

## PROMOTION RECOMMENDATION

### The University of Michigan School of Dentistry

Paul Hugo Krebsbach, DDS, PhD, associate professor of dentistry, with tenure, School of Dentistry and associate professor of biomedical engineering, without tenure, Department of Biomedical Engineering, College of Engineering, is recommended for promotion to professor of dentistry, with tenure, School of Dentistry and professor of biomedical engineering, without tenure, Department of Biomedical Engineering, College of Engineering.

#### Academic Degrees:

BA	1982	College of St. Thomas
DDS	1987	University of Minnesota
Certificate	1993	University of Connecticut Health Center
PhD	1993	University of Connecticut Health Center
Postdoctoral	1996	Senior Staff Fellow, National Institutes of Health

#### Professional Record:

1996-2001	Assistant Professor of Dentistry, Department of Oral Medicine Pathology and Surgery, University of Michigan, School of Dentistry
2001-2005	Associate Professor of Dentistry, with tenure, Department of Oral Medicine, Pathology and Oncology, University of Michigan, School of Dentistry
2001-present	Associate Professor of Biomedical Engineering, without tenure, Department of Biomedical Engineering, University of Michigan, College of Engineering
2005-present	Associate Professor of Dentistry, with tenure, Department of Biologic and Materials Sciences, University of Michigan, School of Dentistry

#### Summary of Evaluation:

Teaching: Dr. Krebsbach has been a consistent contributor to the teaching programs of the School of Dentistry since he first joined the faculty. He is able to effectively communicate with students in a variety of venues ranging from small groups to large lectures, has consistently received positive student and faculty teaching evaluations. He has been involved with the development of novel teaching approaches including the use of case-based learning for teaching Biological Chemistry and interactive, computer-based methods for teaching oral medicine and pathology. He has mentored a wide range of students in the laboratory including 7 dental and 1 medical student, 7 undergraduates, 6 residents or clinical fellows and 14 rotation students in Biomedical Engineering or Oral Health Sciences. Dr. Krebsbach served as thesis advisor for 2 and was co-advisor for 6 PhD students. Finally, he is principal investigator and Director of a training grant from the NIH/NIDCR entitled, "Tissue Engineering and Regeneration," that supports predoctoral and postdoctoral training in tissue regeneration.

Research: Dr. Krebsbach has a strong research productivity, he has maintained a steady portfolio of research grants to support work by his laboratory. He is currently principal investigator on two NIH

R01 grants, a subproject PI on a Bioengineering Research Partnership Grant from the NIH, principal investigator on a grant from the Arbeitsgemeinschaft für Osteosynthesefragen (Swiss) Foundation, a subproject co-investigator on a Multidisciplinary University Research Initiative Grant from the Department of Defense and PI on a grant from the Michigan Center for Stem Cell Research. Finally, he is co-investigator on three additional NIH grants directed by other faculty in the School of Dentistry.

Since coming to Michigan, Dr. Krebsbach's research has progressed along two major paths. He significantly advanced studies on the ameloblastin gene by characterizing promoter sequences and demonstrating that they contain sufficient information to direct ameloblast-selective expression. These studies provided evidence that Cbfa1, a transcription factor previously thought to be active only in bone, can regulate the ameloblastin gene. This novel function for Cbfa1 may provide important insights into the mechanism of amelogenesis. A second area that is now the main thrust of Dr. Krebsbach's research is the development of tissue engineering, gene and stem cell therapies for the repair and regeneration of bone and the development of marrow stromal cells as platforms for delivery of bioactive factors. This work, done largely in collaboration with members of the Department of Biomedical Engineering, shows particular promise for the eventual development of useful new clinical approaches for bone regeneration. A particularly novel aspect of Dr. Krebsbach's recent work is the use of gene therapy to heal skeletal defects compromised by preoperative radiation. Dr. Krebsbach recently commenced work to study osteoblast lineage progression from human embryonic stem cells and was awarded the first R01 grant at the University of Michigan to specifically support these studies. Dr. Krebsbach's rare ability to merge clinical and basic science backgrounds allows him to provide critical insight to this research area.

