

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

FISHCAL (EU project)

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Objectives

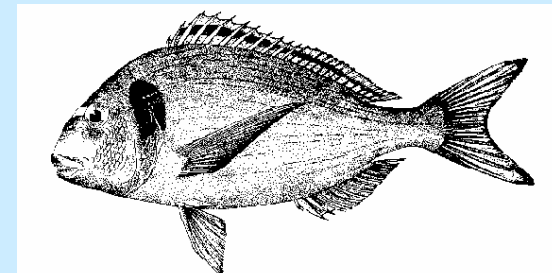
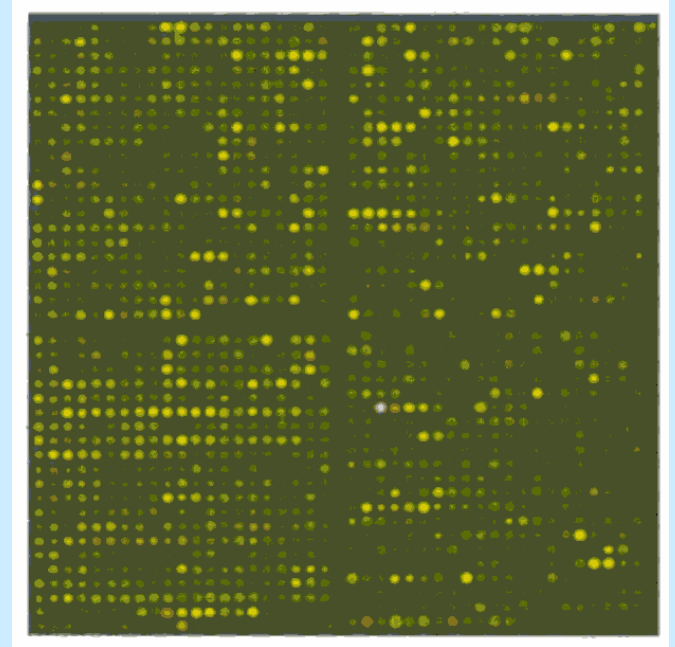
- To identify the relative importance of dietary, endogenous and environmental sources of calcium during critical phases of development, growth and reproduction ✓
- Determine experimentally the roles of PTHrP in whole animal calcium homeostasis ✓
- Study the molecular mechanisms that underpin bone formation 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:

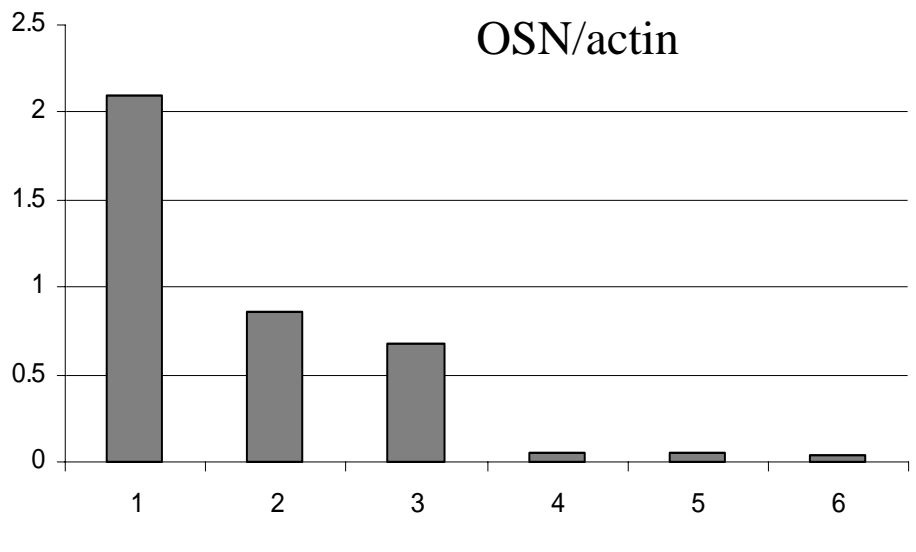
- Identification of PTH/PTHrP promoters.
- Identification of PTHrP responsive genes.
- Gene expression profiles during endochondrial calcification.



