changes of valve interstitial cells (VIC). The mechanisms that trigger osteoblastic transformation in the heart valve are not well understood and only avaliable tretment of CAVD is surgery.

Our previous data show higher sensitivity of VICs from the CAVD patients to osteogenic differentiation (OD) compared to healthy VICs. Here we analyzed VICs from healthy and diseased valves for their differences in osteogenic potential at (1) transcriptomics level at the early stages of differentiation (n=12) and (2) proteomics level at later stages (n=15). VICs were isolated from aortic valves of CAVD patients or from healthy hearts at transplantation, OD was induced by osteogenic medium; transcripts were analyzed 48h after the OD induction while proteomes were analyzed at the 10th day. Total RNA and total protein extracts were analyzed using RNA-seq and shotgun proteomics respectively.

All four comparison groups (control and differentiated VICs from healthy or diseased valves) formed distinct clusters in 3D PLS-DA based on both data (38% and 37% of explained variance for transcriptomics and proteomics data respectively). We identified key molecular markers of osteogenic differentiation in both VICs from healthy and diseased valves after the induction of OD ($P < 0.05$, $FC > 2$). Nevertheless, we observed differential patterns of protein and transcript changes during OD of VICs from diseased or healthy donors. The difference included proteins involved in OD: IGFBP-5 and components of HIF-1 signal pathway (HIF1A, VEGFA, EGLN3; $p < 0.05$).

The data suggest intrinsic differences in sensitivity to proosteogenic stimuli in the aortic valve interstitial cells of healthy persons and of the patients with CAVD.

The project was funded by RFBR research grant 19-29-04082.

doi:10.1016/j.bonr.2020.100303

ND-P01

Microstructural effects of collagen membrane from bovine pericardium in bone defects

Jéssica Suzuki Yamanaka[a], Ana Clara Oliveira[a], Bruna Leonel Carlos[a], Ana Paula Macedo[a], Pedro Babo[b], Raphael Canadas[b], Rui Reis[b], Vitor M. Correlo[b], Antonio Carlos Shimano[a]
[a]*University of São Paulo, Ribeirão Preto, Brazil*
[b]*University of Minho, Guimarães, Portugal*

Techgraft® is a membrane of collagen derived from bovine pericardium produced by Baumer® SA and could be a great alternative biomaterial to application in guided bone regeneration. Therefore, the purpose of this study was to evaluate its microstructural effects in regeneration of bone defect in rat tibia.

Methods: It was an experimental in vivo study approved by the Ethics Committee on Animal Experiments of the University of São Paulo (188/2017). Eighty male Sprague Dawley rats were submitted to surgical procedure to create a bone defect on tibia. Thus, animals were assigned into four groups according treatments: without intervention (CONT), autograft (AG), collagen membrane (CM) and collagen membrane and autograft (CM+AG). Groups were subdivided in two subgroups (n=10) according experimental time (21 and 42 days). In sequence, tibiae were collected and micro-ct analysis was carried out. Data were analyzed using ANOVA test, adopting a 5% significance level.

Results: The membrane induced bone formation in proximity of membrane, in top levels, and increased trabecular appearance of newly formed bone, while autograft groups showed more bone in bottom of defect. BV/TV was lower in CM group compared to other treated groups ($p< 0{,}001$), but all treated groups, including CM, had higher BV/TV than control group ($p< 0{,}005$) at 21 days. At 42 days just CM+AG group showed difference of CONT ($p=0{,}021$). At 21 days AG group had increased trabecular thickness compared to other groups ($p< 0{,}05$); trabecular number was higher in CM+AG group than other groups ($p< 0{,}05$) and higher in CM group than CONT ($p< 0{,}001$); trabecular separation was higher in CONT group than treated groups ($p< 0{,}05$). At 42 days only trabecular number showed significance difference between CM+AG and CONT group ($p=0{,}014$).

Conclusion: The treatment of defects with membrane was positive, but more effective when associated to autograft.

doi:10.1016/j.bonr.2020.100304

ND-P02

Coated latex membrane with calcium β-triphosphate in bone healing of tibia of osteopenic rats

Bruna Leonel Carlos[a], Ana Clara Oliveira[a], Ana Paula Macedo[a], Jessica Suzuki Yamanaka[a], Rondinelli Donizetti Herculano[b], Antônio Carlos Shimano[a]
[a]*Universidade de São Paulo, Ribeirão Preto, Brazil*
[b]*Universidade Estadual Paulista, Araraquara, Brazil*

Bone repair in osteoporotic bones is complicated due to the poor bone quality. Therefore, it is essential to investigate strategies to improve this process. The aim of this study was to evaluate the influence of the latex membrane coated with calcium β-triphosphate in the tissue repair of bone defect performed in the tibia of osteopenic rats, using analysis of bone mineral density (BMD) and mechanical tests. This study was approved by the ethics committee on animal testing of the Medical School of Ribeirão Preto under the Protocol 094/2017. In this study, 40 Sprague-Dawley rats were used. Osteopenia was induced in all animals through ovariectomy and a vitamin D-deficient diet, except in animals of the sham surgery group. After 90 days of ovariectomy, a bone defect of 2.5 mm in diameter was made in the distal third of the animals´ left tibia. The defects received the following treatments per group ($n = 8$): C and SHAM: without specific treatment; L: covered with latex membrane; CBT: filled with calcium β-triphosphate; CBTL: covered with latex membrane coated with calcium β-triphosphate. After 14 days, the animals were killed, and the left tibiae were designated for analysis. BMD was evaluated at the defect site, and the mechanical properties of maximum strength and stiffness were obtained through the mechanical shear test. There was a statistically significant difference for BMD with $p = 0.005$. The CBT (0.141 ± 0.027), L ($0.147 \pm 0{,}0306$) and SHAM ($0.178 \pm 0{,}017$) groups, were the same as each other and presented the highest values of BMD, being different from C (0.113 ± 0.030). The CBTL (0.137 ± 0.023) group had intermediate values. For maximum strength and relative stiffness, there were no statistical differences between groups. In conclusion, natural latex and β-TCP improved BMD at the site of the bone defect, but more analysis is needed to obtain conclusive results.

doi:10.1016/j.bonr.2020.100305

ND-P03

Effects of electroacupuncture on bone defect regeneration in tíbias of ovariectomized rats

Ana Clara Oliveira[a], Jéssica Suzuki Yamanaka[a], Ricardo Tadeu Lopes[b], Ana Paula Macedo[a], Bruna Leonel Carlos[a], Antônio Carlos Shimano[a], Aline Azevedo[a]
[a]*Universidade de São Paulo, Ribeirão Preto, Brazil*
[b]*Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil*

Background: Osteoporosis is an osteometabolic disease characterized by low bone mass, deterioration of bone tissue microarchitecture,