Summer Student Research Program
Project Description

FACULTY SPONSOR'S NAME AND DEGREE: Kenneth Yan, MD, PhD
PHONE: (973) 972-2548
DEPARTMENT AND INTERNAL MAILING ADDRESS:
Department of Otolaryngology – Head and Neck Surgery
90 Bergen Street, Suite 8100
Newark, NJ 07103
E-MAIL: ky286@njms.rutgers.edu

PROJECT TITLE (200 Characters max):

Characterization of the Microbiome Related to Head and Neck Pathologies

HYPOTHESIS:

There will be changes in bacterial diversity and relative abundances of individual bacterial species in response to various head and neck disease states.

PROJECT DESCRIPTION **(Include design, methodology, data collection, techniques, data analysis to be employed and evaluation and interpretation methodology)**

We have several ongoing translational projects characterizing the microbiome of various head and neck pathologies. Each of these projects are comparing the microbiome in various pathologic states to the normal head and neck microbiome. Pathologies currently being studied include laryngeal cancer, subglottic stenosis, laryngopharyngeal reflux, eustachian tube dysfunction and the postoperative state following total laryngectomy. Anatomic sites studied include oral cavity, oropharynx, larynx, nasal cavity and middle ear.

Bacterial swabs are obtained from patients with the pathologies listed above, as well as control patients with no head and neck pathology. Bacterial 16S rRNA is amplified and sequencing performed. Sequence variants are classified into bacterial taxonomies and relative bacterial abundances compared.

SPONSOR'S MOST RECENT PUBLICATIONS RELEVANT TO THIS RESEARCH:

1. **Thompson E, Shah A, Zaransky S, Dhanda A, Bono K, Bono J, Lamichhane S, Mudhar A, Kaye R, Johnson WE, Cugini C, Yan K. Early Insights Into the Healthy Laryngeal Microbiome: A Pilot Study Evaluating Salivary and Oropharyngeal Sampling as Proxies. Laryngoscope. 2026 Jan;136(1):281-290. doi: 10.1002/lary.70043.**

2. Ho RA, Shah E, De Armas JS, Yan K, Kaye R. Artificial Intelligence Models for Dysphonia Patient Education. Otolaryngol Head Neck Surg. 2025 Dec;173(6):1455-1462. doi: 10.1002/ohn.70030. Epub 2025 Oct 13.

3. Malhotra R, Khan H, Celidonio J, Kumar K, Suresh R, Yan K. Outcomes of Open Osteophytectomy in Dysphagia Related to Cervical Osteophytes: A Systematic Review. Ann Otol Rhinol Laryngol. 2025 Nov 8:34894251383821. doi:10.1177/00034894251383821. Epub ahead of print. PMID: 41204874.

4. Thompson ER, Abdel-Azim N, Yan K. Nutritional Status and Outcomes Following Open Laryngeal Surgery for Laryngeal Cancer: A NSQIP Database Study. Laryngoscope Investig Otolaryngol. 2025 Sep 17;10(5):e70257. doi: 10.1002/lio2.70257.

5. Abdel-Azim N, Thompson E, Meeter A, Mohsen M, Povolotskiy R, Pashkover B, Yan K, Kaye R. Comparing Utilization of Operative versus Awake Laryngoplasty Techniques in the U.S.

Medicare Population: 22-Year Trends. Otolaryngol Head Neck Surg. 2025 Aug 26. doi: 10.1002/ohn.70006

6. Malhotra R, Khan H, Zaransky S, Celidonio J, Yan K, Kaye R. Diagnosis and Management of Retrograde Cricopharyngeal Dysfunction: A Systematic Review. OTO Open. 2024 Oct 15. 8(4):e70014.

7. Ho RA, Shaari AL, Cowan PT, Yan K. ChatGPT Responses to Frequently Asked Questions on Meniere's Disease: A Comparison to Clinical Practice Guideline Answers. OTO Open. 2024 Jul 5;8(3):e163.

8. Schlegel P, Yan K, Upadhyaya S, Buyens W, Wong K, Chen A, Faull KF, Al-Hiyari Y, Long J. Tissue-engineered vocal fold replacement in swine: Methods for functional and structural analysis. PLOS One. 2023 Apr 21. 18(4): e0284135.

9. **Yan K, Auger S, Diaz A, Naman J, Vemulapalli R, Hasina R, Izumchenko E, Shogan B, Agrawal N. Microbial Changes Associated with Oral Cavity Cancer Progression. Journal of Otolaryngology – Head and Neck Surgery. 2023 Jan 24. doi: 10.1002/ohn.211**

10. Yan K, Lin J, Albaugh S, Yang M, Wang E, Cyberski T, Abasiyanik F, Wroblewski KE, O'Connor M, Klock A, Tung A, Shahul S, Kurian D, Tay S, Pinto JM. Measuring SARS-CoV-2 Aerosolization in Rooms of Hospitalized Patients. Laryngoscope Investigative Otolaryngology. 2022 Aug; 7(4): 1033–1041.

11. Yan K, Friedman AD. Vocal Fold Cyst Formation after Photoangiolytic KTP Laser Treatment of Early Glottic Cancer. Annals of Otology, Rhinology & Laryngology. 2022 Apr;131(4):360-364.

12. Russell J, Yan K, Sharpf J. Non-thyroid metastasis to the thyroid gland: case series and review with observations by primary pathology. Otolaryngol Head Neck Surg. 2016 Dec; 155(6):961-968.

13. Yan K, Wu Q, Yan DH, Lee CH, Rasim N, Tritschler I, DeVecchio J, Kalady MF, Hjelmeland AJ, Rich JN. Glioma cancer stem cells secrete Gremlin1 to promote their maintenance within the tumor hierarchy. Genes & Development. 2014 May 15; 28(10):1085-100.

THIS PROJECT IS: **X Clinical** **X Laboratory** ☐ **Behavioral** ☐ **Other**

THIS PROJECT IS CANCER-RELATED X
Please explain Cancer relevance
We are studying microbial changes in patients with laryngeal cancer, and patients who have undergone total laryngectomy (usually performed for laryngeal cancer).

THIS PROJECT IS HEART, LUNG & BLOOD- RELATED X No
Please explain Heart, Lung, Blood relevance

THIS PROJECT INVOLVE RADIOISOTOPES? X No

THIS PROJECT INVOLVES THE USE OF ANIMALS X No
PENDING ☐ APPROVED ☐ IACUC PROTOCOL #

THIS PROJECT INVOLVES THE USE OF HUMAN SUBJECTS? X Yes
PENDING X APPROVED X IRB PROTOCOL #
Pro2022001643, Pro2024001199, Pro2025000265

Summer Student Research Program
Project Description

THIS PROJECT IS SUITABLE FOR:

UNDERGRADUATE STUDENTS	X	ENTERING FRESHMEN	X
SOPHOMORES	X	ALL STUDENTS	X

All students are welcome, but preference given to students who will have completed first year of medical school
Preference will be given for a student interested in the Distinction in AI in Medicine Program.

THIS PROJECT IS WORK-STUDY: **Yes ☐ or No X**

THIS PROJECT WILL BE POSTED DURING ACADEMIC YEAR FOR INTERESTED VOLUNTEERS: **Yes X or No ☐**

WHAT WILL THE STUDENT LEARN FROM THIS EXPERIENCE?

The student will learn about clinical study design, data collection, and research methodology. Students may be involved in either clinical or basic science aspects of this project depending on interest. The student may also participate in abstract or manuscript writing. The ultimate goal of these projects are presentations at national meetings and publications in peer-reviewed journals.