Innovative Technology for Polymer Impregnation in Medical Devices

Nancy Hummel - FIBROLINE



With the support of:

WHO ARE WE?

An engineering company with unique dry powder impregnation technologies, delivering “turnkey solutions”



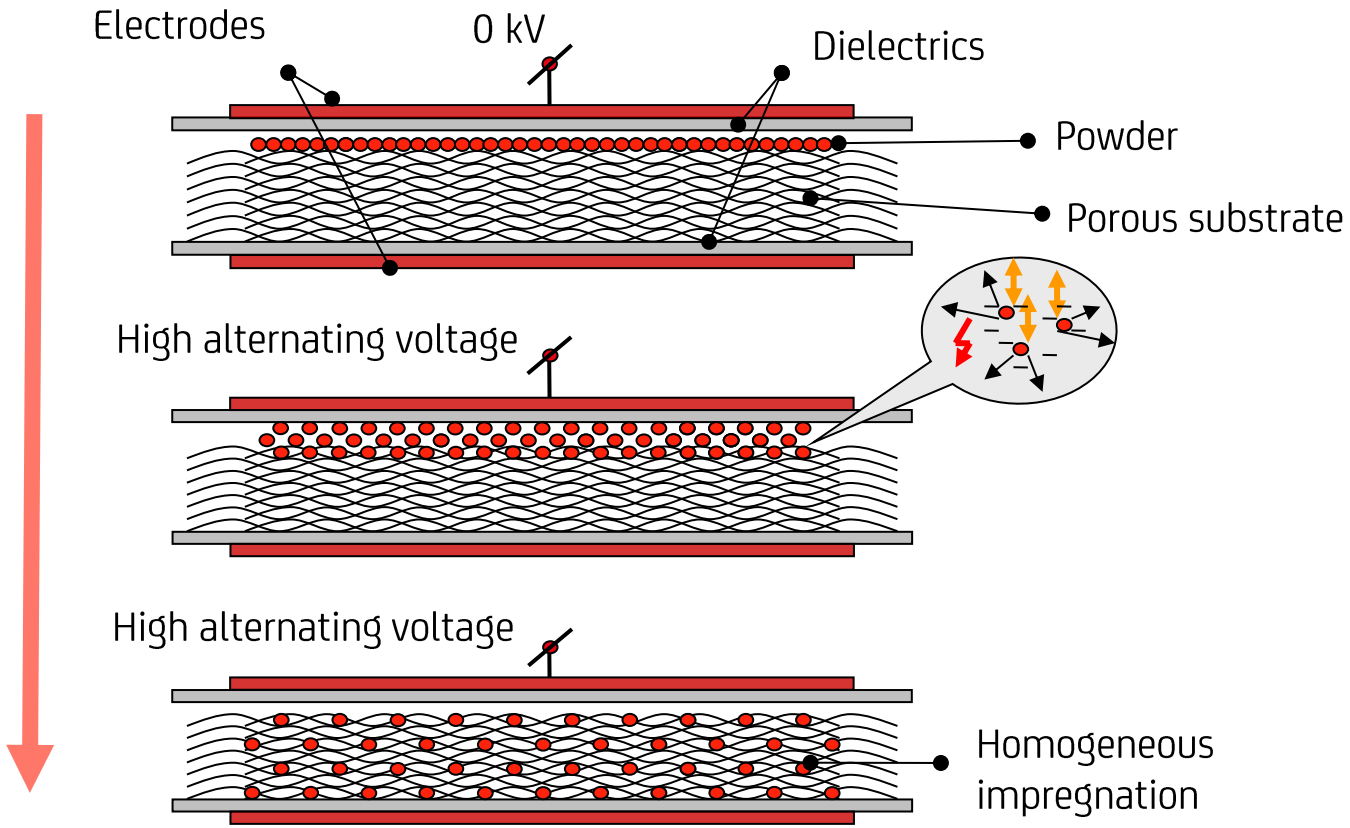
PATENTED

50+ PATENTS WORLDWIDE

R&D TEAM
WITH UNIQUE KNOW-HOW

50+ R&D PROJECTS
15+ TECHNOLOGY TRANSFERS

TECHNOLOGY PRINCIPLE



- Perfect control of the powder distribution
- Dry process
- Room temperature
- Impregnation machines can be implemented in clean rooms

