OMICS International
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Jiao Zhang, J Clin Exp Dermatol Res 2015, 6:6
http://dx.doi.org/10.4172/2155-9554.C1.024

International Conference and Exhibition on

Cosmetic Dermatology & Hair Care

December 07-08, 2015 Philadelphia, USA

A preliminary report of a new auto-derived injectable soft tissue filler and evaluation of biocompatibility and biodegradability

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Although a wide range of materials has been used as implants in reconstructive or cosmetic surgery, many implant materials proved to be of limited usefulness due to lack of stibility or result in host immune response. The purpose of this study is to explore a new autogenous injectable soft tissue filler derived from hair and evaluate the possible use of this potential filling agent. Hair fibers after bleaching were processed into different size particles by a ball mill, or hair keratin gel respectively. The microstructure of material was observed under electron microscopy. General toxic tests in vitro or in vivo include MTT assay, acute toxicity and the micronucleus were used to evaluate the biocompatibility of this material. Animal subcutaneous implant models were employed to investigate the immune reaction, absorption and maintenance of the augmentation effect. Hair-derived material after processing showed an intrinsic capacity with preferable fluidity and glutinousness for injection. General toxic evaluation revealed a good biocompatibility and an absence of cytotoxicity or mutagenicity. Animal subcutaneous implant models did not show local or systemic adverse reactions in the observation period. Hair fiber particles showed preferable augmentation effect which preserved at least 50% of original volume during the observation period comparing to hair keratin gel. The reasonable size of the particle is about 120um. The autogenous hair material directly processed by the ball mill after bleaching is easy to obtain and shows biocompatibility and biodegradability well. It may become a prospective filling agent in reconstructive or cosmetic surgery.

Keywords: Auto-derived injectable soft tissue filling agent, Keratin particle, Biocompatibility, Absorption

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