

BIOGRAPHICAL SKETCH

NAME Dan Gazit, Ph.D., D.M.D.	POSITION TITLE Professor Director, Skeletal Program
eRA COMMONS USER NAME (credential, e.g., agency login) dgazit	

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Hebrew University of Jerusalem Hebrew University of Jerusalem	D.M.D. Ph.D.	1976 1991	Dental Surgeon Bone Biology

A. Personal statement

I have a demonstrated track record (22 years) of peer-reviewed published expertise and grant funding in a wide variety of skeletal regeneration models using adult stem cells and gene therapy. My group has pioneered the use of genetically engineered mesenchymal stem cell and their applications in skeletal tissue repair. We have also developed multi modality imaging strategies to enable tracking of stem cell survival, differentiation and proliferation in living subjects. Our studies have been supported by grants from the NIH, California Institute for Regenerative Medicine (CIRM), the European Commission, the Department of Defense, and biotechnology companies. We have published frequently in high-impact journals in the field of regenerative medicine such as the *Journal of Clinical Investigation*, *Stem Cells*, *Journal of Bone and Mineral Research*, *Nature Protocols*, *Biomaterials* and *Molecular Therapy*. Our primary goal is to perform research and translational studies that directly lead to and support the use of stem cells to treat human skeletal disorders.

B. Positions and Honors.

Positions

Years	Position, Place
1981 - 1985	Instructor in Oral Pathology, Oral Pathology, Hebrew University of Jerusalem (HUJI)
1986 - 1992	Lecturer in Oral Pathology, Bone Biology and Pathology, Hebrew University of Jerusalem
1990 - 1992	Visiting Professor, Bone Biology, UCSF
1992 - 1999	Tenured Senior Lecturer in Oral Pathology, Bone Biology, Biotechnology and Pathology, Hebrew University of Jerusalem
1996 - 2001	Head, Oral Pathology, Oral Pathology Biopsy Facility, The Hebrew University–Hadassah Faculty of Dental Medicine
1997- 2003	Head, Hebrew University Dental Sciences Graduate Program
1999	Visiting Professor, Bone Biology, Leiden Medical Center
1999	Visiting Professor, Bone Biology, Boston University
1999	Visiting Professor, Bone Biology, Harvard Medical School
1999 - 2002	Associate Professor, Bone Biology & Biotechnology, Hebrew University of Jerusalem
2002 - present	Professor, Skeletal Biology and Biotechnology, Hebrew University of Jerusalem
2003 - 2004	Visiting Professor, University of Virginia School of Medicine
2006 - present	Director, Skeletal Program, Department of Surgery and Board of Governors Regenerative Medicine Institute, Cedars- Sinai Medical Center, Los Angeles, CA.
2007- present	Director, Molecular & Micro Imaging Core, Cedars- Sinai Medical Center, Los Angeles, CA.

Honors and memberships

2004-2010	Member, Musculo Skeletal Committee, American Society of Gene Therapy (ASGT).
2005-2009	Director, Hebrew University of Jerusalem Center for Converging Sciences & Technologies
2007 -	Member, Editorial board of Journal of Tissue Engineering and Regenerative Medicine
2009-	Member, Israel Science Foundation, Cellular Biology Committee.
2010-2013	Member, Tissue Engineering Committee, American Society of Gene & Cell Therapy (ASGCT)
2010-2012	Chair, Progenitors and Stem Cells Topic Committee, Orthopaedic research Society
2010-2011	Chair, Calcified Tissues Review Committee, Israel Ministry of Health
2010-	Member, Experimental Sciences Faculty Appointments and Promotions Committee, Hebrew University of Jerusalem
2011	Sir Isaac Kaye Award for Innovation
2012-	Member, Editorial Board, International Journal of Tissue Engineering
2012-	Member, Editorial Board, Journal of Regenerative Medicine and Tissue Engineering
2013-	Member, Experimental Sciences Tenure Committee, Hebrew University of Jerusalem
2013-	Member, Execute Committee of the Board of Governors, Hebrew University of Jerusalem