KEY ADVANTAGES

Liquid process replacement

- No water, no solvent
- No drying step
- Very low energy consumption
- Environmentally friendly process

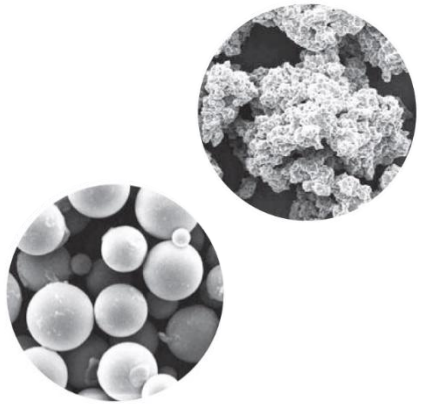
New products creation

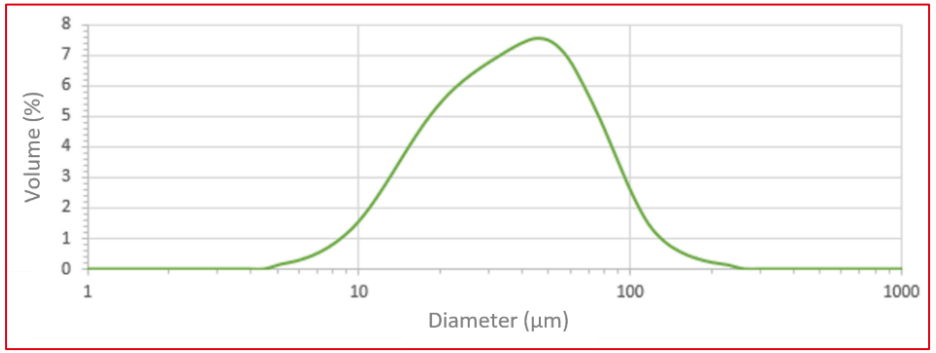
- By combining materials that cannot be processed with other solutions → leading to new products
- Examples: Vitamin C incompatible with water

A LARGE RANGE OF RAW MATERIALS

POWDERS

- Biopolymers as
  - cellulose,
  - starch,
  - chitin,
  - hyaluronic acid,
  - collagen...
- Synthetic polymers as
  - polyethylene (PE),
  - polyethylene glycol (PEG),
  - polycaprolactone (PCL),
  - polylactic acid (PLA),
  - polyhydroxyalkanoates (PHA),
  - polyhexamethylene biguanide (PHMB)...
- Other organic powder as
  - ascorbic acid (vitamin C),
  - citric acid,
  - sorbitol...
- Inorganic powder as
  - salts,
  - hydroxyapatite,
  - kaolin,
  - clay...





A LARGE RANGE OF RAW MATERIALS

POROUS STRUCTURES



- Polyethylene terephthalate (PET)
- Polypropylene (PP)
- Polypropylene / Polyethylene (PP/PE)
- Polyurethane (PU)
- Cotton
- Viscose
- Calcium alginate
- Chitosan
- Collagen...

