HISTOPATHOLOGICAL EFFECT OF INJECTABLE HYALURONIC ACID AS FILLER MATERIAL IN RAT'S LIP.

(EXPERIMENTAL STUDY)

Thesis

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LIST OF ABBREVIATIONS

BDDE	1,4-Butanediol Diglycidyl Ether
BMP-2	Bone Morphogenic Protein-2
ECM	Extra Cellular Matrix
FDA	Food And Drug Administration
GAGs	Glycosaminoglycans
GFs	Growth Factors
GMCSF	Granulocyte-Macrophage Colony-Stimulating Factor
HA	Hyaluronic Acid
HMW	High Molecular Weight
ICAM	Inter Cellular Adhesion Molecule
Ig	Immunoglobulin
Lamp	Lysosomal-Associated Membrane Protein
LDL	Low-Density Lipoprotein
LMW	Low Molecular Weight
MMPs	Matrix Metalloproteinases
NASHA	Non-Animal-Stabilized Hyaluronic Acid
PDGF-B	Platelet-Derived Growth Factor Beta
PG	Prostaglandin
PMNs	Polymorphonuclear Leukocytes
RHAMM	Receptor For Hyaluronan Mediated Motility
ROS	Reactive Oxygen Species
TGF- β	Transforming Growth Factor-B
TNF	Tumor Necrosis Factor
T LR	Toll Like Receptor

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INTRODUCTION

The influence of sun exposure, gravity, and years of facial muscle movements starts to appear as wrinkles on the skin. During the aging process, basic changes in the skin, soft tissue, and skeletal support of the face occur resulting in a breakdown of the tissues under the skin leaving lines or other facial defects **(Fakhari & Berkland, 2013).**

Dermal fillers can help fill in these lines and facial defects, temporarily restoring a smoother, more youthful looking appearance. Many dermal fillers have been used for reducing facial skin lines and wrinkles, and for providing lip augmentation. Hyaluronic acid is one of the most widely used dermal agents which has the properties of an ideal dermal filler **(Farahani et al., 2012)**

An ideal dermal filler should be temporary but long-lasting (months to a year or longer), having minimum side effects and no allergenic effect, easy to administer, having minimum pain or no pain upon injection, and a reasonable cost for both the physician and the patient **(Fakhari & Berkland, 2013).**

Hyaluronic acid (HA) is a naturally occurring biodegradable polymer with a variety of applications in medicine including scaffolding for tissue engineering, dermatological fillers and viscosupplementation for osteoarthritis treatment. HA is present in most connective tissues as well as, in body fluids such as synovial fluid and in the vitreous humor of the eye **(Fakhari & Berkland, 2013).**

HA plays a key role in regulating extracellular matrix (ECM) organization and metabolism by influencing cell migration, proliferation and differentiation. Thus, it is dynamically involved in a number of biological and pathological processes such as embryogenesis, inflammation, metastasis, tumour progression, tissue turnover and wound healing **(Olczyk et al., 2008).**

HA has features that make it an attractive substance for dermal filler use, such as its ability to bind to large amounts of water, its natural presence in the skin, and its low potential for adverse reactions **(Tezel & Fredrickson, 2008).**

Hyaluronic acid injection can be used as a dermal filler to improve the skin's contour and reduce depressions in the skin due to scars, injury or lines. Although Hyaluronic acid fillers are non-toxic and non-immunogenic, hypersensitivity and granulomatous foreign body reaction have been reported **(Farahani et al., 2012).**