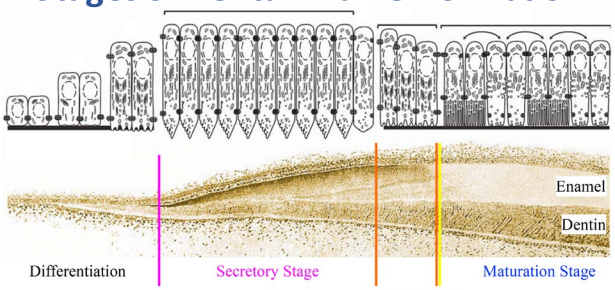
National Institute of Dental and Craniofacial Research

Updated 5/2021

EnamelBase:
A Consortium of Amelogenesis Models

ENAMELBASE is dedicated to developing and sharing tools and resources to accelerate scientific and technical progress in studying a multi-stage process of dental enamel formation called amelogenesis (refer to the figure). NIDCR established this consortium to overcome a current scarcity of physiologically-relevant animal models and other in vivo and in vitro systems to support mechanistic and pre-clinical studies of amelogenesis. We envision that the tools and resources generated as a result of this effort will empower the research community and facilitate collaborations to understand the developmental mechanisms, treat the diseases affecting enamel formation, and develop a new generation of enamel restoration therapies to meet clinical needs.

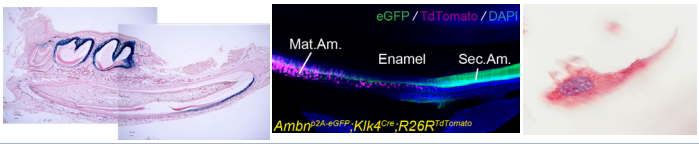
Stages of Dental Enamel Formation



Hu JC, *et al.*, (2007) Cells Tissues Organs 186:78-85.

Tools and resources available to the research community:

- **Animal Models**: A variety of genetic mouse models targeting pre-secretory to maturation stages of amelogenesis. For the list of the available mutant, conditional-ready, Cre-drivers and reporter models, please consult the NIH-funded repository Mutant Mouse Resource and Research Center (MMRRC).
- **In vitro bioreactor:** A three-dimensional co-culture system for the expansion and maintenance of ameloblast-like cells.
- **Protocols:** Protocols and procedures for generating and handling these models as well as methods and protocols for obtaining the various data types.
- **Data Types**: For the list of morphological, biochemical, histological, biophysical, high-resolution structural images, and multi-scale omics data please consult the NIDCR-Funded craniofacial knowledge base, FaceBase.



The material and data resources generated from these NIDCR-funded cooperative agreements are available to all researchers directly from the investigators or resources listed below.

NIDCR Awards:

UH3DE028850 Cre Mouse Models To Study Amelogenesis
Institution: University of Southern California
Principal Investigator: Michael Paine, BDS, PhD (paine@usc.edu)

UH3DE028869 Ameloblast Differentiation and Amelogenesis: Next-Generation Models to Define Key Mechanisms and Factors Involved in Biological Enamel Formation
Institution: Texas A&M University
Principal Investigator: Tom Diekwisch, DMD, PhD (diekwisch@tamu.edu)

UH3DE028849 Development and Validation of Novel Amelogenesis Models
Institution: University of Michigan
Principal Investigator: Jan Hu, BDS, PhD (janhu@umich.edu)

UH3DE028872 Enamel atlas: systems-level amelogenesis tools at multiple scales
Institutions: University of California-San Francisco; Northwestern University
Multiple Principal Investigators: Ophir Klein, PhD, MD (ophir.klein@ucsf.edu); **and** Derk Joester, PhD (djoester@northwestern.edu)

RESOURCES

MMRRC: https://www.mmrrc.org
FaceBase: https://www.facebase.org
RFA-DE-19-004 Encouraging Development of Novel Amelogenesis Models

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