C. Peer-reviewed publications (h-index currently 38).

1. Tai K, Pelled G, Sheyn D, Bershteyn A, Han L, Kallai I, Zilberman Y, Ortiz C, **Gazit D**. Nanobiomechanics of repair bone regenerated by genetically modified mesenchymal stem cells. *Tissue Eng Part A*. 2008 Oct;14(10):1709-20. PubMed PMID: 18620480.
2. Steinhardt Y, Aslan H, Regev E, Zilberman Y, Kallai I, **Gazit D**, Gazit Z. Maxillofacial-derived stem cells regenerate critical mandibular bone defect. *Tissue Eng Part A*. 2008 Nov;14(11):1763-73. PubMed PMID: 18636943.
3. Kimelman-Bleich N, Pelled G, Sheyn D, Kallai I, Zilberman Y, Mizrahi O, Tal Y, Tawackoli W, Gazit Z, **Gazit D**. The use of a synthetic oxygen carrier-enriched hydrogel to enhance mesenchymal stem cell based bone formation in vivo. *Biomaterials*. 2009; 30(27):4639-48. Epub 2009 Jun 21. PubMed PMID: 19540585.
4. Garty S, Kimelman-Bleich N, Hayouka Z, Cohn D, Friedler A, Pelled G, **Gazit D**. Peptide-modified "smart" hydrogels and genetically engineered stem cells for skeletal tissue engineering. *Biomacromolecules*, 2010; 11(6):1516-1526. PubMed PMID: 20462241.
5. Kallai I, van Lenthe H, Ruffoni D, Zilberman Y, Müller R, Pelled G, **Gazit D**. Quantitative, structural and image-based mechanical analysis of nonunion fracture repaired by genetically engineered mesenchymal stem cells. *J Biomech*. 2010;43(12):2315-20. Epub 2010 May 14. PubMed PMID: 20471652; PubMed Central PMCID: PMC2948956.
6. Sheyn D, Pelled G, Netanel D, Domany E, **Gazit D**. The Effect of Simulated Microgravity on Human Mesenchymal Stem Cells Cultured in an Osteogenic Differentiation System: A Bioinformatics Study. *Tissue Eng Part A*. 2010;16(11): 3403-3412. Epub 2010 Aug 31. PubMed PMID: 20807102; PubMed Central PMCID: PMC2971652.
7. Sheyn D, Rütthemann M, Mizrahi O, Kallai I, Zilberman Y, Tawackoli W, Kanim LE, Zhao L, Bae H, Pelled G, Snedeker J, **Gazit D**. Genetically Modified Mesenchymal Stem Cells Induce Mechanically Stable Posterior Spine Fusion. *Tissue Eng Part A*. 2010;16(12):3679-86. Epub 2010 Sep 28. PubMed PMID: 20618082; PubMed Central PMCID: PMC2991214.
8. Kimelman-Bleich N, Pelled G, Zilberman Y, Kallai I, Mizrahi O, Tawackoli W, Gazit Z, **Gazit D**. Targeted Gene-and-host Progenitor Cell Therapy for Nonunion Bone Fracture Repair. *Mol Ther*. 2011;19(1):53-9. Epub 2010 Sep 21. PubMed PMID: 20859259; PubMed Central PMCID: PMC3017436.
9. Kallai I, Mizrahi O, Tawackoli W, Gazit Z, Pelled G, **Gazit D**. Micro-Computed Tomography-Based Structural Analysis of Various Bone-Tissue Regeneration Models. *Nat Protoc*. 2011;6(1):105-10. Epub 2011 Jan 6. PubMed PMID: 21212786.
10. Sheyn D, Kallai I, Tawackoli W, Cohn Yakubovich D, Oh A, Su S, Da X, Lavi A, Kimelman-Bleich N, Zilberman Y, Li N, Bae H, Gazit Z, Pelled G, **Gazit D**. Gene-Modified Adult Stem Cells Regenerate

- Vertebral Bone Defect in a Rat Model. *Mol Pharm.* 2011; 3;8(5):1592-601. Epub 2011 Sep 13. PubMed PMID: 21834548; PubMed Central PMCID: PMC3220930.
11. Pelled G, Snedeker JG, Ben-Arav A, Rigozzi S, Zilberman Y, Kimelman-Bleich N, Gazit Z, Müller R, **Gazit D**. Smad8/BMP2-engineered mesenchymal stem cells induce accelerated recovery of the biomechanical properties of the achilles tendon. *J Orthop Res.* 2012 Dec;30(12):1932-9. Epub 2012 Jun 13. PubMed PMID: 22696396; PubMed Central PMCID: PMC3479351.
 12. Ben Arav A, Pelled G, Zilberman Y, Kimelman-Bleich N, Gazit Z, Schwarz EM, **Gazit D**. Adeno-Associated Virus–Coated Allografts: A Novel Approach for Cranioplasty. *J Tissue Eng Regen Med.* 2012 Nov;6(10):e43-50. Epub 2012 Sep 3. PubMed PMID: 22941779.
 13. Benjamin S, Sheyn D, Ben-David S, Oh A, Kallai I, Li N, **Gazit D**, Gazit Z. Oxygenated environment enhances both stem cell survival and osteogenic differentiation. *Tissue Eng Part A.* 2013 Mar;19(5-6):748-58. Epub 2013 Jan 4. PubMed PMID: 23215901.
 14. Mizrahi O, Sheyn D, Tawackoli W, Kallai I, Oh A, Su S, Da X, Zarrini P, Cook-Wiens G, **Gazit D**, Gazit Z. BMP-6 is more efficient in bone formation than BMP-2 when overexpressed in mesenchymal stem cells. *Gene Ther.* 2013 Apr;20(4):370-7. Epub 2012 Jun 21. PubMed PMID: 22717741.
 15. Sheyn D, Cohn Yakubovich D, Kallai I, Su S, Da X, Pelled G, Tawackoli W, Cook-Weins G, Schwarz EM, **Gazit D**, Gazit Z. PTH promotes allograft integration in a calvarial bone defect. *Mol Pharm.* 2013 Dec 2;10(12):4462-71. Epub 2013 Nov 8. PubMed PMID: 24131143; PubMed Central PMCID: PMC3902084.