IN-LINE TECHNOLOGY

DOSING

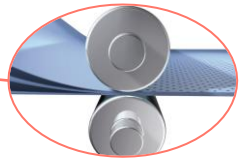


IMPREGNATION



FIXATION





Lamination



Powder form binder



Bi-component fibers

3 configurations developed

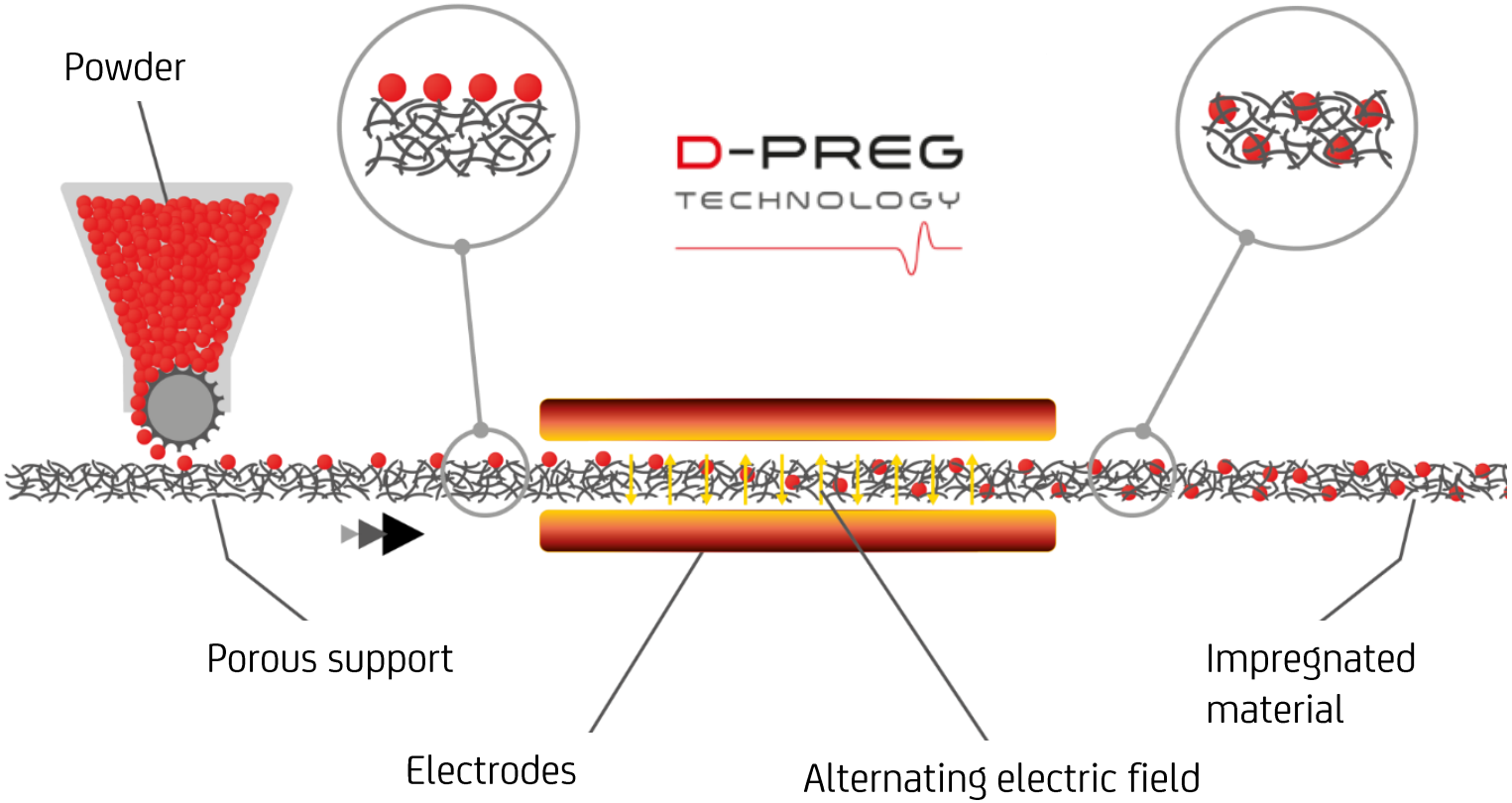
D-PREG TECHNOLOGY

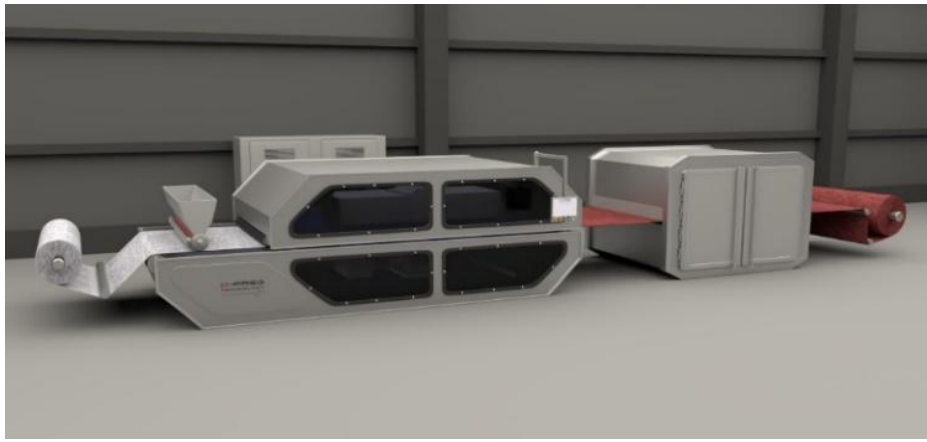
S-PREG TECHNOLOGY

Y-PREG TECHNOLOGY

FIBROLINE

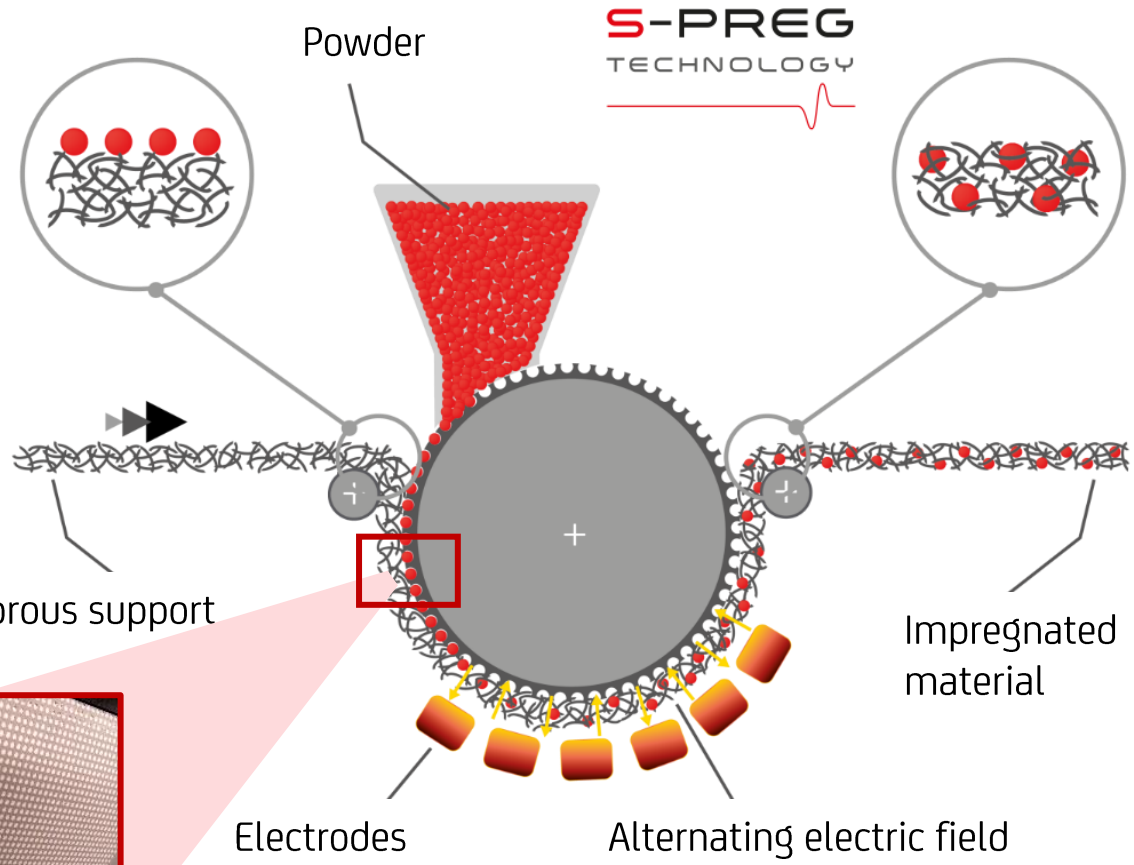
