

# Fish muscle proteins

- Fish muscle Protein can be divided into the following three group
- Myofibrillar protein
- Sarcoplasmic protein
- Stroma protein

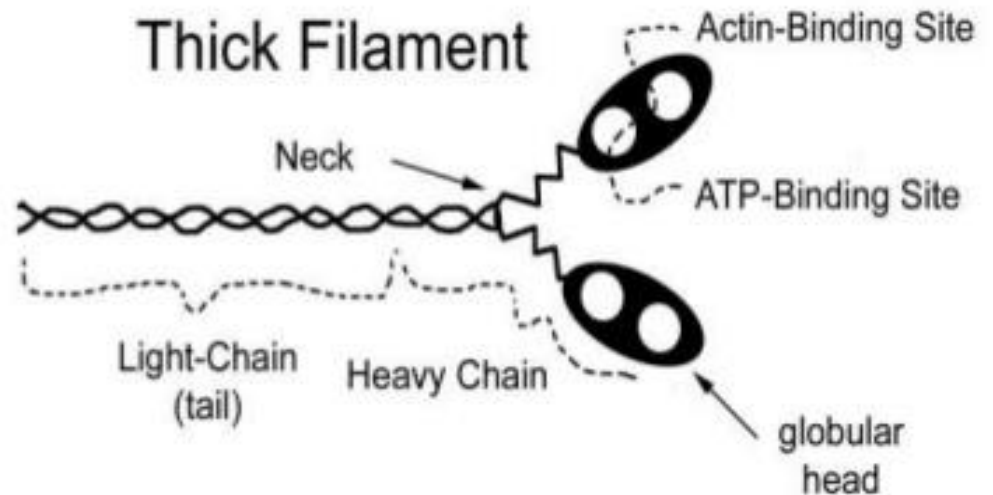
# Myofibrillar Protein

- Myofibrillar protein is the protein that forms myofibril, which contains Myosin, Actin, Tropomyosin, Troponin and Actinin.
- Myofibrillar protein covers 66-77% of the total protein in fish meat.
- These proteins are soluble in natural salt solution of high ionic strength ( $<0.5\text{M}$ ).

- This protein is responsible for coagulation and gel formation during different processing methods (mainly in the production of surimi).

## Myosin-

- Myosin is the protein which forms the **thick filaments** .
- A molecular weight is about **500,000** daltons.
- It is most abundant myofibrillar component, constituting approximately 40-60% of total protein content.