D. Research Support.

Ongoing Research Support

1. CIRM TR4-06713 “Gene Targeting to Endogenous Stem Cells for Segmental Bone Fracture Healing”
12/1/13 – 11/30/16

The objective of the project is to develop a new therapeutic modality for segmental fracture repair consisting of ultrasound-mediated gene targeting to endogenous MSCs.

Role: PI.

2. NIH R01DE19902 “PTH Effects on Craniofacial Allografting”. 07/1/09 – 6/30/15

The goal of the proposal is to define the effects of PTH on bone healing using allografts with specific emphasis on scar tissue formation and inflammation.

Role: PI.

3. NIH/NIAMS R01AR066517-01 6/1/14- 5/31/18

“Diagnosis of Discogenic Low Back Pain Using pH Level-Dependent MRI”

Purpose: Develop and establish an MRI method to diagnose the origin of discogenic low back pain.

Role: PI.

Completed Research Support:

1. CIRM TR2-01780 “Systemic Adult Stem Cell Therapy for Osteoporosis-Related Vertebral Compression Fractures”. 3/1/11- 2/28/14

The goals of the project are to develop a stem cell-based therapy for osteoporotic vertebral fractures. Our hypothesis is that that PTH will induce MSC homing to the bone defects leading to accelerated bone repair.

Role: PI.

2. CIRM RT2-02057 "Tri-Resolution Visualization System for Stem Cells and Tissue Regeneration Monitoring" 10/01/11- 30/09/14

The goal of this project is to develop a SPECT-MR imaging system with triple resolution capabilities for stem cell tracking in vivo.

Role: Sub contract PI.

3. Telemedicine and Advanced Technology Research Center (TATRC) U.S. Army Medical Research and Materiel Command. "Molecular and Tissue Imaging for Stem Cell Therapeutics and Tissue Engineering of Spinal Vertebrae". 9/2009- 9/2012

Purpose: Develop molecular imaging tools for tracking genetically engineered MSCs implanted in vertebral bone defects.

Role: Project leader.

4. CIRM DR2-05288 "Genetically Engineered Mesenchymal Stem Cells For The Treatment Of Vertebral Compression Fractures". 09/01/11 – 02/29/12

Purpose: To establish a "Disease Team" and submit a proposal focused on pre-IND studies for a stem cell therapy targeted at vertebral compression fractures.

Role: PI

5. NIH 1R03 AR057143-01 "Stem Cells From The Intervertebral Disc: Do They Vary In Degeneration?" 07/01/09 – 06/30/2011

Purpose: The proposed study aims to investigate stem cells residing in the nucleus pulposus. It is our hypothesis that stem cells residing in the degenerated nucleus pulposus demonstrate a change in their number and/or differentiation profile compared to stem cells in healthy discs.

Role: co-PI

6. NIH 1R01AR056694-01A1 "Engineered Delivery of Adult Versus Fetal Stem Cells for Bone Regeneration". 07/01/09 – 06/30/2011

Purpose: Define the potential of fetal stem cells vs. bone marrow-derived MSCs in long bone fracture repair.

Role: co - PI

7. CIRM RT1-01027 "A Novel SPECT Microscopy System for 3D Imaging of Single Stem Cells In Vivo". 3/2009 - 2/2011

Purpose: Develop a new non-invasive nuclear microscope for the 3D visualization of individual stem cells within living laboratory animal subjects.

Role: Co-PI.