

【Aeras Bio Inc.】

The world's first practical application of regenerative medicine using dental pulp stem cells

We will start dental pulp regenerative therapy by cultivating dental nerve cells derived from unwanted teeth and transplanting the cells to the tooth that needs treatment.

Aeras Bio Inc. (a member company of Kobe Biomedical Innovation Cluster), which plans and promotes dental pulp-related projects, has announced it will start regenerative therapy using dental pulp stem cells at the Regenerative Dental Clinic, which works together with Aeras Bio Inc. Dental pulp regenerative therapy is a therapy that regenerates dental pulp in a tooth with dead nerves due to caries (irreversible pulpitis, etc.) by collecting autologous dental pulp from an unwanted tooth for culturing and proliferation of the stem cells contained in the pulp and by implanting them into the tooth that has the dead nerve. This practical application of pulp regenerative therapy is a world first.

This autumn, a “dental pulp stem cells bank” will also be launched for long-term cryopreservation of dental pulp stem cells with liquid nitrogen at well-managed storage facilities. We will contribute to people's healthy lives by storing unwanted teeth as a preparation for future protection.

« Summary »

Body tissue, such as bone marrow in the bones, contain cells called stem cells that form the basis for growth (differentiation) of different types of cells. Regenerative medicine, which involves the transplantation of these stem cells, has come under the spotlight. Stem cells called “dental pulp stem cells” exist in the nerve tissues (dental pulp) within the tooth and these stem cells can be harvested from unwanted teeth such as wisdom teeth and deciduous teeth. Regenerative medicine using dental pulp stem cells is one regenerative medical technique: after thoroughly decontaminating the root canal of the tooth that has undergone pulpectomy for the treatment of caries, the stem cells are harvested from the patient's unwanted tooth and processed for transplant into the root canal of the tooth for regeneration of the dental pulp.

« Significance / Usefulness »

Pulpectomy is generally performed on teeth with extensive caries such as irreversible pulpitis, involving removal of the injured pulp and filling of the hollow. If it deteriorates further, the tooth should be extracted. Removing the pulp may increase the risk of breaking the tooth and losing protection against bacteria, as well as the ability to restore part of the dental pulp tissue. There is also a risk that caries may progress under the filling in the tooth with the accumulation of pus even after the hollow has been filled, and this may not be noticed and thus left untreated.

In Japan, about 6 million pulpectomies are currently performed per year; dental pulp regenerative therapy is a new therapy that provides an alternative to pulpectomy. A healthy tooth may be restored by cultivating the dental pulp stem cells harvested from the unwanted tooth and transplanting the stem cells into the injured dental pulp. In addition, as opposed to dentures (artificial teeth) or implants (artificial dental roots), it is the patients' own teeth that are restored with dental nerves, enabling them to continue to have the sensation of chewing with their own teeth into old age, thus contributing to the improvement of QOL (quality of life). Furthermore, as it is believed that dental pulp stem cells contained in the dental pulp have the capacity to induce blood vessels and nerve tissue, it is expected that

they can also be used for regenerative medicine related to cerebral infarctions, spinal injuries or vascular disorders.

«Flow of dental pulp regenerative therapy»

- (1) The patient visits the Regenerative Dental Clinic for extraction of the unwanted tooth such as a wisdom tooth.
- (2) The extracted tooth is transported to the Dental Pulp Cultivation Center of Aeras Bio Inc. (located within the same building as the Regenerative Dental Clinic) and the dental pulp is collected from the tooth for cultivation and proliferation of the dental pulp stem cells contained in the pulp.
- (3) At the Regenerative Dental Clinic, the dental pulp stem cells are combined with medicines and transplanted into the tooth from which the pulp has been removed.
- (4) Due to the function of the substances secreted by the dental pulp stem cells, the stem cells of the surrounding tissue gather inside the tooth, growing the blood vessels and nerves. After 1 month or so, the dental pulp is restored and the patient regains the feeling in the tooth.
- (5) After 6 months to 1 year, the surrounding tissue (dentin) of the dental pulp is regenerated. Finally, the crown and filling are applied to restore the top of the tooth and the patient is then able to chew with his/her own teeth.

«Future development»

Along with the start of dental pulp regenerative therapy at the Regenerative Dental Clinic, Aeras Bio Inc. promotes dental pulp regenerative therapy focusing on domestic dental clinics, by utilizing the customer network of Ci Medical Co., Ltd., a company related to Aeras Bio that offers mail order services for dental clinics.

*Photo: Aeras Bio Inc.



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Facilities for cultivation of dental pulp stem cells



Cryo Tube (for cryopreservation)



Waiting room of the clinic