of Technology
Harvard Medical School
Brigham and Women's Hospital
VA Boston Healthcare System**



UNIT CELL PROCESSES

Bone Remodeling

Bone (Trabecular) Structure

Normal

**Osteoporotic:
Postmenopausal**

Two photos removed due to copyright restrictions. Postmenopausal bone is much less dense.

Effects (bone resorption) of the alteration in chemical regulator (lack of estrogen).

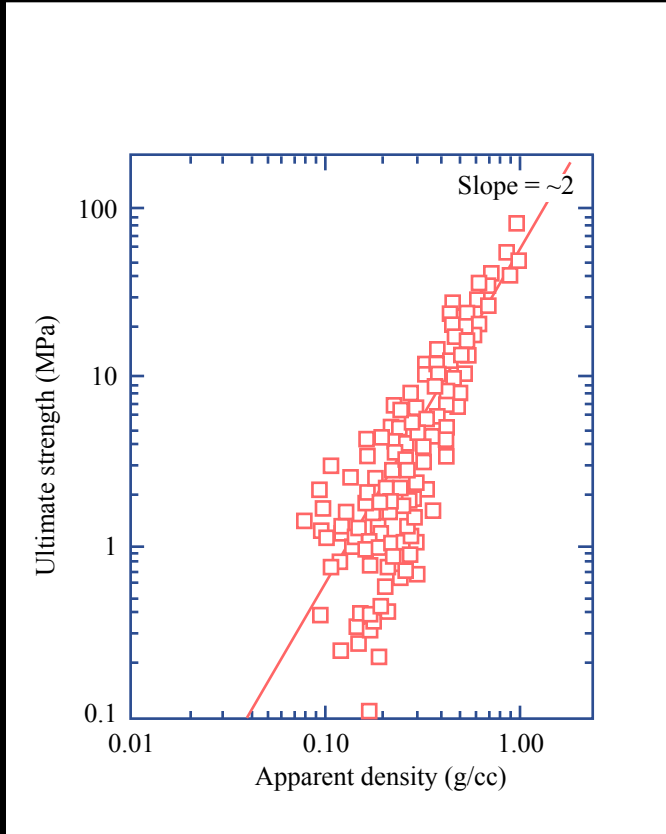
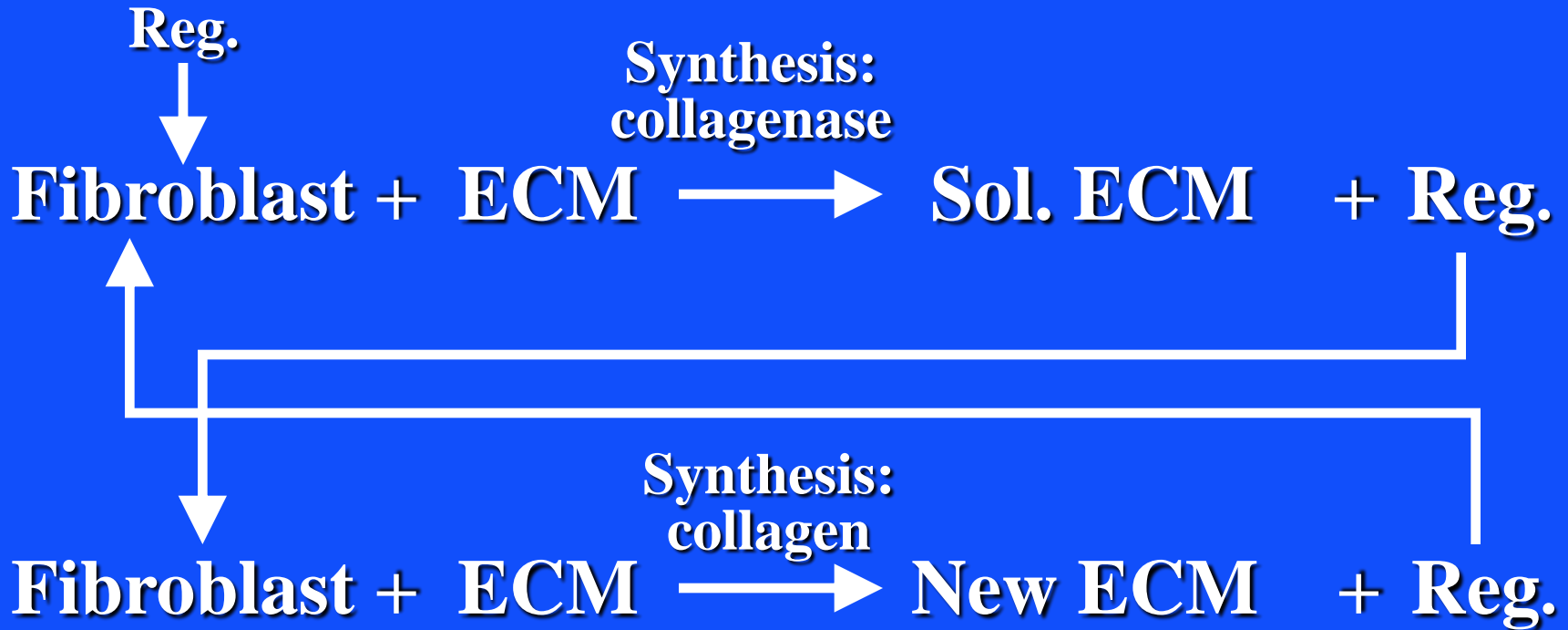


