

RESEARCH SPOTLIGHT

TRANSLATING SCIENCE TO PRACTICE

Spanning Disciplines, Advancing Science & Practice

The Penn Dental Medicine research enterprise spans scientific disciplines to translate new knowledge into clinical therapies that are expanding our understanding of disease and advancing patient care. In 2021, faculty and research staff continued to move scholarship forward across their respective fields and beyond. On the pages that follow, we highlight some of these research and scholarly activities for 2021.



\$20.91M

Awarded
for research
in FY21

Funding by Investigators

Among the Penn Dental Medicine faculty, following are the total funds (direct and indirect) spent by each principal investigator in the 2021 calendar year.

FACULTY/DEPARTMENT	2021 TOTAL
Dr. Kelly Jordan-Sciotto, Oral Medicine	\$ 2,434,713
Dr. George Hajishengallis, Basic & Translational Sciences	\$ 1,593,738
Dr. Pat Corby, Oral Medicine	\$ 1,540,304
Dr. Dana T. Graves, Periodontics	\$ 1,468,673
Dr. Henry Daniell, Basic & Translational Sciences	\$ 1,353,367
Dr. Hyun (Michel) Koo, Orthodontics/COH/Pediatrics	\$ 973,137
Dr. Hydar Ali, Basic & Translational Sciences	\$ 926,124
Dr. Gary H. Cohen, Basic & Translational Sciences	\$ 861,225
Dr. Claire H. Mitchell, Basic & Translational Sciences	\$ 847,713
Dr. Yu Zhang, Preventive & Restorative Sciences	\$ 766,893
Dr. Bruce J. Shenker, Basic & Translational Sciences	\$ 753,760
Dr. Chider Chen, Oral & Maxillofacial Surgery	\$ 652,239
Dr. Temitope Omolehinwa, Oral Medicine	\$ 537,956
Dr. Kathleen Boesze-Battaglia, Basic & Translational Sciences	\$ 593,424
Dr. Esra Sahingur, Periodontics	\$ 496,530
Dr. David Hershkowitz, Preventive & Restorative Sciences	\$ 483,816
Dr. Joan Gluch, Community Oral Health (COH)	\$ 483,103
Dr. Thomas Sollecito, Oral Medicine	\$ 390,237
Dr. Geelsu Hwang, Preventive & Restorative Sciences	\$ 340,252
Dr. Kang Ko, Periodontics	\$ 251,181
Dr. Shuying (Sherri) Yang, Basic & Translational Sciences	\$ 169,776
Dr. Robert P. Ricciardi, Basic & Translational Sciences	\$ 165,284
Dr. Anh Le, Oral & Maxillofacial Surgery	\$ 162,370
Dr. Elliot Hersh, Oral & Maxillofacial Surgery	\$ 135,020
Dr. Mark S. Wolff, Preventive & Restorative Sciences	\$ 69,451
Dr. Anuradha Dhringra, Basic & Translational Sciences	\$ 33,029
Dr. Nataliya Balashova, Basic & Translational Sciences	\$ 20,762
Dr. Flavia Teles, Basic & Translational Sciences	\$ 11,076

Scholarly Impact

The impact of faculty publications measured by the h index* is presented for a selection of faculty within both the clinical departments and the Department of Basic & Translational Sciences for the past five years. Career h-indexes are also included.