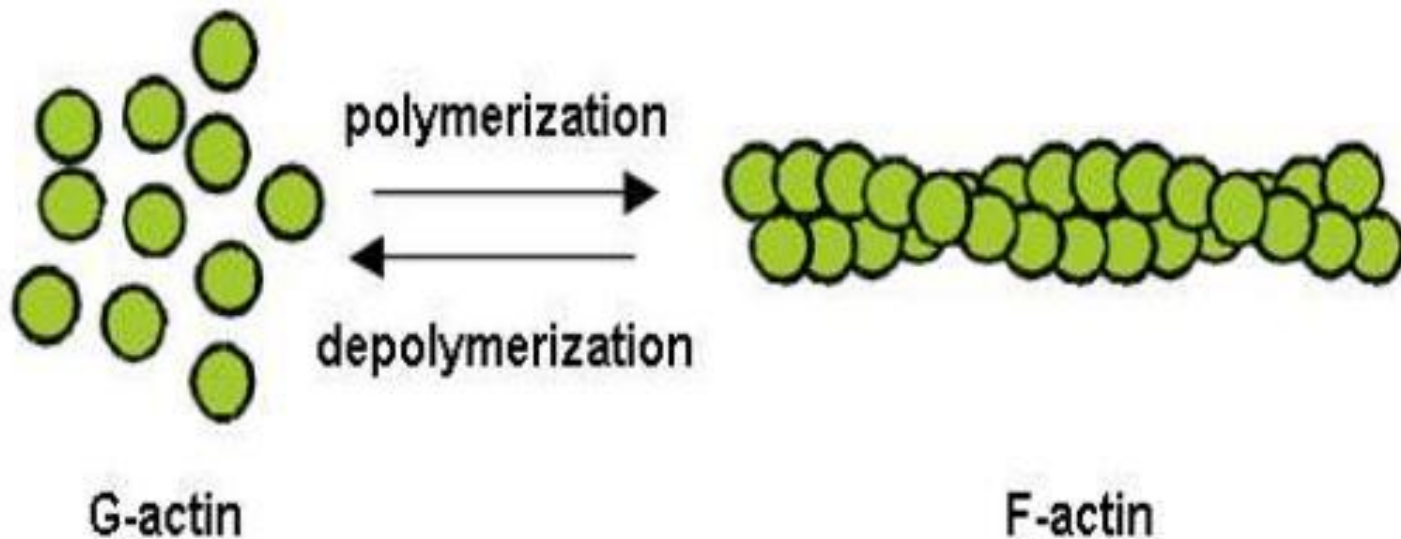
# Myosin

- Myosin consists of six polypeptide chains and out of them two heavy chains and four light chains.
- Myosin is a motor molecule that works to move the cell. This will result in a contraction and expansion movement.
- Myosin is a special protein that converts adenosine triphosphate (ATP), a molecule that cells use in order to live and work, into mechanical energy (energy of work). This will then generate force and movement.

# Actin

- It constitutes about 22% of the total myofibrillar protein.
- It can be present as either a free monomer called G-actin (globular) or as part of a linear polymer microfilament called F-actin(filamentous), both of which are essential for such important cellular functions as the mobility and contraction of cells during cell division.

➤ Monomer form of actin i.e. G-actin and after polymerization, actin filaments are formed and called F- actin.

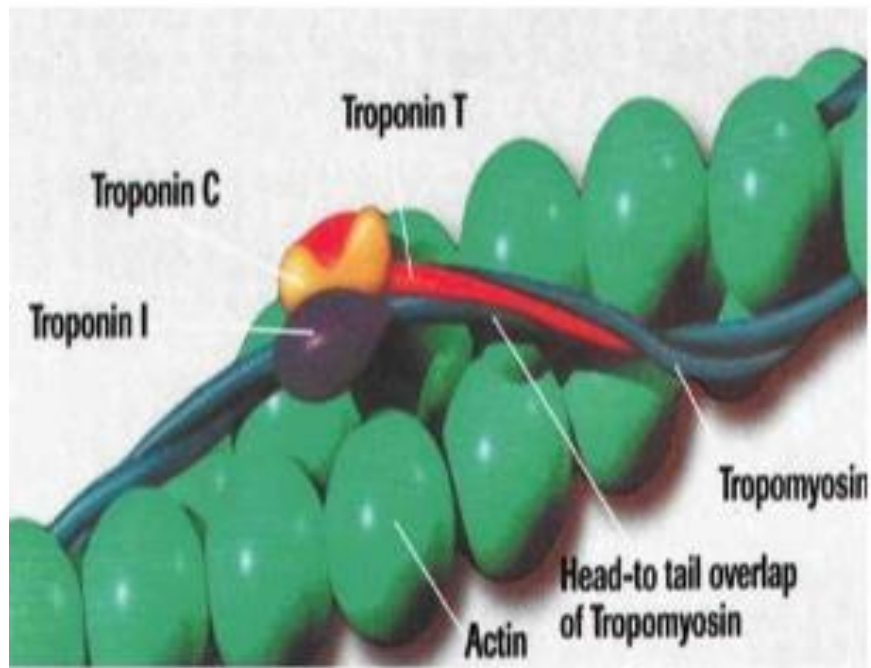




# Troponin and Tropomyosin

- Troponin and tropomyosin regulate muscle contraction
- Troponin covers 8-10% of total myofibrillar proteins.
- There are 3 type of troponin
  - 1.Troponin–C (calcium binding)
  - 2.Troponin-I (inhibitory protein)
  3. Troponin-T (tropomyosin binding).
- Tropomyosin covers 5-10% of total myofibrillar protein.
- Tropomyosin have two polypeptide alpha and beta chain and combine to form a tropomyosin dimer.

# Troponin



# Tropomyosin

## Tropomyosin



# Actomyosin

- A complex of actin and myosin of which the contractile protein filaments of muscle tissue are composed.

# Sarcoplasmic protein

- Sarcoplasmic protein contains many kinds of water soluble proteins (myoalbumin, globulin and enzymes) called myogen
- These proteins are soluble in neutral salt solution of low ionic strength (0.15M).
- It covers a accounts for 25-30% of the total proteins.
- The concentration of sarcoplasmic protein is high in pelagic fishes such as sardine,mackeral while lower in demersal species.

# Stroma Protein

- Stroma proteins accounts for about 3% of total proteins in teleosts and 10% in elasmobranches.
- These are connective tissues and insoluble in neutral salt solution or in dilute acids or alkalies.
- The component of stroma is collagen, elastin or both.
- Elastin is very resistant to moist heat and cooking.
- Collagen is almost totally insoluble in water or saline and does not participate in gel formation
- Collagen is present in skin, air bladder of the fish and it convert in gelatin during heat processing.