TECHNICAL TUESDAYS

MEDICAL TEXTILES – PART I

REF: TT/ SEPT 2022/ WK 2

Characteristics of fibers used in medical textile

The characteristics of fibers used in medical textiles are different as they are designed with medical use in mind. The basic properties that make them ideal for use in this area are:

- Non-toxic
- Non-carcinogenic
- Non-allergenic
- Fully biocompatible
- Anti-microbial

There are some specific characteristics based on the usage as well. Those are as below:

- **Non-implantable materials** - These materials are used for external applications on the body and may or may not make contact with skin. These are used as coverings; hence the characteristics of the fibers used in these materials are also aligned with the application.

    1. Stable and spatial structure.
    2. Good absorbent to body perspiration and secretion from wound.
    3. Sufficient tensile strength
    4. Elastic in nature due to special weave which allows the material to stretch twice its length.
    5. Eliminates possibility of loose fibers on the material, so that the fibers don't get caught in the wound.
    6. Causes no mechanical injury of a granulating wound **(Granulation - That part of the healing process in which lumpy, pink tissue containing new connective tissue and capillaries forms around the edges of a wound).**
    7. Should not interfere in the process of wound healing.
    8. Decreased wound adhesion.

- **Healthcare and hygienic products –** This includes surgeons' gown, caps and mask, patient drapes, diapers etc. The specific properties associated with these types of products are:
    1. Lightweight

2. High level of air permeability
3. Should have higher filter capacity for masks mainly
4. Super absorbent.
5. Should possess antiseptic properties.

- **Extracorporeal devices** - These devices used to support the function of vital organs, such as kidney, liver, lung, heart etc. Hollow fiber is used in these devices. Like artificial kidney is made with hollow hair sized cellulose fibers or hollow polyester fibers, artificial liver is made of hollow viscose to separate and dispose patients plasmas and supply fresh plasma and mechanical lung is made with a hollow polypropylene fiber or a hollow silicone membrane.

- **Implantable materials** - These materials are used in effecting repair to the body whether it is wound closure (sutures) or replacement surgery (vascular grafts, artificial ligaments etc.) Biocompatibility is of prime importance if textile materials are to be accepted by the body. And the four key factors that will determine how the body reacts to the implants are:
  1. Porosity, which determines the rate at which human tissue will grow and encapsulate the implant.
  2. Small circular fibers are better encapsulated with human tissue than larger fibers with irregular cross sections.
  3. The fiber polymer must not release toxic substances, and fiber should be free from surface contaminants such as lubricants and sizing agents.
  4. Biodegradable

  The major requirements of a good vascular graft include

  1. Non-fraying
  2. Flexibility
  3. Durability
  4. Biocompatibility
  5. Stability to sterilization
  6. Resistance to bacteria/viruses

REQUIREMENTS OF A GOOD VASCULAR GRAFT
• **Non-fraying** • **Flexibility** • **Durability** • **Biocompatibility** • **Stability to sterilization** • **Resistance to bacteria/viruses**
REQUIREMENTS OF A GOOD SUTURE
• **Good tensile strength** • **Stiffness** • **Easy handling** • **Good knotting security**

References:

1. https://www.healthtechzone.com/
2. https://www.technicaltextile.net/
3. https://textilelearner.net/
4. https://textileapex.blogspot.com/

.....To be continued.....

UNSCRAMBLE THE JUMBLE WORDS
TIALAPS
LUCSAVRA
LITYIOBMPOCAITIB
TNESORBAB

Last week`s Answers: 1) TISSUE 2) HEALTHCARE 3) ADULT 4) PLASTER

Wishing you a great week ahead!

Technical Tuesdays is a knowledge sharing initiative by Resil Chemicals Private Limited
arc@resil.com | www.resil.com.