Concurrent Free Papers 8: Basic Research

8.1 Regulation of Type I/II Collagen and BMP2 in Low-magnitude High-frequency Vibration Treatment on Fracture Healing — a Rat Study
Shi HE, Cheung WH, Qin L, Lee KM, Chan KW, Leung KS

8.2 Tissue Engineered Composite of Osteo-differentiated Mesenchymal Stem Cell-bioceramics Enhanced Non-decorticated Posterior Spinal Fusion
Chan CW, Lee KM, Qin L, Yip RCL, Hui CFF, Hu YY, Cheng JCY

8.3 Epimedium-derived-flavonoid Reduces Incidence of Steroid-associated Osteonecrosis with Dose-dependent Manner in a Rabbit Model
Zhang G, Sheng H, Wang XL, Qin L, Yao XS

8.4 The Use of Esomeprazole in Controlling Non-steroidal Anti-inflammatory Drug-associated Gastrointestinal Symptoms — a Local Perspective
Ko P, Lam J, Ping C, Yung P, Lo R, Lam B

8.5 Should We Collect Femoral Head for Allogenic Bone Grafting? From a Financial Consideration
Leung HB

8.6 Nitrogen Plasma Modified Nickel Titanium Alloy for Orthopaedic Implantation: Long-term In Vivo Study
Lam KO, Yeung KWK, Chan YL, Wu SL, Liu XM, Chung CY, Chu PK, Chan D, Luk KDK, Cheung KMC

8.7 Biodegradable Metallic Material for Orthopaedics: Preliminary Result of Magnesium Ion Concentration versus Osteoblast Activity
Wong HM, Yeung KWK, Lam KO, Chu PK, Luk KDK, Cheung KMC

8.8 Optimal Dosage of Routine Antibiotics to Inhibit Staphylococcus Aureus without Inducing Osteoblast Necrosis In Vitro
Leung KY, Yeung KWK, Kao RYT, Chu PK, Cheung KMC

8.9 L-Asparagine Functionalised Strontium Phosphate Nanorods
Lam WM, Wong CT, Li ZY, Chan WK, Luk KDK, B Xu, Lu WW

8.10 Bone Composition and Mineral Crystal Structure after Strontium Treatment for Osteoporosis in Goat Model
Lu WW, Li ZY, Chiu PKY, Lam WM, Yang C, Xu B, Wong CT, Fung D, Cheung KMC, Luk KDK

8.11 Micro-architectural and Nano-mechanical Properties of Trabecular Bone with Strontium Treatment in Large Animal Model of Osteoporosis
Li ZY, Lu WW, Chiu PKY, Lam WM, Tang B, Ngan AHW, Wong CT, Fung D, Cheung KMC, Luk KDK

8.12 Audit of a Regional Hospital Bone Bank Service, and the Outcome of a Bone Bank Audit System
Mak NT, Chiu CK, Fok WM, NM Wong, PY Lau

Concurrent Free Papers 9: Trauma 2, Foot and Ankle

9.1 Percutaneous Fixation of Cancancal Fractures — Clinical Results of Seventeen Cases
Yeung YK, Chan SK, Ho YF

9.2 Clinical Outcome of Minimally Invasive Plate Osteosynthesis in the Management of Fracture Distal Tibia
Chan CE, Lau TW, Leung FKL

9.3 Hemiarthroplasty for Fractures of Proximal Humerus — Functional Results and Factors Affecting Outcome
Chow KP, Chan B, Lau YK, Li W

9.4 Double-row Fixation for Comminuted Displaced Greater Tuberosity Fracture of Proximal Humerus
Chow KP, Li W

9.5 A Survey of Patients’ Perception to Eventual Hallux Valgus Surgery in a Public Hospital
Ngai WYH, Lam ECH, Chan SCF

9.6 First Metatarsophalangeal Arthroscopy in Patients with Hallux Valgus
Lui TH

9.7 Arthroscopic Assisted Correction of Hallux Valgus Deformity
Lui TH, Chan KB, Ngai WK
8.7

Biodegradable Metallic Material for Orthopaedics: Preliminary Result of Magnesium Ion Concentration versus Osteoblast Activity

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Introduction: Patients with orthopaedic fracture or deformity are managed by surgically implanting metallic fixation. In many cases, those metallic implants need to be removed after the tissues have healed sufficiently. To avoid repeated surgeries and increase of morbidity, a degradable metallic material such as magnesium alloy is therefore superior to conventional non-degradable metals. However, the major obstacle in clinical use is its rapid degradation after implantation. Upon degradation, large amount of magnesium ions will pour into the human body. It may affect the bone healing if the physiological balance is suddenly altered. Hence, this study aims to investigate the correlation of magnesium ion concentration and the osteoblast activity in vitro.

Methods: Various concentrations of magnesium ions ranging from 100 to 30,000 ppm were tested against to the osteoblast activity using SaOs-2 human osteoblast culture. MTT assay (3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide) was used to determine the cell viability and the cell enzymatic activity.

Results: The results suggest that higher magnesium ions concentration (>10,000 ppm) decreases the osteoblast activity. The osteoblasts cannot survive when the concentration reaches to 30,000 ppm or above. However, it is found that small amounts of magnesium ions (<600 ppm) can promote the osteoblast activity.

Discussion and Conclusion: This study demonstrates that the magnesium ions do not induce toxic effect to human osteoblasts if the concentration is below 10,000 ppm. The degradable orthopaedic implants made of magnesium alloy are feasible for clinical use if the degradation rate can be controlled carefully.

8.8

Optimal Dosage of Routine Antibiotics to Inhibit Staphylococcus Aureus without Inducing Osteoblast Necrosis In Vitro

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Introduction: Staphylococcus aureus is highly virulent and sometime observed in orthopaedic implant related infections. The antibiotics including cefazolin, vancomycin and gentamicin are commonly administrated clinically. However, the correlations between such antibiotics and osteoblast activity have not been well studied, especially the optimal dosage to inhibit that bacterium without inducing cytotoxic effect to osteoblasts. Therefore, we aim to investigate the tolerance of osteoblasts against to such antibiotics in-vitro.

Methods: Osteoblasts (SaOs2) were cultured in antibiotic free medium and exposed to concentrations of cefazolin, vancomycin and gentamicin at order of magnitude intervals between 10,000 μg/mL and 0.001 μg/mL. Cell number at 24 hours was determined using thiazolyl blue tetrazolium bromide (MTT) assay. With the use of the same concentration gradient, minimal inhibition concentration of such antibiotics to S. aureus was also measured.

Results: In cytotoxicity testing, osteoblasts do not survive when the concentration of antibiotics reaches 10,000 μg/mL. However, the cells can survive if the concentration is lower than 1000 μg/mL. In minimal inhibition concentration test, it suggests that 0.625 μg/mL of gentamicin and vancomycin is able to inhibit S. aureus activity. For cefazolin, the concentration is even lower (0.15,625 μg/mL).

Discussion and Conclusion: The recommended daily dosage of cefazolin is 35.7 μg/mL, 3.75 μg/mL for gentamicin, and 17.86 μg/mL for vancomycin. As compared with the in vitro results, these clinical dosages do not induce any toxic effect to the osteoblasts and are able to inhibit S. aureus activity. Cefazolin at lower concentration can also kill that bacterium.