MedicalXpress

MicroRNA-146a is abundant in extracellular vesicles released by osteoclasts

March 19 2016

Today at the 45th Annual Meeting & Exhibition of the American Association for Dental Research, researcher Lexie Holliday, University of Florida, Gainesville, USA, will present a study titled "MicroRNA-146a is Abundant in Extracellular Vesicles Released by Osteoclasts." The AADR Annual Meeting is being held in conjunction with the 40th Annual Meeting of the Canadian Association for Dental Research.

Recent data from Holliday and her team of researchers shows that extracellular vesicles (EVs) released by osteoclasts regulate bone cells in vitro. MicroRNAs are small, non-coding RNAs that silence translation of target mRNAs. EVs can shuttle functional microRNAs from their cell of origin to target cells. MicroRNA (miR)-146a is induced by NF kappa B and represses NF Kappa B signaling by inhibiting translation of TRAF6 and IRAK1. Osteoclasts require constant NF Kappa B signaling to differentiate and resorb bone. In this study, the researchers aimed to identify microRNAs in osteoclast-derived EVs to identify potential regulators of bone remodeling.

In this study, osteoclasts were produced by stimulating RAW 264.7 cells with recombinant Receptor Activator of Nuclear Factor kappa B-Ligand. EVs were isolated using ExoQuickTM, positive/negative-stained and visualized by transmission electron microscopy (TEM) and tested by Western blotting for standard exosomal markers. MicroRNAs from osteoclasts and osteoclast precursors were isolated using the miRVana kit and profiled by microarray. RNA was isolated from EVs using

SeraMiR Exosome RNA Purification kit and quantitative real time PCR was performed.

EVs were predominantly between 30-70 nm in diameter by TEM and contained exosome markers CD63 and CD81. Microarray analysis showed that Let-7b-5p and miR-146a were at 160% and 210% higher levels in osteoclasts than precursors. In contrast MiR-689 and miR-290 were reduced to 15% and 3% of their precursor level in osteoclasts. Very little miR-689 or miR-290 was detected in EVs. Let-7b-5p increased 2-fold in osteoclasts. MiR-146a was very abundant in EVs and was at a 21.1-fold higher level in EVs from osteoclasts compared with precursors. MiR-146a is enriched in EVs from osteoclasts.

The release of miR-146a in EVs may prevent repression of the NF kappa B pathway in osteoclasts. MiR-146a-rich EVs may regulate osteoblasts or other target cells. MiR-146a in EVs is a potential biomarker for the presence of osteoclasts.

More information: This is a summary of oral presentation #1500, "MicroRNA-146a is Abundant in Extracellular Vesicles Released by Osteoclasts," which will be presented on Saturday, March 19, 2016, 8:45 a.m. - 9 a.m. at the Los Angeles Convention Center, room #408B.

Provided by International & American Associations for Dental Research