CLINICAL DEPARTMENTS

FACULTY	SCOPUS H-INDEX	
	LIFETIME	5-YEAR
Dr. Hyun (Michel) Koo, Orthodontics/Divs. Pediatrics/Community Oral Health	61	30
Dr. Alonso Carrasco Labra, Preventive & Restorative Sciences	32	24
Dr. Yu Zhang, Preventive & Restorative Sciences	45	22
Dr. Yuan Liu, Preventive & Restorative Sciences	19	21
Dr. Dana Graves, Periodontics	72	18
Dr. Chider Chen, Oral Surgery	35	16
Dr. Geelsu Hwang, Preventive & Restorative Sciences	28	16
Dr. Bekir Karabucak, Endodontics	22	14
Dr. Rabie Shanti, Oral Surgery	20	13
Dr. Frank C. Setzer, Endodontics	20	13
Dr. Anh D. Le, Oral Surgery	45	12
Dr. Markus B. Blatz, Preventive & Restorative Sciences	30	11
Dr. Chenshuang Li, Orthodontics	14	11
Dr. Rodrigo Neiva, Periodontics	27	10
Dr. Thomas Sollecito, Oral Medicine	21	10
Dr. Michael Glick, Preventive & Restorative Sciences	31	9
Dr. Mark S. Wolff, Preventive & Restorative Sciences	30	9
Dr. Kelly L. Jordan-Sciutto, Oral Medicine	26	9
Dr. Patricia Corby, Oral Medicine	23	9
Dr. Betty Hajishengallis, Div. Pediatric Dentistry	17	9
Dr. Esra Sahingur, Periodontics	14	9
Dr. Joseph P. Fiorellini, Periodontics	34	8
Dr. Elliot V. Hersh, Oral Surgery	29	8
Dr. Mel Mupparapu, Oral Medicine	17	8
Dr. Katherine N. Theken, Oral Surgery	13	7
Dr. Sunday O. Akintoye, Oral Medicine	24	6
Dr. Jonathan Korostoff, Periodontics	24	6
Dr. Fusun Ozer, Preventive & Restorative Sciences	24	6
Dr. Chun-Hsi Chung, Orthodontics	19	6
Dr. Francis Mante, Preventive & Restorative Sciences	18	5
Dr. Eric Stoopler, Oral Medicine	17	5
Dr. Eric Granquist, Oral Surgery	7	5

Dr. Edgar El Chaar, Periodontics	7	5
Dr. Su-Min Lee, Endodontics	6	5
Dr. Neeraj Panchal, Oral Surgery	5	5
Dr. Syngcuk Kim, Endodontics	42	4
Dr. Martin S. Greenberg, Oral Medicine	25	4
Dr. Lee Ryan Carrasco, Oral Surgery	11	4
Dr. Yu Wang, Periodontics	11	4
Dr. Helen E. Giannakopoulos, Oral Surgery	10	4
Dr. Eugene Ko, Oral Medicine	5	4
Dr. Yu Cheng Chang, Periodontics	4	4
Dr. Hyeran Helen Jeon, Orthodontics	4	3
Dr. Katherine France, Oral Medicine	3	3
Dr. Takako Tanaka, Oral Medicine	9	2
Dr. Kang I Ko, Periodontics	6	2
Dr. Nipul Tanna, Orthodontics	4	2
Dr. Joan Gluch, Community Oral Health	4	2
Dr Brian P. Ford, Oral Surgery	2	2
Dr. Uri Hangorsky, Periodontics	2	2
Dr. Roopali Kulkarni, Oral Medicine	2	2
Dr. Temitope Omolehinwa, Oral Medicine	2	2
Dr. Peter D. Quinn, Oral Surgery	16	1
Dr. Thomas R. Berardi, Oral Medicine	2	1
Dr. Adeyinka Dayo, Oral Medicine	1	1

DEPARTMENT OF BASIC & TRANSLATIONAL SCIENCES

FACULTY	SCOPUS H-INDEX	
	LIFETIME	5-YEAR
Dr. George Hajishengallis	66	28
Dr. Henry Daniell	73	22
Dr. Kathleen Boesze-Battaglia	33	14
Dr. Shuying (Sheri) Yang	24	13
Dr. Claire Mitchell	38	12
Dr. Gary Cohen	66	10
Dr. Hydar Ali	38	10
Dr. Yan Yuan	32	8
Dr. Flavia Teles	22	7
Dr. Bruce Shenker	36	6
Dr. Faizan Alawi	20	6
Dr. Nataliya Balashova	17	6
Dr. Cagla Akay Espinoza	16	4
Dr. Robert P. Ricciardi	33	3
Dr. Marco Tizzano	15	2

* The h-index was developed by J.E. Hirsch, Department of Physics, UCSD and attempts to measure the impact of an individual's publications. As an example, an h-index of 20 means there are 20 publications that have 20 citations or more each in journals covered by the Scopus database.

2021 High Impact Original Articles: Basic & Translational Sciences

Within the School's Department of Basic & Translational Sciences, following is a selection of original research articles with Penn Dental Medicine faculty as first or senior authors published in 2021 in journals of high impact.

