AAO Foundation Award Final Report
(a/o 5/31/2012)

Please prepare a report that addresses the following:

Type of Award, e.g., Orthodontic Faculty Development Fellowship Award, Postdoctoral Fellowship Award, Biomedical Research Award, Center Award, Educational Innovation Award, Program Award, Research Aid Award

Biomedical Research Award

Name(s) of Principal Investigator(s)

Sumit Yadav

Title of Project

BMP2 regulation of the mandibular condylar cartilage growth

Period of AAOF Support (e.g. 07-01-15 to 06-30-16):

07-01-2016 to 12-31-2017

Amount of Funding

30,000

Summary/Abstract (250 word maximum)

Response to the following questions:

1. Were the original, specific aims of the proposal realized?
2. Were the results published?
   a.) If so, was AAOF support acknowledged.
   b.) If not, are there plans to publish? If not, why not?
3. Have the results of this proposal been presented?
   a.) If so, when and where? And was AAOF support acknowledged.
   b.) If not, are there plans to do so? If not, why not?
4. To what extent have you used, or how do you intend to use, AAOF funding to further your career?

Please mail hard copy to AAOF and also send electronically
(as a Word document and e-mail attachment) to
aaofevp@aaortho.org

Abstract:

Objective: The objective of the proposed research is to understand the role of Bone Morphogenic Protein 2 (BMP2) in the postnatal growth, pathogenesis and adaptive remodeling of the mandibular condylar cartilage. Our main objective was to determine the effects of BMP2 loss of function on the Mandibular Condylar Cartilage and the subchondral bone. Methods: BMP2 was conditionally deleted in the lineage of bone and cartilage to study the differential effects. Results: In our first model, we are conditionally deleted BMP2 in αSMA expressing cells (**osteochondrogenic lineage:** αSMA expressing cells are present both in MCC and the subchondral bone) and we observed a severe phenotype. There was decrease in the cartilage thickness, a decrease in cell proliferation, a decrease in chondroprogenitor population and a decrease in extracellular matrix secretion and mineralization in the MCC. There was decrease in the expression of chondrocyte progenitor and maturation markers (PRG4, Notch, Sox9, Col2a1, Col10a1 and Ihh). Furthermore, there was decreased subchondral bone volume and bone density. In our second model, we are conditionally deleting BMP2 in aggrecan expressing cells (**chondrogenic lineage:** aggrecan is only expressed by the mature chondrocytes in the MCC) and we observed a decrease in cartilage thickness and a decrease in extracellular matrix secretion and mineralization. The bone density and bone volume fraction was not significantly decreased. Conclusion: BMP2 is required for postnatal growth of the cartilage of TMJ.

Q.1. Were the original, specific aims of the proposal realized?
A.1. Yes
Q.2. Were the results published?
a.) If so, was AAOF support acknowledged. Not Yet published
b.) If not, are there plans to publish? If not, why not? Manuscript in preparation
3. Have the results of this proposal been presented?
a.) If so, when and where? And was AAOF support acknowledged. Results were used in submitting a grant proposal to NIDCR.
b.) If not, are there plans to do so? If not, why not? The results will be present in June in TMJ symposium.
4. To what extent have you used, or how do you intend to use, AAOF funding to further your career? AAOF has helped me in securing the NIDCR and other foundation grants. This helped in publishing some key papers and getting promoted to Associate Professor.