



**Bone Marrow Derived Stem Cells versus Hydroxyapatite
Nanopowder in Bone Regeneration of Albino Rats
(Histological and Immunohistochemical study)**

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بسم الله الرحمن الرحيم

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم

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سورة البقرة

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Dedication

To the soul of my father

To my lovely mother

To my dear brother

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
MSCs	Mesenchymal stem cells
BMMSCs	Bone marrow mesenchymal stem cells
BMP	Bone morphogenic proteins
nHA	Nano hydroxyapatite
SPARC	Secreted protein acidic and rich in cysteine
ECM	Extracellular matrix
HA	Hydroxyapatite
ES	Embryonic stem
BM	Bone marrow
HSC	Hematopoietic stem cells
HAp	Hydroxyapatite nanopowder
mg/kg	Milligram per kilogram of body weight
r.p.m	Revolution per minute
mg/ml	Milligram per millileter

Abbreviation	Meaning
PBS	Phosphate buffer saline
EDTA	Ethylene diamine tetra-acetic acid
H&E	Hematoxylin and Eosin
MT	Masson trichrome
SD	Standard deviation