AUTHORS	ARTICLES	IMPACT FACTOR	JOURNAL
Wang, H., Li, X., Kajikawa, T., Shin, J., Lim, J.-H., Kourtzelis, I., Nagai, K., Korostoff, J.M., Grossklaus, S., Naumann, R., Chavakis, T., Hajishengallis, G.	Stromal cell-derived DEL-1 inhibits Tfh cell activation and inflammatory arthritis	14.808	<i>Journal of Clinical Investigation</i>
Daniell, H. , Nair, S.K., Esmaeili, N., Wakade, G., Shahid, N., Ganesan, P.K., Islam, M.R., Shepley-McTaggart, A., Feng, S., Gary, E.N., Ali, A.R., Nuth, M., Cruz, S.N., Graham-Wooten, J., Streatfield, S.J., Montoya-Lopez, R., Kaznica, P., Mawson, M., Green, B.J., Ricciardi, R., Milone, M., Harty, R.N., Wang, P., Weiner, D.B., Margulies, K.B., Collman, R.G.	Debulking SARS-CoV-2 in saliva using angiotensin converting enzyme 2 in chewing gum to decrease oral virus transmission and infection	11.454	<i>Molecular Therapy</i>
Guan, H., Nuth, M., Lee, V., Lin, C., Mitchell, C.H., Lu, W., Scott, R.W., Parker, M.H., Kulp, J.L., Reitz, A.B., Ricciardi, R.P.	Herpes Simplex Virus-1 infection in human primary corneal epithelial cells is blocked by a stapled peptide that targets processive DNA synthesis	11.454	<i>Ocular Surface</i>
Li, X., Yang, S., Chinipardaz, Z., Koyama, E., Yang, S.	SAG therapy restores bone growth and reduces enchondroma incidence in a model of skeletal chondrodysplasias caused by Ihh deficiency	11.454	<i>Molecular Therapy Methods and Clinical Development</i>
Deepak, V., Komarow, H.D., Alblaiheh, A.A., Carter, M.C., Metcalfe, D.D., Ali, H.	Expression of MRGPRX2 in skin mast cells of patients with maculopapular cutaneous mastocytosis	10.793	<i>Journal of Allergy and Clinical Immunology: In Practice</i>

2021 High Impact Review Articles

Following is a selection of review articles with Penn Dental Medicine faculty as first or senior authors published in 2021 in journals of high impact.

AUTHORS	ARTICLES	IMPACT FACTOR	JOURNAL	DEPARTMENT
Hajishengallis, G. , Chavakis, T.	Local and systemic mechanisms linking periodontal disease and inflammatory comorbidities	53.106	<i>Nature Reviews Immunology</i>	Basic & Translational Sciences
K Theken , G FitzGerald	Bioactive lipids in antiviral immunity	47.728	<i>Science</i>	Oral & Maxillofacial Surgery
Hajishengallis, G. , Hasturk, H., Lambris, J.D., Apatzidou, D.A., Belibasakis, G.N., Bostanci, N., Corby, P.M., Cutler, C.W., D'Auto, F., Hajishengallis, E., Huber-Lang, M., Ioannidou, E., Kajikawa, T., Kantarci, A., Korostoff, J.M., Kotsakis, G.A., Maekawa, T., Mastellos, D.C., Moutsopoulos, N.M., Myneni, S., Nagelberg, R., Nilsson, B., Papapanou, P.N., Papathanasiou, E., Potempa, J., Risitano, A., Sahingur, S.E., Saito, A., Sculean, A., Stavropoulos, A., Teles, F.R., Tonetti, M., Yancopoulou, D.	C3-targeted therapy in periodontal disease: moving closer to the clinic	16.687	<i>Trends in Immunology</i>	Basic & Translational Sciences
Singh, R., Ren, Z., Shi, Y., Lin, S., Kwon, K.-C., Balamurugan, S., Rai, V., Mante, F., Koo, H., Daniell, H.	Affordable oral healthcare: dental biofilm disruption using chloroplast made enzymes with chewing gum delivery	9.803	<i>Plant Biotechnology Journal</i>	Basic & Translational Sciences
Ko, K.I., Sculean, A., Graves, D.T.	Diabetic wound healing in soft and hard oral tissues	7.012	<i>Translational Research</i>	Periodontics

2021 High Impact Original Articles: Clinical Sciences

Within the School's clinical departments, following is a selection of original research articles with Penn Dental Medicine faculty as first or senior authors published in 2021 in journals of high impact.

