INSPIRE* RECOMBINANT HUMAN™ TYPE-I COLLAGEN WOUND DRESSING, A NOVEL SCAFFOLD FOR CUTANEOUS WOUND HEALING.

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Type-I Collagen scaffolds are thought to be the best "man made" scaffolds for the medical device market, providing an optimal mimic environment for cell proliferation and tissue repair. To date, the collagen used is of animal origin, entailing several risks including pathogens and allergic reactions. The purpose of this study was to produce a safe and efficient scaffold based on novel human recombinant type-I collagen. Using genetic engineering we have successfully expressed five human genes in tobacco plants to produce fully functional triple helical recombinant human type-I collagen, **Collage-rh™**, identical to human collagen. A 100% human recombinant collagen type I wound dressing sheet, "**Inspire-rh™**" wound dressing sheet was fabricated by fibrillogenesis and freeze drying. Thermal dehydration treatment was applied to physically cross-link the collagen monomers in order to increase chemical and mechanical stability. A highly porous cohesive structure was obtained, capable of absorbing large quantities of fluids, up to 40 times its own weight, in a few seconds. This characteristic is particularly important and highly desirable for wound dressing products, due to the need to absorb exudates. In tissue culture the bio-functionality of "**Inspire-rh™**" wound dressing sheet was studied using key cell models that participate in the wound healing process, human dermal fibroblasts, human endothelial cells and human bone marrow-derived mesenchymal stem cells. Proliferation of cells on **Inspire-rh™** scaffolds was compared to commercially available collagen containing products for cutaneous wound healing. **Inspire-rh™** sheets showed superior biological performance in supporting human dermal fibroblasts, human endothelial cells and human mesenchymal stem cell proliferation, therefore expected to jump start tissue repair and accelerate wound healing. **Collage-rh™** can be used to produce additional types of safe and efficient scaffolds for other applications such as orthopedic bone devices, leading to a new era in regenerative medicine.

*__Inspire-rh™__ was later changed to **Vergenix™**