D-PREG TECHNOLOGY



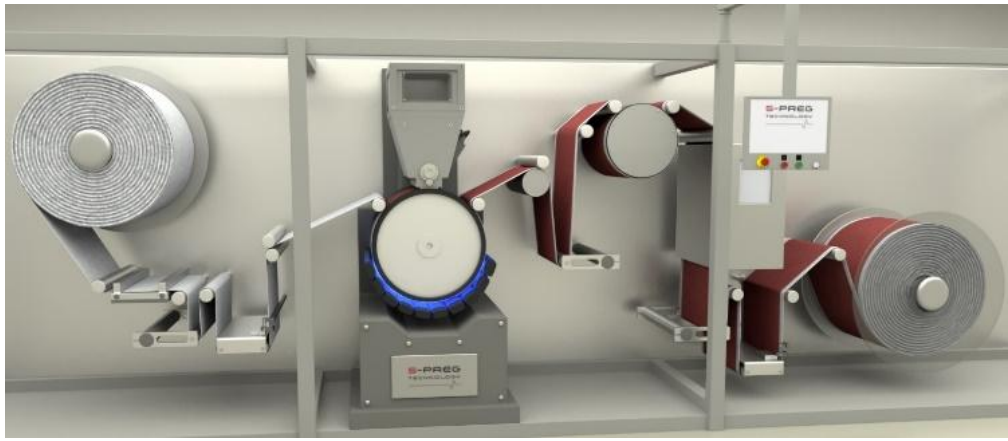


- Flexible configuration
- Adapted to most of our applications

S-PREG TECHNOLOGY

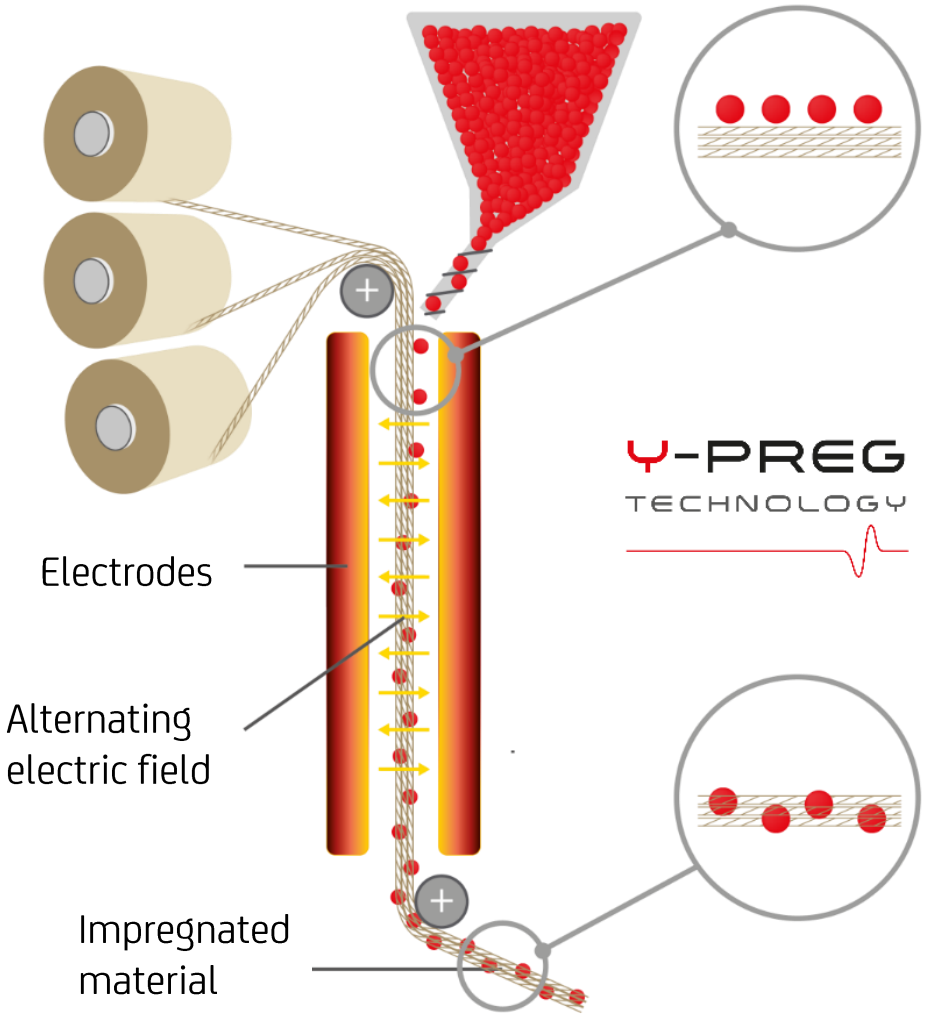






- Pattern deposition
- Adapted to very low powder content

Y-PREG TECHNOLOGY





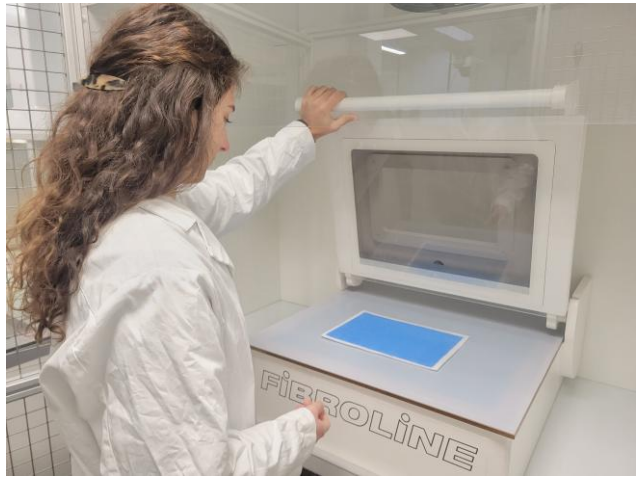
- For multifilaments or braids

HOW WE WORK?