Figure by MIT OpenCourseWare. Data from AAOS Orthop. Basic Sci., 2000.

UNIT CELL PROCESSES

FIBROUS TISSUE REMODELING



UNIT CELL PROCESSES

BONE REMODELING

Degradation

Synthesis:
collagenase, H⁺

Osteoclast + ECM \longrightarrow Sol. ECM + Reg.

Formation

Synthesis:
collagen

Osteoblast + ECM \longrightarrow New ECM + Reg.

UNIT CELL PROCESSES

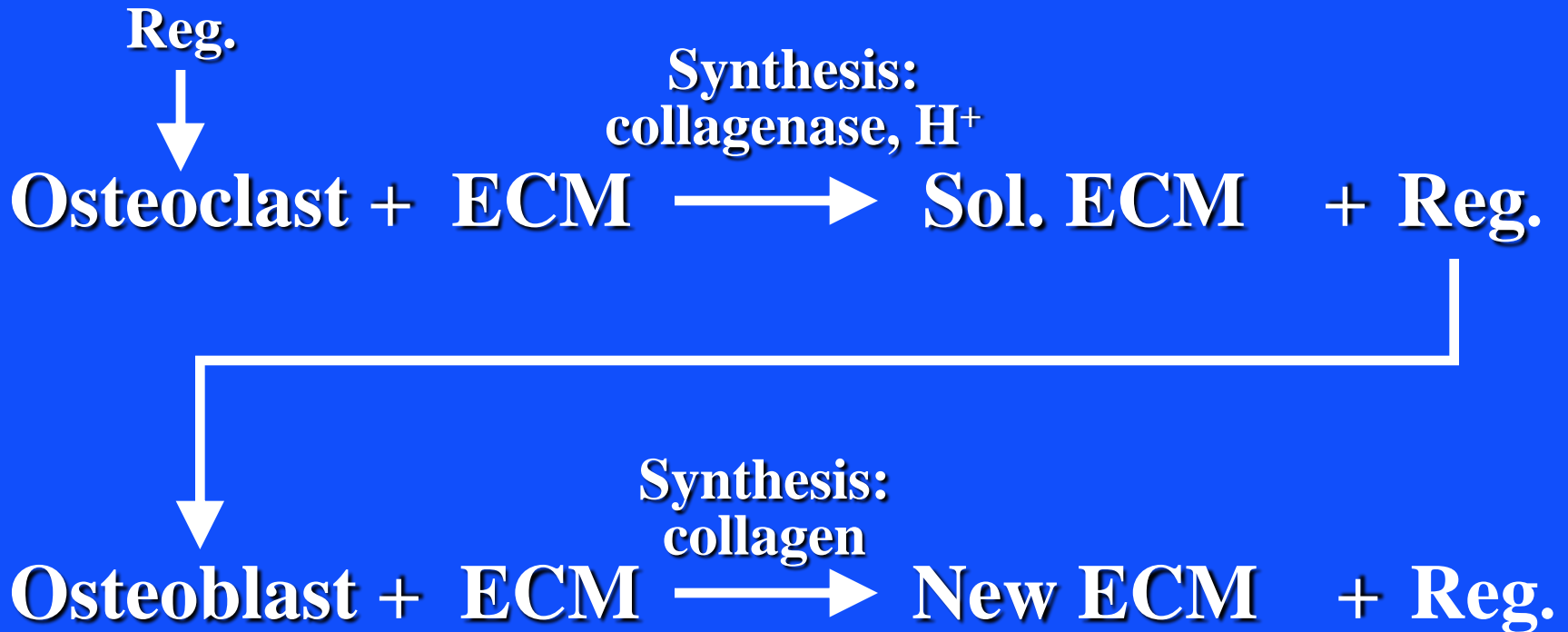
BONE REMODELING

Reg.
↓
Osteoclast + ECM $\xrightarrow{\text{Synthesis: collagenase, H}^+}$ Sol. ECM + Reg.

