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Report of "Research Award of Oral Sciences"

Major: Oral Sciences
Grade: 4
Department: Orthodontic
Name: KhurelOchir Tsendsuren

Title: The immunoregulatory role of p21 on the development of TMJ-OA

1. Aim of research and results obtained (Approximately 400 words):

[Objective] Temporomandibular joint osteoarthritis (TMJ-OA) is a degenerative disease that involves progression degradation of subchondral bone and articular cartilage. The cyclin-dependent kinase inhibitor p21 is identified as a potent inhibitor of cell cycle progression. Recently, it has been reported that p21 is a regulator of transcription factor activity, and p21 regulated the expression of MMP-13 and aggrecan (ACAN) in articular cartilage. In this study, we evaluated the role of p21 in mechanical stress exposed to mandibular condylar cartilage and subchondral bone in p21 knockout mice ($p21^{-/-}$). **[Materials and Methods]** Mice were randomly divided into control and experimental groups. In the experimental groups, mechanical stress was applied to the TMJs by forced mouth opening for 3 h/d for 7 day. After the experimental period, all mice were sacrificed and the TMJs were dissected for histological, immunohistochemistry, micro CT, and RT-PCR analysis. **[Result and Discussion]** In HE staining and micro-CT analysis; $p21^{-/-}$ mice with mechanical stress showed subchondral bone destruction, thinner cartilage and smaller areas of proteoglycans than WT mice with mechanical stress. Immunohistochemical analysis indicated that MMP-9 and MMP-13 positive cell numbers were significantly larger in $p21^{-/-}$mice with mechanical stress compared to WT mice with mechanical stress while ACAN positive cell numbers were lower in $p21^{-/-}$ mice with mechanical stress compared to WT mice with mechanical stress. **[Conclusion]** Our results suggest that p21 in chondrocytes functions to maintain matrix synthesis by regulation of ACAN and MMP-13 expression. It is concluded that cell cycle related molecule p21 might regulate TMJ-OA pathogenesis in mice.

2. Self-evaluation of research achievement:

My poster presentation was selected for poster session and it was my first time as a presenter on ASBMR 2019 and also big international conference. I really enjoyed the conference and had good experiences in Orlando, Florida. I met and talked many researchers with same research field with my research. And this year I got travel award from JSBMR for presenting ASBMR and award certificate, and it is really motivated me. This year I got many good data from my research project and around July I'm going to submit my research publication.

3. Meeting presentation:

* Title, conference, venue, date, co-author, presentation (oral/ poster). (Underline the speaker.)

1. Khurel-Ochir Tsendsuren. The 7th Annual Meeting of the Mongolian Association of Orthodontists in Ulaanbaatar, Mongolia. 1st author 2019.8 (Poster)
2. Khurel-Ochir Tsendsuren. P21 deficiency is susceptible to TMJ-Osteoarthritis with mechanical stress. Tokushima Bioscience Retreat. 1st author, 2019.9 (Oral)
3. Khurel-Ochir Tsendsuren. p21 deficiency is suspectible to TMJ-Osteoarthritis with mechanical stress. ASBMR 2019 Annual Meeting in Orlando, Florida. 1st author, 2019.9 (Poster). The ASBMR presentation with this award's support.
4. Khurel-Ochir Tsendsuren. p21 deficiency is suspectible to TMJ-Osteoarthritis with mechanical stress. The 38th Annual Meeting of the Japanese Society for Bone and Mineral Research in Kobe, Japan. 1st author, 2019,10 (Poster)
5. Khurel-Ochir Tsendsuren. The Immunoregulatory role of p21 on the development of osteoarthritis in the temporomandibular joint. 78th Annual Meeting of the Japanese Orthodontic Society in Yokohama, Japan. 1st author 2019.11 (Poster)

4. Journal publication:

* Title, journal, volume, number, paragraph, date, co-author. (Underline the speaker.)