AUTHORS	ARTICLES	IMPACT FACTOR	JOURNAL	DEPARTMENT
Huang, Y., Liu, Y., Shah, S., Kim, D., Simon-Soro, A., Ito, T., Hajfathalian, M., Li, Y., Hsu, J.C., Nieves, L.M., Alawi, F., Naha, P.C., Cormode, D.P., Koo, H.	Precision targeting of bacterial pathogen via bi-functional nanozyme activated by biofilm microenvironment	12.479	<i>Biomaterials</i>	Orthodontics/Pediatrics/ Community Oral Health
Zhang, Q., Nguyen, P., Burrell, J.C., Zeng, J., Shi, S., Shanti, R.M., Kulischak, G., Cullen, D.K., Le, A.D.	Harnessing 3D collagen hydrogel-directed conversion of human GMSCs into SCP-like cells to generate functionalized nerve conduits	10.364	<i>npj Regenerative Medicine</i>	Oral & Maxillofacial Surgery
Dhall, A., Islam, S., Park, M., Zhang, Y., Kim, A., Hwang, G.	Bimodal Nanocomposite Platform with Antibiofilm and Self-Powering Functionalities for Biomedical Applications	9.229	<i>ACS Applied Materials and Interfaces</i>	Restorative Sciences
Mooney, E.C., Holden, S.E., Xia, X.-J., Li, Y., Jiang, M., Banson, C.N., Zhu, B., Sahingur, S.E.	Quercetin Preserves Oral Cavity Health by Mitigating Inflammation and Microbial Dysbiosis	7.561	<i>Frontiers in Immunology</i>	Periodontics
Roth, L.M., Zidane, B., Festa, L., Putatunda, R., Romer, M., Monnerie, H., Jordan-Sciutto, K.L. , Grinspan, J.B.	Differential effects of integrase strand transfer inhibitors, elvitegravir and raltegravir, on oligodendrocyte maturation: A role for the integrated stress response	7.452	<i>GLIA</i>	Oral Medicine

* The Impact Factor identifies the frequency with which an average article from a journal is cited in a particular year. This number can be used to evaluate or compare a journal's relative importance to others in the same field. Journal impact factors are reported in Clarivate Analytics InCites™ Journal Citation Reports®. The JCR, 2017, was used for these figures.

FY21 Patent Awards

The following patents were awarded to Penn Dental Medicine faculty in fiscal year 2021 as part of their research activities.

PATENT TITLE	INVENTOR
Chloroplasts engineered to express pharmaceutical proteins in edible plants	Dr. Henry Daniell
Oral Delivery Of Angiotensin Converting Enzyme 2 (Ace2) Or Angiotensin-(1-7)-Bioencapsulated In Plant Cells Attenuates Pulmonary Hypertensions, Cardiac Dysfunction And Development Of Autoimmune And Experimentally Induced Ocular Disorders	Dr. Henry Daniell, Qihong Li, Mohan Raizada
Orally Administered Plastid Expressed Cholera Toxin B Subunit-Exendin 4 As Treatment For Type 2 Diabetes	Dr. Henry Daniell
Compositions and Methods Thereof for Down-Regulation of Genes Following Oral Delivery of an RNAi Molecule Bioencapsulated Within Plant Cells	Dr. Henry Daniell
Compositions and Methods for Delivery of Bioencapsulated Proteins Across Blood-Brain and Retinal Barriers	Dr. Henry Daniell

2021 New Grant Awards

In 2021, the following new grants above \$50,000 were awarded to Penn Dental Medicine faculty.

Inter- and Intra-cellular effects of cannabinoids, HIV and ART in the CNS

Principal Investigator: Dr. Kelly L. Jordan-Sciutto, Dept. of Oral Medicine (NIH; Total Award \$3,529,874, 5 years)

Biofilm Elimination and Caries Prevention using Multifunctional Nanocatalysts

Principal Investigator: Dr. Hyun (Michel) Koo, Dept. of Orthodontics, Divs. of Community Oral Health/Pediatric Dentistry (NIH; Total Award \$3,464,432, 5 years)

Effects of HIV and ART on myelination in the adolescent

Principal Investigator: Dr. Kelly L. Jordan-Sciutto, Dept. of Oral Medicine (NIH; Total Award \$3,316,582, 5 years)

RGS12, a Novel Inflammatory Mediator for Rheumatoid Arthritis

Principal Investigator: Dr. Shuying Yang, Dept. Basic & Translational Sciences (Dept. of Defense; Total Award; \$2,402,885, 4 years)

The role of solitary chemosensory cells in periodontal homeostasis

Principal Investigator: Dr. Marco Tizzano, Dept. Basic & Translational Sciences (NIH; Total Award \$1,978,427, 4 years)

Wound healing mechanisms by distinct oral fibroblast population

Principal Investigator: Dr. Kang Ko, Dept. of Periodontics (NIH; Total Costs: \$1,929,393, 5 years)