1 → PRODUCT DEVELOPMENT

2 → PILOT VALIDATION

3 → TECHNOLOGY TRANSFER

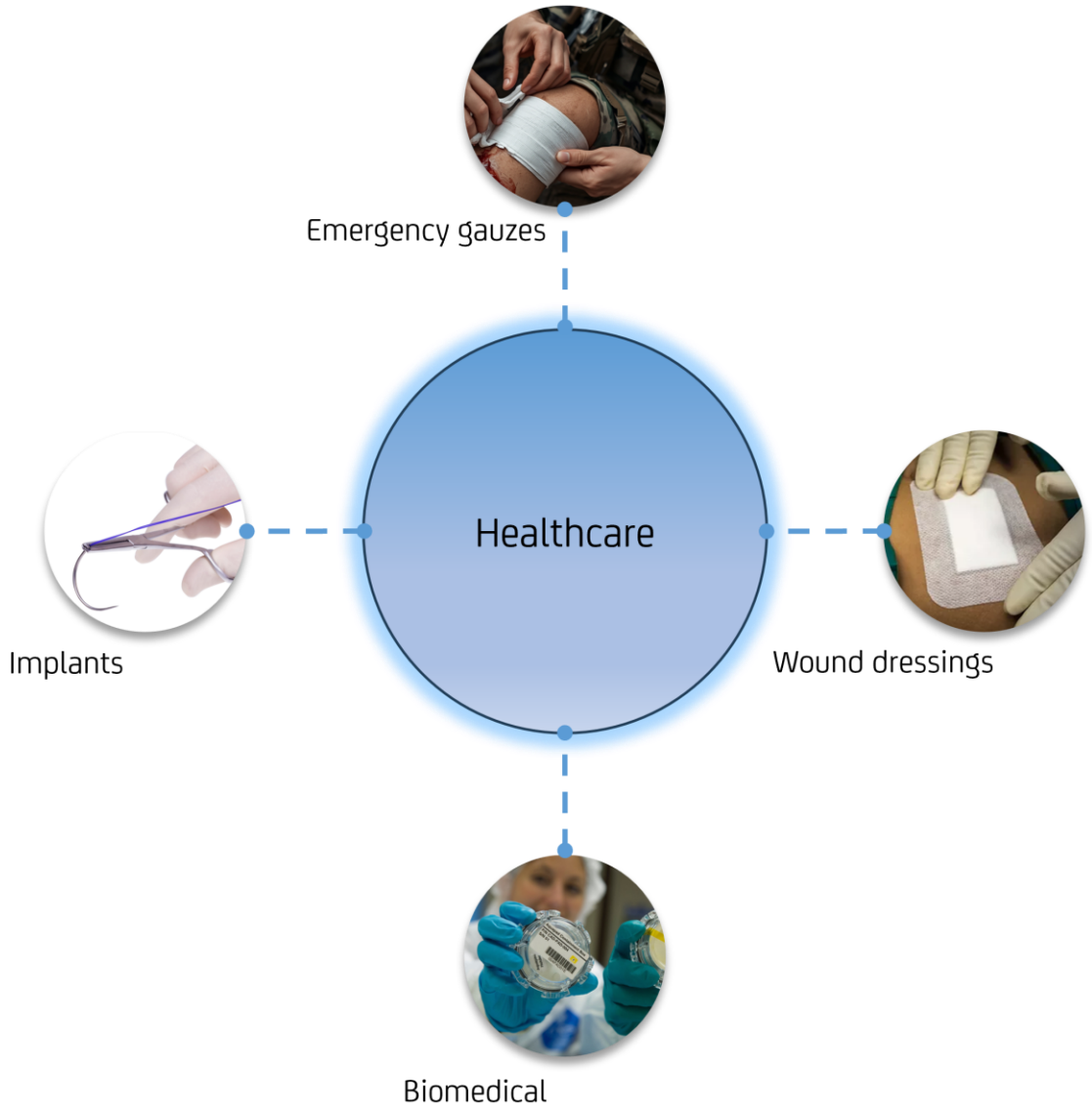




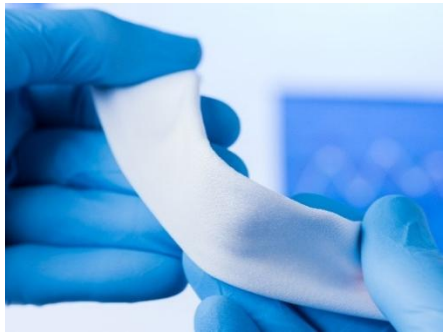
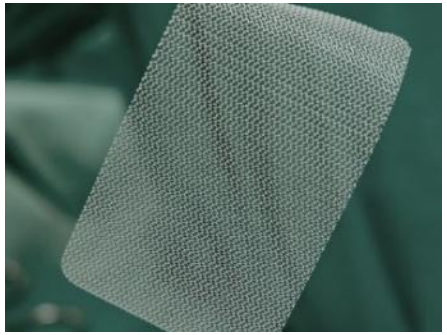


EXAMPLES OF APPLICATIONS

- Medical Device Class II / III



IMPLANTS


- Hemostatic patches, neuro patches, vascular patches, surgical aortic heart valves and mesh products for hernia repair

- Any type of structure can be functionalized (nonwovens, knitted fabrics…)

