# Characterization of the role of non-canonical poly A polymerase Tent5a in mineralize tissues

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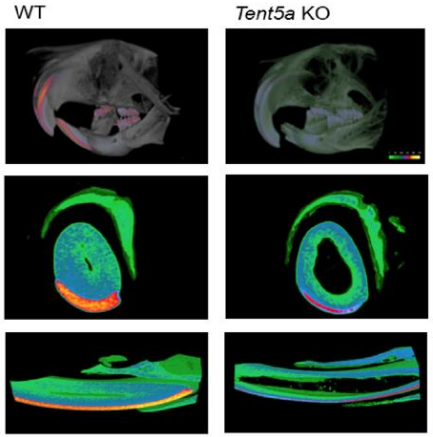
## INTRODUCTION

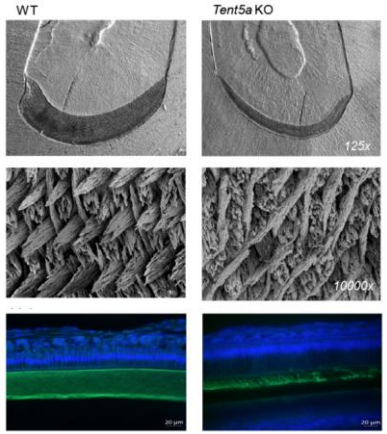
**Tent5a is a non-canonical poly (A) polymerase that regulates RNA by modifying 3'end of RNA and it is essential for proper bone and teeth mineralization. Tent5a loss of function mutations have been previously identified in patients with osteogenesis imperfecta. In this study, we generated a Tent5a deficient mouse model to characterize the molecular mechanisms that underlie the observed phenotypic changes. Tent5a is express in ameloblast in teeth, cells that synthesize enamel matrix proteins (EMPs) needed for enamel formation. Here we present our most recent data focusing on the role of Tent5a in amelogenesis.**

• Tent5a deficient mice displays skeletal and tooth abnormalities



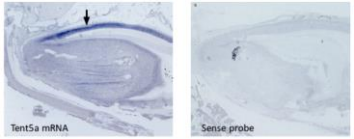

MicroCT images of Tent5 KO mice compared to wild type controls. Hypomineralization of the craniofacial section with several fractures and malformations in Tent5a KO mice. Virtual frontal and longitudinal virtual sections in a range of pseudocolors representing HAP density. Enamel layer thickness and density is reduced in Tent5a mutant.

• Tent5a KO mice shows disrupted enamel structure and Amelogenin is not able to assemble correctly.



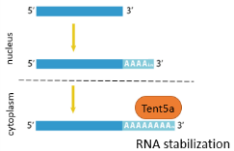

SEM anelysis of the enamel shows thinner enamel layer in Tent5a KO mice together with disrupted enamel prims organization. Amelx (green) localization did not differ but assembly of the protein was not possible with the ablation of Tent5a. Scale car 20 µm.

• Expression of Tent5a in mice incisor.

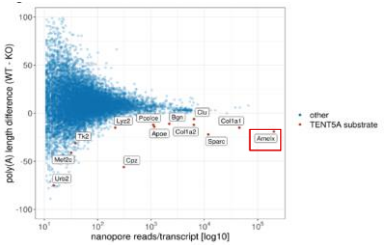



Tent5a in-situ hybridization on adult wild-type C57Bl/6n mice incisor. Strong expression of Tent5a was found in ameloblast cells (arrow). Scale bar 100µm.

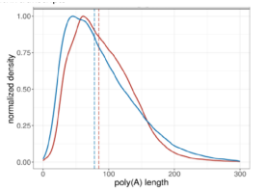
• Tent5a function in ameloblasts.



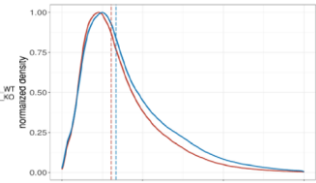

• *Amelx* is a Tent5a mRNA target together with extracellular matrix proteins essential for amelogenesis




Extracellular transcrips




Other than extracellular transcrips




Nanopore direct mRNA sequencing of ameloblast cells validated that Tent5a polyadenylates amelogenin (Amelx) and other secreted proteins mRNA to increase their expression during amelogenesis and this is essential for proper teeth formation.

## CONCLUSIONS

- Tent5a ablation in mice displays hypomineralization and deformities in skeletal tissue and teeth.
- Tent5a is express in ameloblast secretory cells and regulates the expression of secreted proteins important for biomineralization such as Amelogenin, by stabilizing their mRNAs.
- Moreover, Amelx is not able to assemble correctly in the absence of Tent5a, which is essential to ensure mineralization.

## FINANCIAL SUPPORT

Financial support was given to CCP by the Czech Academy of Sciences (RVO 68378050); by project LM2018126 by the Ministry of Education, Youth and Sports, Czech Republic (MEYS CZ); the Operational Program Research and Development for Innovations projects CZ.1.05/1.1.00/02.0109 and CZ.1.05/2.1.00/19.0395 by MEYS CZ and European Regional Development Fund; by the Operational Program Research, Development and Education projects CZ.02.1.01/0.0/0.0/16_013/0001789 and CZ.02.1.01/0.0/0.0/18_046/0015861 by MEYS CZ and European Structural and Investment Funds; by Horizon 2020 projects INFRAFRONTIER2020 (project ID 730879), IPAD-MD Research (project ID 653961) and EOSC-Life (project ID 824087).