Plant fibers used as surgical dressings

Cotton (Surgical Cotton)

General Introduction

- Cotton is a soft, fluffy staple fiber grown in bolls around the seeds of cotton plants. When processed and sterilized, it is widely used in surgical dressings due to its absorbency and softness.



Synonyms

- Common Name: Cotton
- Other Names: Absorbent Cotton, Surgical Cotton
- Botanical Name: *Gossypium hirsutum*, *Gossypium barbadense*

Biological Source

- Dried epidermal trichomes from the seeds of cultivated species of *Gossypium*.
- Family: Malvaceae

Composition

- Major: Nearly pure cellulose (~ 91–96%)
- Minor: Waxes, proteins, pectins, and inorganic salts

Chemistry & Chemical Classes

- **Chemical Class**: Polysaccharides (Cellulose)
- **Structure**: Cellulose is a linear polymer of β-D-glucose units linked by β-1,4-glycosidic bonds.

Therapeutic Uses

- As a surgical dressing: used for wound cleaning, hemostasis, and bandaging.

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- Used in manufacturing of medicated cotton and tampons.

Commercial Applications

- Surgical dressings (cotton rolls, pads, swabs)
- Cosmetic pads
- Absorbent material in pharma and cosmetics
- Sanitary napkins, diapers

Silk (Surgical Sutures)

General Introduction

- Silk is a natural protein fiber produced by silkworms. It is one of the oldest known natural fibers and has high tensile strength, making it suitable for surgical sutures.



Synonyms

- Common Name: Silk
- Scientific Name: *Bombyx mori* silk
- Other Names: Natural Silk, Silk Fiber

Biological Source

- Fibroin protein obtained from the cocoon of the silkworm *Bombyx mori*.
- Family: Bombycidae (insect origin)

Composition

- Fibroin (70–80%) – a structural protein
- Sericin (~20–30%) – a gummy coating protein

Chemistry & Chemical Classes

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- **Chemical Class**: Proteins (fibroin is a fibrous protein)
- **Structure**: Consists mainly of glycine, alanine, and serine forming β-sheet structures.

Therapeutic Uses

- Used as non-absorbable surgical sutures
- Occasionally used in cosmetic surgery and ophthalmology

Commercial Applications

- Black braided silk sutures
- Used in dental and cardiovascular surgeries
- Also used in textile industry for luxury fabrics (non-medical use)

Wool (Absorbent Wool / Lanoline Wool)

General Introduction

- Wool is a fibrous protein material obtained from the fleece of sheep. Its absorbent and cushioning nature makes it suitable in surgical applications like padding and wound care.



Synonyms

- Common Name: Wool
- Other Names: Absorbent Wool, Lanoline Wool
- Scientific Source: *Ovis aries* (domestic sheep)

Biological Source

- Hair of sheep, processed to remove fat and impurities
- Family: Bovidae

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Composition

- Major: Keratin (a fibrous protein)
- Minor: Lipids (lanolin), moisture

Chemistry & Chemical Classes

- **Chemical Class**: Proteins (keratin type)
- **Structure**: High molecular weight protein with sulfur-containing amino acids like cysteine

Therapeutic Uses

- Used in absorbent pads and dressings
- Helps protect wounds and absorbs exudate
- Lanolin (from wool fat) used in ointments and skin creams

Commercial Applications

- Wound dressing and cushioning
- Manufacture of lanolin-based pharmaceutical and cosmetic products
- Orthopedic padding materials

Regenerated Fibres (e.g., Rayon, Cellulose Acetate)

General Introduction

- Regenerated fibres are semi-synthetic fibres produced by chemically modifying natural cellulose. Rayon is the most common regenerated fiber used in surgical dressings.

Synonyms

- Common Names: Rayon, Viscose, Regenerated Cellulose
- Other Names: Artificial Silk

Biological Source

- Derived from cellulose extracted from wood pulp or cotton linters.

Composition

- Chemically treated cellulose
- May contain additives like plasticizers or stabilizers depending on the process

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