Recent and Significant Publications:

1. Nussenbaum, B., Rutherford, R.B., Teknos, T.N., Dornfeld, K.J., **Krebsbach, P.H.** Ex vivo Gene Therapy for Skeletal Regeneration in Cranial Defects Compromised by Preoperative Radiation, *Human Gene Therapy* 14:1107-1115, 2003.
2. **Krebsbach, P.H.**, Zhang, K., Malik, A., Kurachi, K. Bone Marrow-Derived Stromal Cells as a Genetic Platform for Systemic Delivery of Therapeutic Proteins *in vivo*: Human Factor IX Model, *J Gene Medicine* 5:11-17, 2003.
3. Schneider, A., Taboas, J.M., McCauley, L.K., and **Krebsbach, P.H.** Skeletal Homeostasis in Tissue Engineered Bone, *Journal of Orthopedic Research* 21:859-864, 2003.
4. Schek, R.M., Hollister, S.J., and Krebsbach, P.H., Delivery and Protection of Adenoviruses using Biocompatible Hydrogels for Localized Gene Therapy, *Molecular Therapy* 9:130-138, 2004.
5. Schek, R.M., Taboas, J.M., Segvich, S.J., Hollister, S.J., and **Krebsbach, P.H.** Engineered Osteochondral Grafts on Biphasic Composite Solid Free Form Fabricated Scaffolds, *Tissue Engineering* 10:1376-1385, 2004.

Service: Dr. Krebsbach is an exemplary faculty member having a distinguished record of service within the School, the University and the scientific community at large. His curriculum vita displays a wide range of service/leadership activities. Within the School of Dentistry some representative service activities include: Strategic Assessment Facilitating Committee, Oral Health Sciences PhD Program Committee, Biomedical Research Cores Committee, Executive Committee, Dean Search Advisory Committee, Research Table Clinic Day Planning Committee, Curriculum Committee as well as multiple faculty search committees. Services to the greater University community include: Executive Committee-Center for Gene Therapy, several committee memberships for the Organogenesis Center and membership in the Rackham Divisional Board I. National and international service activities include: Co-Chair of the 9<sup>th</sup> International Conference on the Chemistry

and Biology of Mineralized Tissues, President and Vice-President of the IADR Mineralized Tissues Group, Co-Chair and Chair of the AADR Hatton Award Committee and membership on numerous NIH review panels including Chair of the NIH Special Grants Review Committee.

External Reviewers:

Reviewer (A)

"I consider him to be one of the top five academic/research dentists [of his cohort] in the US. He is talented, visionary, bright, hard working and he is a good human being."

Reviewer (B)

"Dr. Krebsbach has an excellent publication record. He is one of a growing group of investigators trying to design tissue engineered constructs for bone and cartilage repair. Those who have met some success are limited and Dr. Krebsbach has been successful."

Reviewer (C)

"In addition to his research accomplishments Dr. Krebsbach is extremely pro-active and service oriented in the biomedical community. Based on his keen sense of where important research projects are headed and his organized and thorough approach, I am confident he will continue to succeed in securing research and grant funding for years to come."

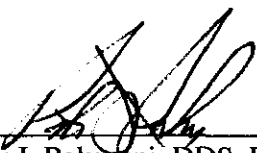
Reviewer (D)

"The view from outside of your institution is that he is understated, studious and someone who can be counted upon. He is a good person, warm and giving. As I survey the landscape of dentist scientists, Dr. Krebsbach is clearly among the top ten percent in the nation."

Reviewer (E)

"Dr. Krebsbach is a very successful clinician scientist. High impact publications and invitations to speak at national and international meetings demonstrate recognition of his achievements."

Summary of Recommendation: Dr. Krebsbach is an outstanding candidate for promotion to Professor at the University of Michigan. He has excelled in all aspects of academic life and brings much honor and distinction to the School and University. It is with the support of the Appointments, Promotion and Tenure and Executive Committees of both the School of Dentistry and the College of Engineering that Dr. Krebsbach is being recommended for promotion to professor of dentistry, with tenure, School of Dentistry, and professor of biomedical engineering, without tenure, College of Engineering.



Peter J. Polverini, DDS, DMSc  
Dean, School of Dentistry



Ronald Gibala, Ph.D.  
Interim Dean, College of Engineering

May 2006