Biological Indicators of Racial Disparity in Ameloblastoma Recurrence

Principal Investigator: Dr. Sunday Akintoye, Dept. Oral Medicine (NIH; Total Award \$1,858,595, 5 years)

Local endogenous regulators of functional immune plasticity in the periodontium

Principal Investigator: Dr. George Hajishengallis, Dept. of Basic & Translational Sciences (NIH; Total Costs: \$1,758,750, 5 years)

Advanced Training at the Interface of Engineering and Oral-Craniofacial Sciences

Principal Investigator: Dr. Hyun (Michel) Koo, Dept. of Orthodontics, Divs. of Community Oral Health/Pediatric Dentistry (NIH; Total Award \$1,257,065, 5 years)

Regulation of Epithelial Barrier

Principal Investigator: Dr. Dana Graves, Dept. of Periodontics (NIH through ASRI LLC; Total Award \$904,137, 5 years)

Advanced Training at the Interface of Engineering and Oral-Craniofacial Sciences

Principal Investigator: Dr. Hyun (Michel) Koo, Professor, Dept. of Orthodontics, Divs. of Community Oral Health/Pediatric Dentistry (NIH; Total Award \$483,605, 5 years)

The hCNS-HIV/ARV assay system, a platform utilizing human iPSC-neurons/-microglia/-astrocytes to test HIV/AIDS

Principal Investigator: Dr. Kelly L. Jordan-Sciutto, Dept. of Oral Medicine (NIH through Vala Sciences Inc.; Total Award \$411,909, 2 years)

Role of solitary chemosensory cells in irritant avoidance and protection of olfactory sensation

Principal Investigator: Dr. Marco Tizzano, Dept. Basic & Translational Sciences (NIH; Total Award \$363,964, 1 year)

Development of a Peptide-Drug Conjugate for Topically Treating the Viral Skin Disease Molluscum Contagiosum

Principal Investigator: Dr. Robert Ricciardi, Dept. of Basic & Translational Sciences (NIH through Fox Chase Chemical Diversity Center; \$349,200, 2 years)

The Impact of Oral Health on Metabolism and Persistent Inflammation in HIV Patients on Antiretroviral Therapy

Principal Investigator: Dr. Temitope Omolehinwa, Dept. of Oral Medicine (NIH; Total Award \$298,566, 1 year)

A Phase II, randomized, open-label trial to test the effects of Povidone-iodine 0.5% as mouthwash/gargle on SARS-CoV-2

Principal Investigator: Dr. Corby Patricia, Dept. of Oral Medicine (Avrio Health; Total Award \$270,439, 1 year)

Small Scale Robotics for Automated Dental Biofilm Treatment

Principal Investigator: Dr. Hyun (Michel) Koo, Dept. of Orthodontics, Divs. of Community Oral Health/Pediatric Dentistry (NIH; Total Award \$269,026, 1 year)

mRNA-LNP vaccine platform

Principal Investigator: Gary Cohen, Dept. of Basic & Translational Sciences (BioNTech; Total Award \$190,406, 1 year)

Oral Protein Therapeutics against C. difficile Associated Colitis

Principal Investigator: Dr. Henry Daniell, Dept. of Basic and Translational Sciences (NIH through Texas A&M University Health Science Center; Total Award \$162,500, 1 year)

Long-term Oral Complications of an Established Head and Neck Cancer Cohort - Clinical Registry of Dental Outcomes in Head and Neck Cancer Patients: ORARAD

Principal Investigator: Dr. Sollecito Thomas, Dept. of Oral Medicine (NIH through Charlotte-Mecklenburg Authority / Carolinas Medical Center; Total Award \$161,445, 1 year)

Mechanisms of variability in analgesic response to ibuprofen following third molar extraction

Principal Investigator: Dr. Katherine Theken, Dept. of Oral & Maxillofacial Surgery/ Pharmacology (Oral and Maxillofacial Surgery Foundation; Total Award \$150,000, 1 year)

HIV viral dynamics and host-cell gene expression profiles in human induced pluripotent stem cell-derived myeloid cells

Principal Investigator: Dr. Cagla Espinoza, Dept. of Basic and Translational Sciences (NIH; Total Award \$97,500, 1 year)

Comparison of Five Distinct Membranes for Preservation of the Alveolar Ridge Following Tooth Extraction: A Prospective, Randomized, Controlled Clinical Study

Principal Investigator: Dr. Yu Cheng Chang, Dept. of Periodontics (ZIMMER BIOMET; Total Award \$55,500, 1 year)