HEMOSTATIC PATCH: ETHIZIA



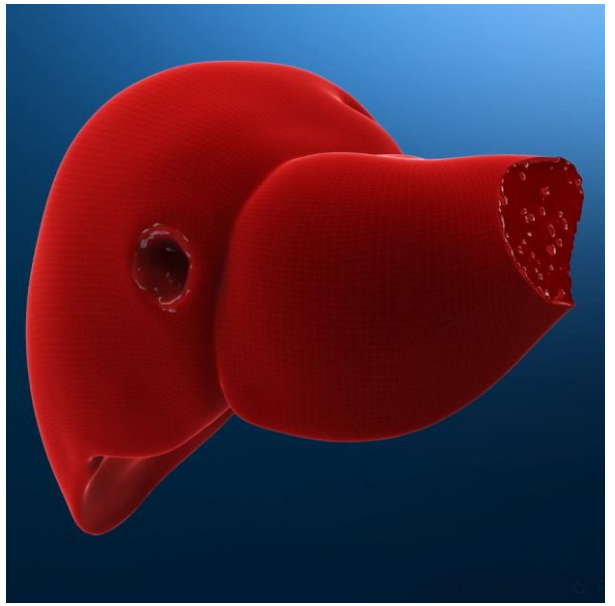


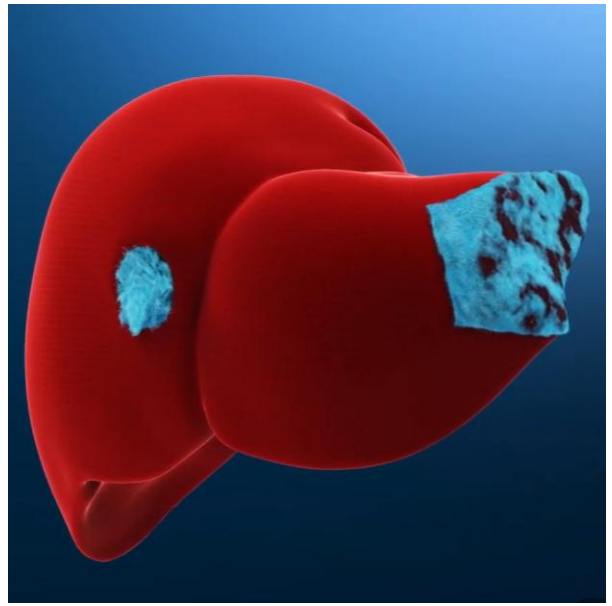


Technology licensed to:

Johnson&Johnson MedTech

- Adjunctive hemostat for disruptive bleeding on internal organs
- Fully resorbable
- Active and efficacious on both sides
- Product launch in EMEA in 2024





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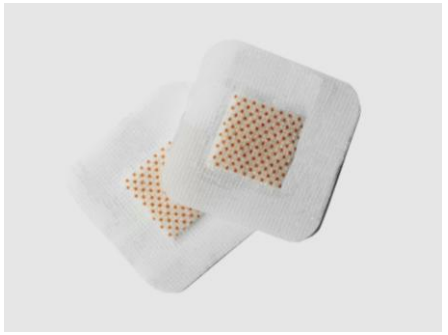
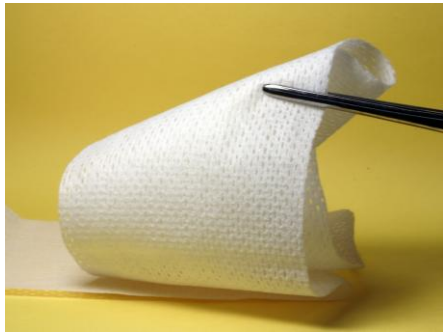
HEMOSTATIC PATCH: ETHIZIA

- Gelatin-based carrier impregnated with activated POx polymer technology
  - **Electrophilic groups E* on polyoxazoline particles** that are capable of reacting with amine groups in blood
  - **Nucleophilic groups Nu on polymer particles** that, in the presence of water, are capable of reacting with E* groups of the polyoxazoline

Technology licensed to:
Johnson&Johnson MedTech



WOUND DRESSINGS

- Wide range of functional powders:
  - antimicrobial agent as chitosan...
  - superabsorbent as sodium polyacrylate...
  - wound healing agent as hyaluronic acid...
  - anti-odor as zeolite, perfumed powder...
- Any type of structure can be functionalized (nonwovens, foams, collagen matrices...)

ANTIMICROBIAL DRESSING: ALLEVYN AG+





Technology licensed to:

Smith+Nephew

ALLEVYN™ Ag+ SURGICAL is an antimicrobial foam dressing

- Indicated for use on surgical wounds
- Antimicrobial silver foam layer with carbon
- Product launch in 2025

FIBROLINE

CONTACT



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Thank you for your attention !