#### CALCIUM, THE BACKBONE OF FISH CULTURE: IMPORTANCE IN SKELETAL FORMATION, REPRODUCTION AND NORMAL PHYSIOLOGY

### FISHCAL (EU project)

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## Objectives

- To identify the relative importance of dietary, endogenous and environmental sources of calcium during critical phases of development, growth and reproduction
- Determine experimentally the roles of PTHrP in whole animal calcium homeostasis
- Study the molecular mechanisms that underpin bone formation in fish and the way in which PTHrP regulates this process (ongoing)
- Model species sea bream (*Sparus auratus*).

## **Tools Generated**

- Recombinant sea bream proteins and specific antisera.
- Specific radioimmunoassays for parathyroid hormone (PTH) and parathyroid hormone related protein (PTHrP), thyroid hormones and steroids.
- Quantitative RT-PCR for endocrine hormones and receptors.
- Subtractive larval head cartilage cDNA library and a Microarray.
- Identification of candidate genes.
- Physiological studies and phenotype.

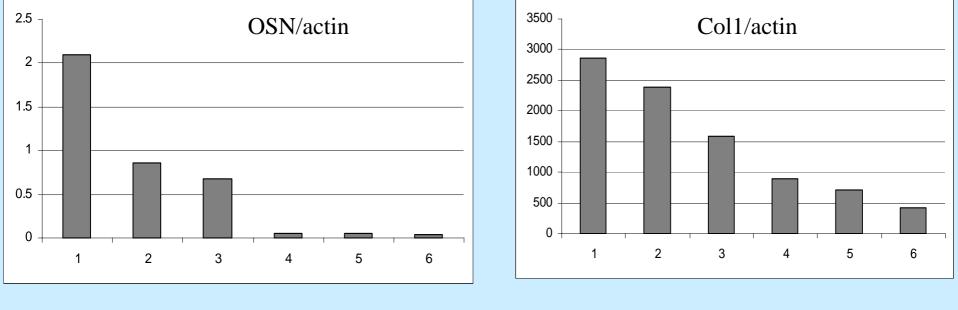
# Genomics input:

- Identification of PTH/PTHrP promotors.
- Identification of PTHrP responsive genes.
- Gene expression profiles during endochondrial calcification.

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Candidate molecular markers of skeletal tissue -Extracellular Matrix proteins (ECM)

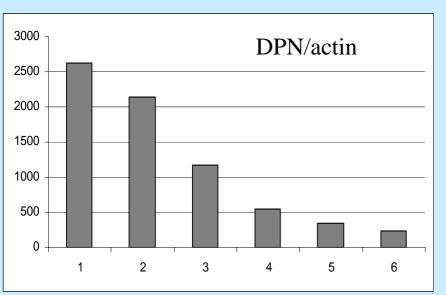
- ECM highly complex arrangement of structural proteins, growth factors, and matricellular proteins.
- Structural proteins such as collagen 1, collagen 5 and dermatopontin, and osteonectin (implicated in bone mineralization) are regulated by hormones.

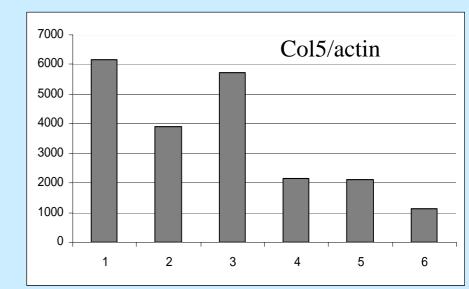


1.	Control	3. Calcitonin
2.	E2	4. Vitamin D

5. PTHrP (10nM)6. PTHrP (1000nM)

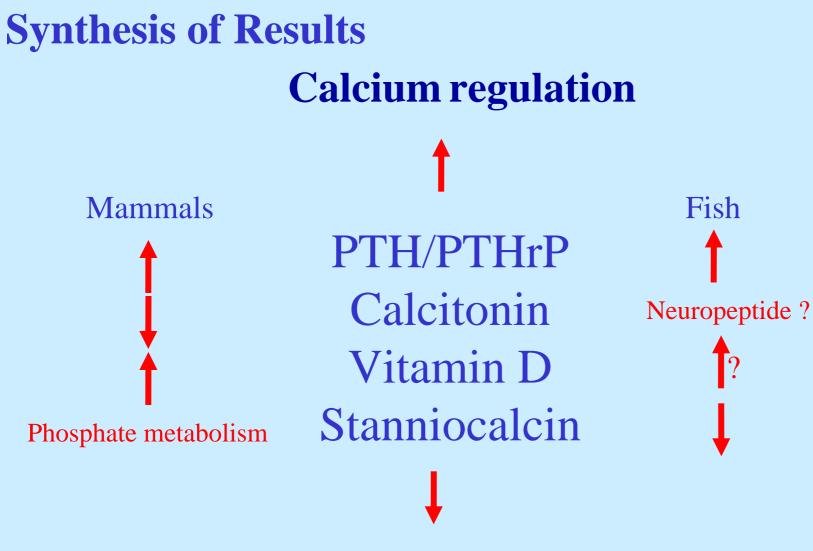
#### Candidate gene expression in scales - influence of hormones





#### Molecular Markers of Skeletal Tissue

- ECM responsive to endocrine hormones with a key role in skeletal formation.
- Candidate genes in skeletal formation in sea bream identified.
- Application of tools generated to study skeletal formation in normal and abnormal larvae.



Skeletal formation and metabolism