Osteoblast + ECM $\xrightarrow{\text{Synthesis: collagen}}$ New ECM + Reg.

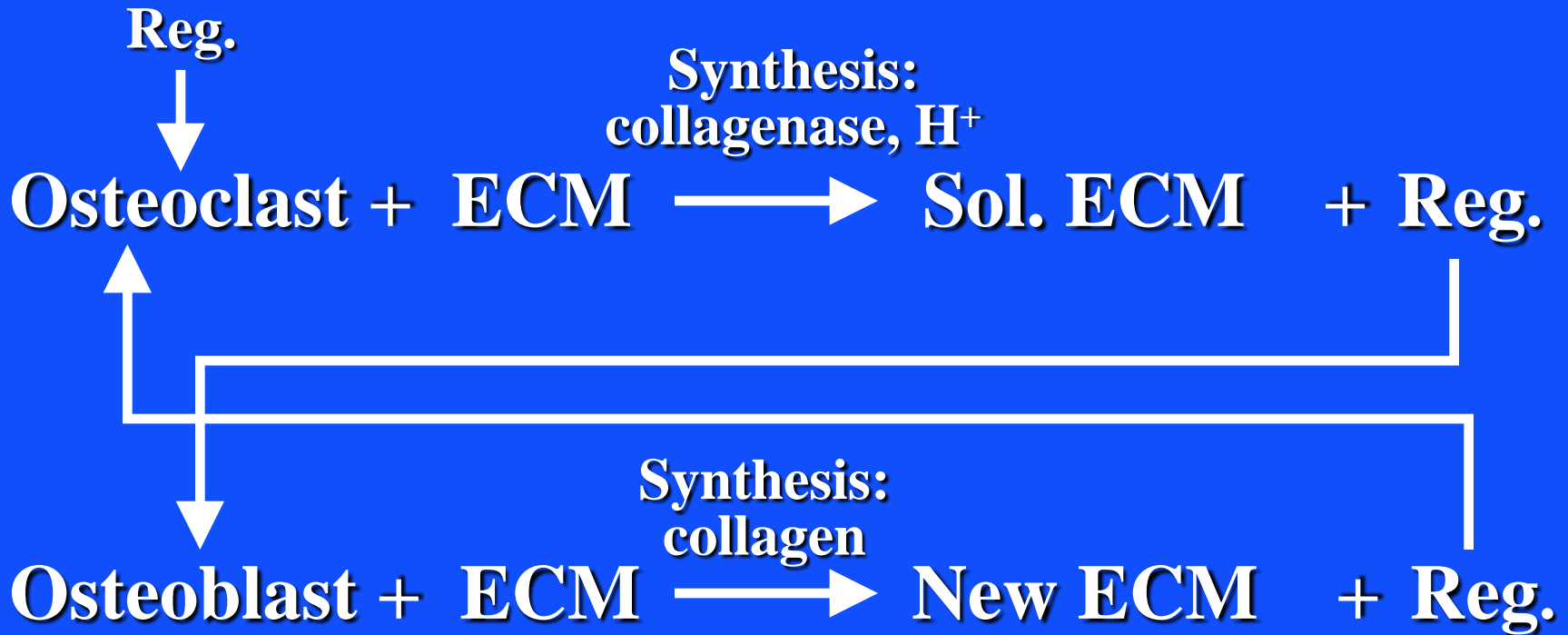
UNIT CELL PROCESSES

BONE REMODELING



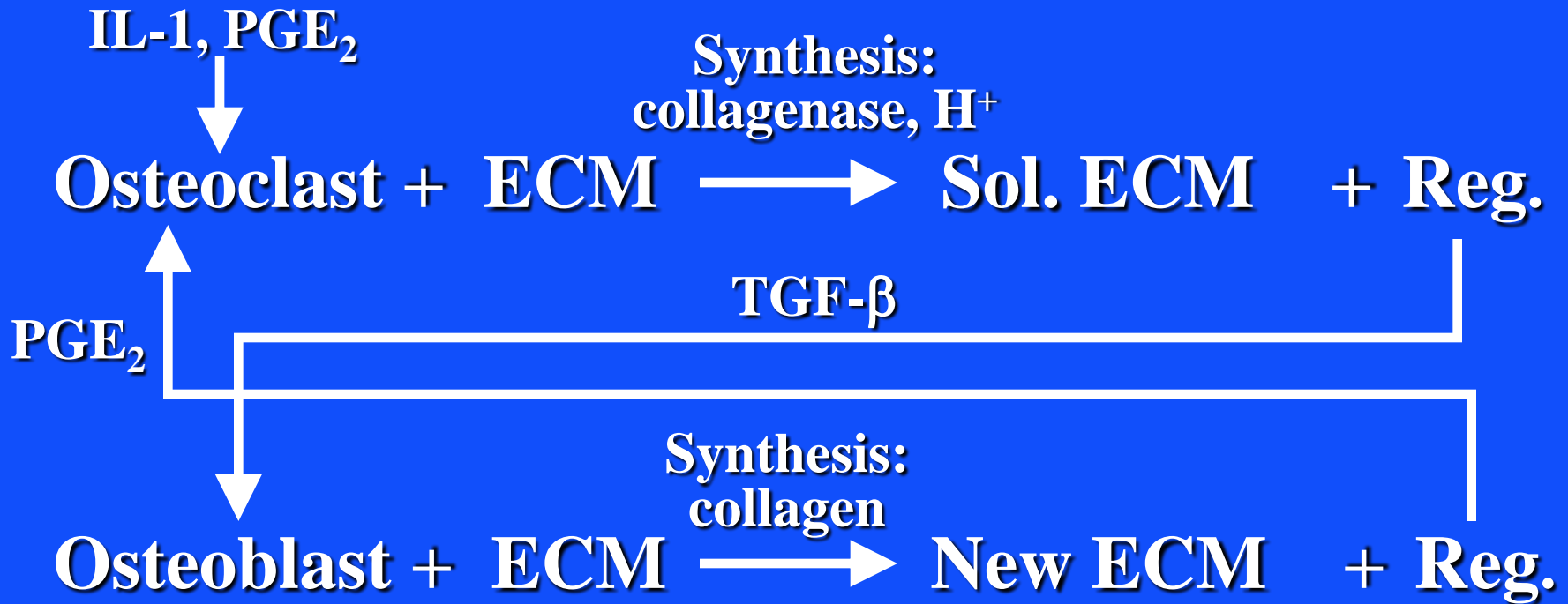