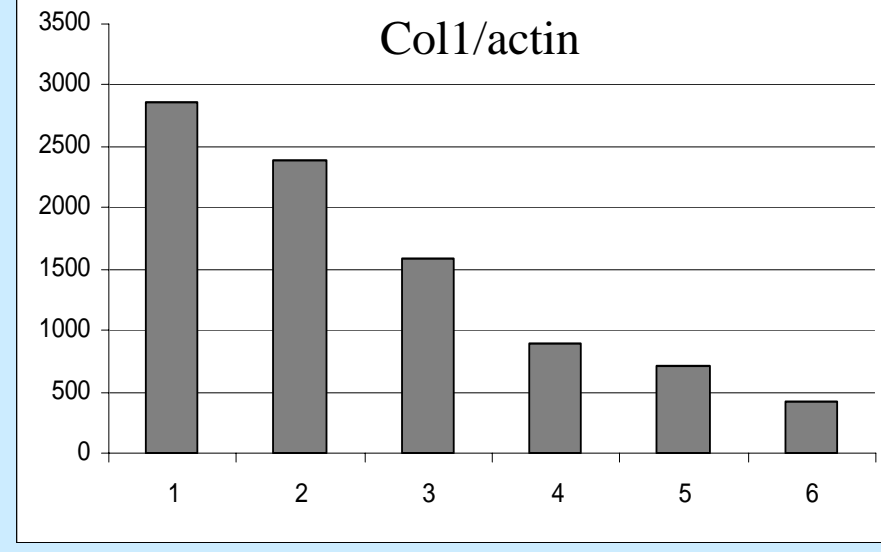
Candidate molecular markers of skeletal tissue - Extracellular Matrix proteins (ECM)

- 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.

OSN/actin



Col1/actin



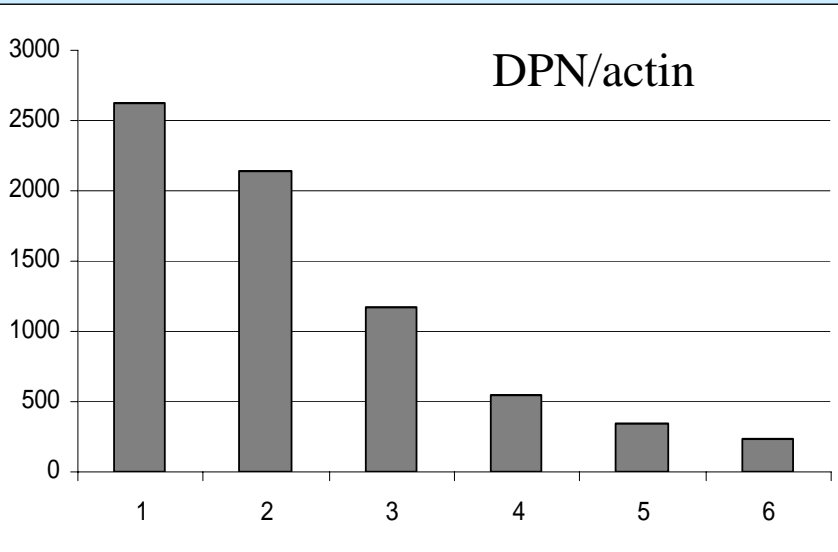
- 1. Control
- 2. E2

- 3. Calcitonin
- 4. Vitamin D

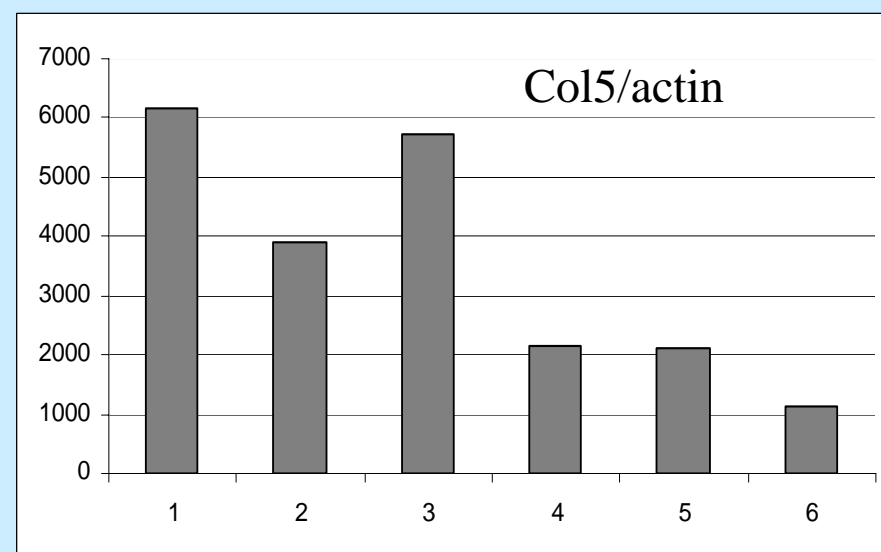
- 5. PTHrP (10nM)
- 6. PTHrP (1000nM)

Candidate gene expression in scales - influence of hormones

DPN/actin



Col5/actin



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.

Synthesis of Results

Calcium regulation

