

## Anthocyanidins and Anti-Obesity Drug Liraglutide Promote Human Adipose Mesenchymal Cell Differentiation into Chondrocyte and Osteocyte Lineages

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Adipose tissue derived mesenchymal stem cells (aMSCs) are an attractive source for regenerative therapy due to their unique ability to form osteocytes, chondrocytes and adipocytes *in vitro* after appropriate stimuli. Therefore, aMSCs may serve as a valuable tool for screening of pharmacologically active compound effect on tissue engineering. Plant pigments anthocyanidins are known for their anti-oxidative, anti-inflammatory and anti-tumor properties as well as for influence on wound healing. Anthocyanidin effect on aMSC differentiation may lead to design of new therapeutic strategies for regenerative medicine.

The objective of the current study was to evaluate the effect of anthocyanidins malvidin, cyanidin, delphinidin on the adipogenic, osteogenic and chondrogenic differentiation of human aMSCs.

aMSCs (ATCC, PCS-500-011) were differentiated into adipocytes, osteocytes and chondrocytes by Gibco® StemPro® differentiation kits according to manufacturer's instructions. 25 μM malvidin, cyanidin and delphinidin (all from Sigma Aldrich) were added to aMSCs during the differentiation. The expression of adipogenesis, osteogenesis and chondrogenesis related markers was analyzed by qPCR and ELISA. 10 and 100 nM liraglutide (TRC Research) was used to compare anthocyanidin effects on aMSCs differentiation.

Delphinidin decreased the expression of *FABP4* and *Adiponectin* similarly to liraglutide in newly formed adipocytes. Malvidin and liraglutide increased the accumulation of calcium deposits and expression of *Runx2* and *BMP-2* in the osteocytes. Delphinidin, cyanidin and liraglutide significantly induced the expression of *Col2a1* and *Aggrecan* in the chondrocytes.

Delphinidin and anti-obesity drug liraglutide inhibit formation of adipocytes from aMSCs. Malvidin and liraglutide induce the osteogenesis, whereas cyanidin, delphinidin and liraglutide promote osteogenic and chondrogenic differentiation.

### Biography:

Liga Saulite is a PhD student at Pharmacy study program of Faculty of Medicine of University of Latvia. She has received BSc and MSc degrees in Biology at University of Latvia. She has studied Biochemistry and Molecular Biology at University of Bremen and Molecular Cancer biology and laboratory animal welfare in University of Oslo. Her main expertise includes mesenchymal stem cells, breast cancer cells, nanoparticles, neurodifferentiation and Schwann cells. She is co-author in four scientific publications.