UNIT CELL PROCESSES

BONE REMODELING



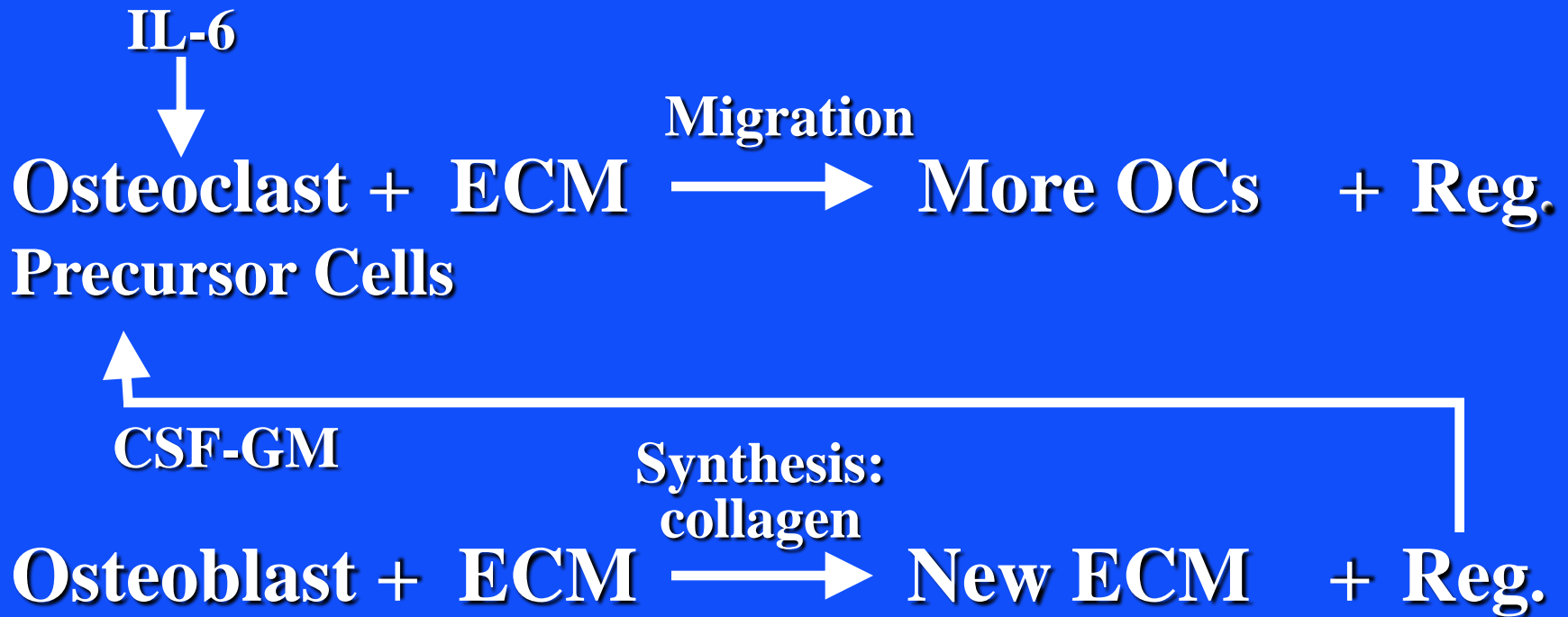
UNIT CELL PROCESSES

BONE REMODELING



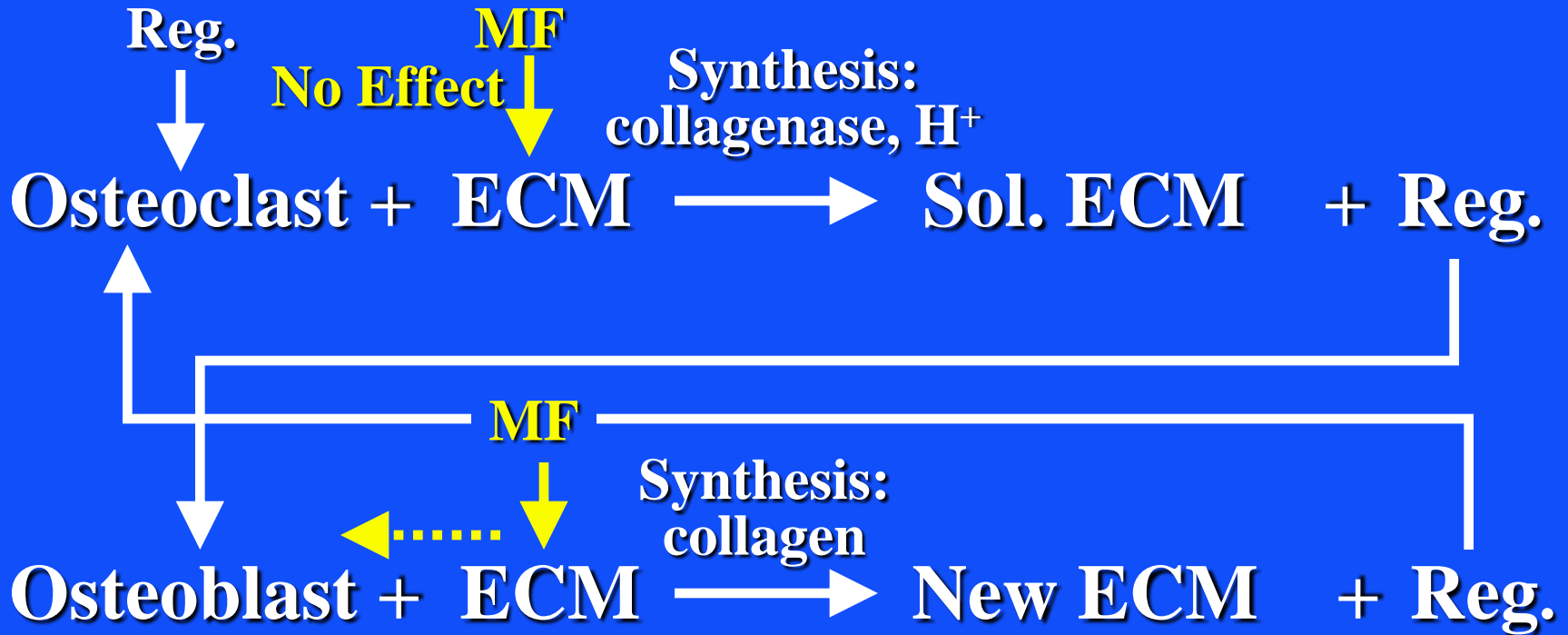
UNIT CELL PROCESSES

BONE REMODELING



UNIT CELL PROCESSES

BONE REMODELING



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20.441J / 2.79J / 3.96J / HST.522J Biomaterials-Tissue Interactions
Fall 2009

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