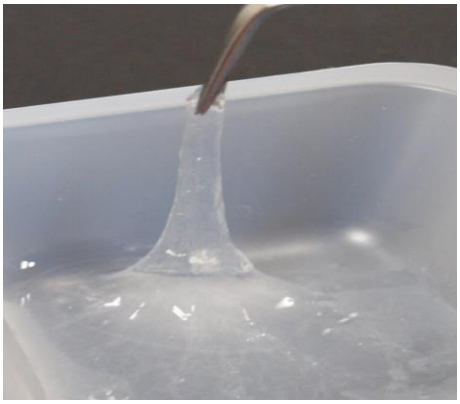
Wispecs is a new Japanese-born tissue-adhesive hydrogel, developed based on our polymer complex preparation technology. It dissociates and dissolves under physiological conditions.

Technology of Wispecs



Devices derived from mammalian proteins are always associated with risks such as virus contamination and immunogenicity. We have developed a new biocompatible tissue adhesive device using safe synthetic polymers, polyacrylic acid (PAA) and polyvinylpyrrolidone (PVP), as the main ingredients. Both PAA and PVP are water-soluble synthetic polymers that have been used for a long time as pharmaceutical excipients and food additives. It has long been known that they form a water-insoluble complex. However, simply mixing solutions of PAA and PVP results in a non-swelling, and an adhesive gel cannot be obtained. We explored various methods and for the first time succeeded in obtaining a highly swollen PAA/PVP complex hydrogel by mixing PAA and PVP under very specific conditions.

When the PAA/PVP hydrogel is dried, a transparent film or a sponge-like material is obtained. When water is added to these dried materials, they instantly swell again to a soft and transparent hydrogel.

Features of Wispecs:

- Wispecs does not contain any components derived from mammals.
- When water is added, it instantly swells into a soft hydrogel, which adheres to skin, mucous membranes, teeth, and bones, as well as metals and some plastics.
- It can be easily peeled off when dried, minimizing irritation during removal.
- Inside the body, it gradually dissociates into the original water-soluble polymers.
- It can be produced reproducibly without the need for special equipment.

Application in medical devices (hemostatic materials, wound dressings)

Hemostatic Effect:
When the dried film or sponge of Wispecs is applied to a bleeding wound, it instantly absorbs body fluids and blood to a hydrogel. It adheres to seal the wound and stop the bleeding. Utilizing this function, it has been commercialized under the product name "PyteQ Dental" by Golden Orchid Brothers Inc. as a hemostatic agent for post-tooth extraction bleeding.

Pain Relief:
When the Wispecs sponge is applied to abrasions or blisters, it immediately alleviates pain. The pain in a wound is caused by exposed nerve endings coming into contact with air or clothing. The Wispecs hydrogel, swollen with blood and body fluids, gently envelops the exposed nerve endings at the wound site, preventing stimulation and reducing pain.

Healing Promotion:
When dry Wispecs is applied to a wound, it quickly absorbs blood and body fluids, forming a hydrogel. During this process, many blood cells become entrapped within the gel. These cells secrete various growth factors that are effective in wound repair. The swollen gel retains these proteins and gradually releases them towards the wound surface, and may promote healing.

Expansion of Wispecs:

Wispecs, a swellable PAA/PVP complex gel, is anticipated to have applications in the food and cosmetics sectors as a new and safe adhesive and tacky material. Additionally, as a bioadhesive material, it expands the possibilities for surgical treatment methods. It is also expected to be applied in drug delivery systems (DDS) as a carrier for the sustained release of bioactive substances.

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