

**KOREA-SINGAPORE R&D JOINT CALL
PRE-PROPOSAL APPLICATION FORM**

Title	Development of micronized acellular dermal filler which is enhanced in bio-compatibility and duration by special cross-linking with hyaluronic acid
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Brief Description of Proposed Collaboration

1. Research Aims

The micronized acellular dermal matrix tissue substitute used for tissue reconstruction and augmentation has good bio-compatibility. On the downside, it fails to last in the body for long periods of time. By using specialized cross-linking technology; we're trying to develop a new biomaterial for tissue regeneration by using a micronized acellular dermal matrix, conjugated by hyaluronic acid, in order to decrease acute inflammations, such as edema and pain, by at least 30% and increase the lasting time length by at least 150%.

2. Research Need & Problem

- America's market size of the tissue engineering field, which includes skin substitutes, was about 18.9 billion dollars with approximately 5 million patients in 2009. This market is estimated to increase to approximately 6.4 million patients with about 24.3 billion dollars in 2019.
- This market is mostly made up by diabetes, pressure ulcer, or venous ulcer treatments. This market also includes treatments for abdominal wall repair, recovery of donor sites for skin grafts, burns, facial reconstruction, breast reconstruction or augmentation, etc.
- Aside from the diseases and accidents mentioned above, due to the dramatic expansion of the plastic surgery field, the size of the market increases by 5% every year.
- Skin substitutes can be divided into human source (allograft), animal source (xenograft), and synthetic. Allograft has a relatively high price, but after being implanted, there is neither immune rejection nor inflammation; thus making it known as the best skin substitute.
- However, because the human acellular dermis is a processed skin from a donor, using it as a skin substitute has its limitations.
- Also, after being implanted, there is the drawback of a short duration. Various proteases, including collagenase, degrades the micronized acellular dermal matrix. Therefore, after about 6~12 months, absorption occurs.
- The market size of needed acellular dermal matrix increases every year. A product that can use the raw material effectively, with a longer lasting time and a higher biocompatibility is needed for the situation.

3. Solution Overview

- After being implanted, hyaluronic acid needs to be conjugated with the acellular dermal matrix

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acellular dermal matrix, in order to physically protect the degradation due to the proteases.

- Since hyaluronic acid has a very good moisture capacity, it may be used as a bio-material with the acellular dermal matrix to maintain the volume functions for tissue regeneration.
- The acellular dermal matrix combined with hyaluronic acid has an anti-inflammation role. Through this, it not only increases the duration of the acellular dermal matrix, but it also increases the bio-compatibility of the acellular dermal matrix.
- Using special conjugation methods, degrading of the hyaluronic acid decreases and increases the duration length through a process of secondary cross-linking using the permanent cross-linking and the E-beam of the acellular dermal matrix and hyaluronic acid.

4. Solution Impact

- The acellular dermal matrix conjugated with hyaluronic acid will increase the length of duration by at least 150%, which will decrease the re-operation rate of the patient and increase the satisfactory rate of the doctor.
- This is a new bio-material in plastic surgery. So far, it is safer and more effective compared to the the hyaluronic acid and synthetic high molecule.
- It is a bio-material that is used to prevent adhesion during surgical operations.
- An increase in sales can be expected from an expansion of the market and taking over the existing filler market.
- An expansion of the occupation of the filler market and sales increase are expected.

5. Collaborative Planning

● L&C Bio's role

- To develop a technology for permanant conjugation of the acellular dermal matrix and hyaluronic acid
- To produce a hyaluronic acid conjugated with an acellular dermal matrix
- To test the safety and toxicity of the hyaluronic acid conjugated acellular dermal matrix using cultured cells

● A*STAR's role

- To analyze the conjugation ratio and cross-linkage of the hyaluronic acid and acellular dermal matrix using A*STAR's excellent analysis technology
- To test the Hyaluronic acid conjugated acellular dermal matrix on animals in A*STAR's animal facility

