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**AAO Foundation Final Report Form  
(a/o 5/31/2017)**

Type of Award: Biomedical Research Award

Name(s) of Principal Investigator: Achint Utreja

Title of Project: The Effect of Intermittent PTH on Mandibular Condylar Cartilage

Period of AAOF Support: 07-01-16 to 06-30-18

Amount of Funding: \$29,937

Summary/Abstract:

**Objectives:** Intermittent administration of parathyroid hormone (PTH) is the only FDA-approved agent capable of making new bone to treat osteoporosis. Similar to bone, other mesenchymal connective tissues such as joint cartilage have receptors for PTH; however, the effect of intermittent PTH on cartilaginous tissue is unclear. Similar to osteogenic cells, PTH could expand chondrogenic cell populations, advancing the treatment approaches for temporomandibular joint (TMJ) disorders and condylar growth disturbances. Therefore, the objective of this study was to examine the effect of varying doses of intermittent PTH on the mandibular condylar cartilage of the TMJ.

**Methods:** Sixty, 6-week-old growing mice and sixty, 7-month-old adult mice were equally divided into four groups: vehicle (saline) and 3 doses of intermittent PTH administration (25, 100 and 200 µg/kg). Following four weeks of daily subcutaneous injections of either the vehicle or PTH, the mandibular condyle and TMJ were dissected from all animals for gene expression and micro-CT analyses, and linear mandibular measurements.

**Results:** Micro-CT analysis of the subchondral bone showed a significant decrease in percent bone volume (BV/TV) and trabecular thickness (Tb.Th) in the 100 and 200 µg PTH groups compared to the 25 µg group ( $P < 0.05$ ). Mandibular measurements demonstrated a significant decrease in condyle head length in the 100 µg group compared to the 25 µg group ( $P < 0.05$ ). Gene expression analysis showed a 4-fold increase in Sox9 expression and a 3-fold increase in type X collagen (Col10) expression in the 25 µg group compared to the vehicle group. In the 200 µg group, type II collagen (Col2) expression was the lowest and Col10 expression was the highest among all groups.

**Conclusions:** Intermittent PTH at low dose (25 µg/kg) produces an anabolic response in the TMJ cartilage and subchondral bone whereas a high dose (200 µg/kg) appears to compromise cartilage integrity.

Response to the following questions:

1. Were the original, specific aims of the proposal realized?

Response: Yes, the specific aim of the proposal was realized.

2. Were the results published?

Response: The meeting abstract was published. AAOF support was acknowledged.

*Effect of Varying Doses of Intermittent PTH on the TMJ.* Wang J, Saylae J, Cregor M, Bellido T, Utreja A. *J Dent Res* 97 (Spec Iss A):0041, 2018 ([www.iadr.org](http://www.iadr.org)).

Additional study results are currently being analyzed. A manuscript is under preparation and will soon be submitted to a peer-reviewed journal for publication.

3. Have the results of this proposal been presented?

Response: The results were presented at the 47<sup>th</sup> Annual Meeting of the American Association for Dental Research (AADR). AAOF support was acknowledged.

*Title:* Effect of Varying Doses of Intermittent PTH on the TMJ

*Authors:* Junmei Wang, Jeremiah Saylae, Meloney Cregor, Teresita Bellido, Achint Utreja

*Year:* 2018

*Location:* Fort Lauderdale, FL

4. To what extent have you used, or how do you intend to use, AAOF funding to further your career?

Response: AAOF funding played a pivotal role in completing this project and in generating preliminary data for the following extramural grant application that was submitted in 2017 to the National Institutes of Health (NIH):

*Project Title:* Role of the Wnt Signaling Pathway during TMJ Development and Function

*PI:* Achint Utreja

*Funding Opportunity Title:* Mentored Clinical Scientist Research Career Development Award (K08)

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