

manner. Next, to investigate the regulatory mechanism of Npnt expression by Wnt3a in osteoblasts, we analyzed the effects of inhibition of the Wnt/ $\beta$ -catenin signaling pathway using inhibitors and a small interfering RNA targeting  $\beta$ -catenin. In conclusion, we found that Wnt3a promotes Npnt gene expression via the Wnt/ $\beta$ -catenin signaling pathway. Our results suggest that Wnt3a induces various mechanisms that are involved in osteoblast proliferation and cell survival via Npnt gene expression.

#### P1-15.

#### Highly efficient osteogenic differentiation of human dental pulp stem cells by a helioxanthin-derivative (TH)

(大学院博士課程 3 年口腔外科学)

○藤居 泰行

(歯科口腔外科・矯正歯科)

古賀 陽子、近津 大地

Recently, human dental pulp stem cells (hDPSCs) were identified, and could differentiate into multilineage cell types. hDPSCs are now considered a type of mesenchymal stem cells and exhibit higher clonogenic and proliferative potential than bone marrow stem cells. Meanwhile, the treatment of severe bone defects remains a great challenge, and novel bone regenerative medicine has been required. Several studies have shown that a helioxanthin derivative (TH) induces osteogenic differentiation of preosteoblastic and mesenchymal cells. However, the osteogenic differentiation activities of TH were showed only in specific cell lines. Therefore, the effects of TH for human primary cells remain unknown. In this study, we explored to induce osteogenic differentiation of hDPSCs efficiently using TH. Furthermore, we investigated the ability of osteogenesis of TH induced hDPSCs sheets *in vivo*.

hDPSCs were obtained from dental pulp of third molars from 16-22 year old patients and cultured in osteogenic condition with or without TH ( $10^{-5}$  to  $10^{-8}$  M). TH at  $10^{-6}$  M induced matrix mineralization of hDPSCs more intensively than the other concentrations of TH as evidenced by Alizarin red staining. RT-qPCR

showed that osteogenic condition with TH significantly upregulated the gene expression levels of *Alp*, *colla1*, and *osteocalcin*. Furthermore, cell-sheets generated by culturing hDPSCs with TH on temperature-responsive dishes achieved bone healing in mouse calvaria defect models.

We demonstrated that osteogenic condition with TH induces the osteogenic differentiation of hDPSCs more efficiently. Moreover, we succeeded in bone regeneration *in vivo* by hDPSCs-sheets with TH. TH induced hDPSCs may be a useful cell source of bone regenerative medicine.

#### P1-16.

#### 特別養護老人ホーム入所者におけるサルコペニアと認知機能の関連

(高齢総合医学分野)

○都河 明人、清水聡一郎、佐藤 友彦

廣瀬 大輔、渡邊 亮、羽生 春夫

【目的】 要介護状態患者に 12 ヶ月間の運動介入を行い、筋力、筋肉量、認知機能の変化を検討した。

【方法】 要介護状態の特別養護老人ホームに入居中の 37 例（要介護度： $3.3 \pm 1.0$ 、Barthel Index： $44.2 \pm 18.9$ 、サルコペニアの有病率 68%）を対象とした。無作為に運動介入群 19 例、非介入群 18 例に振り分けた。運動介入群には、週 2 回 40 分程度の運動介入を 8 人程度のグループに分け、12 ヶ月施行した。

サルコペニアはアジア基準（一部改編）を用いて評価した。筋力・筋量評価項目として Skeletal Mass Index (SMI)、握力、認知機能評価として MMSE、Trail Making Test Part A、抑うつ気分の評価として GDS-15 を施行し、その変化を検討した。

【結果】 介入前と 12 ヶ月後間では、MMSE、握力で運動介入群が非介入群に対して有意な改善を認めた。

【考察】 要介護状態の特別養護老人ホーム入居者への 12 ヶ月間の運動介入では、運動介入群において認知機能の改善を認めた。要介護状態においても、運動介入の効果があることが示唆された。以上より、今後要介護状態の患者に対して、積極的に運動介入を行う有用性が示唆された。運動介入の方法に関しては、要介護状態の患者に対しては従来の運動介入