

# Selected Meeting Abstracts from 2016 4th International Conference on Biomedicine and Pharmaceutics

## Oral Session

## Pharmaceutics and Drug Delivery Research

### 1 AN INVESTIGATION OF MICRO-HYDROXYAPATITE SPHERES LOADED WITH INDOMETHACIN FOR TARGETED DRUG DELIVERY

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**Objectives** A major obstacle to be overcome for oral drug delivery is that drug absorption/release must be avoided before the drug reaches the target site. In an attempt to overcome this challenge, we selected synthetic hydroxyapatite (HA) as a drug carrier for the hydrophobic drug indomethacin (IDM) used in local treatment of the colon, exploring the loaded drug and in vitro release characteristics of IDM/HA.

**Methods** An easy one-step hydrothermal method was employed to prepare micro-hydroxyapatite (HA) spheres. Infrared spectroscopy, X-ray diffraction and scanning electron microscopy further confirmed the composition, structure and morphology of the obtained sample. In vitro release of the anti-inflammatory drug (IDM) was performed successively under simulated conditions. The loading and release profiles of the drug were analysed by UV-spectrophotometry.

**Results** The use of ethanol enhances solubilization, and the drug loading rate is about 62.21% at 37° C for 12 hours when the mass ratio of IDM/HA is 2:1. The in vitro release of IDM/HA is dependent on solution pH. There is almost no release of IDM (only 0.159%) at pH 1.0, poor release (about 10.55%) at pH 6.8, and a cumulative release rate of up to 84.95% at pH 7.8. These results suggest that HA particles can be used as a pH responsive vehicle for delivering drugs.

**Conclusions** The as-synthesized micro-hydroxyapatite spheres may act as a promising drug delivery system due to their good biocompatibility, pH sensitivity and high drug loading/release efficiency. The IDM/HA drug delivery system satisfies the basic demand of oral site-specific delivery.

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### 2 OPPOSITE EFFECTS OF *ABCG4* KNOCKOUT ON GONADAL FAT/BODY WEIGHT RATIO CHANGES BETWEEN MALE AND FEMALE MOUSE LITTERMATES

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**Objectives** To explore the effect of ATP-binding cassette subfamily G member 4 (*Abcg4*) gene knockout on gonadal white adipose tissue (GWAT) production in the mouse.

**Methods** *Abcg4* knock-out/GFP knock-in mice were bred and verified by genotyping. Sex-matched littermates 1–2 months old were chosen for the study. The mice were anaesthetized and weighed. Epididymal white adipose tissue (EWAT) from male mice and peri-uterine adipose tissue from female mice was removed and weighed and the gonadal fat/body weight ratio was calculated.

**Results** The GWAT/body weight ratio of the *Abcg4*<sup>−/−</sup> female mouse was 20% higher than that of its wild-type female littermate, but for the male mouse, the ratio was much lower in the knockout mouse than in its wild-type littermate (the ratio for the knockout mouse was only 66% of that of the wild-type littermate). *Abcg4* knockout results in an obese female mouse and a lean male mouse, compared to their normal sex-matched littermates.

**Conclusions** *Abcg4* knockout has a remarkable effect on gonadal fat/body weight ratio, with opposite effects in male and female mice.

### 3 PRELIMINARY INVESTIGATION ON THE HIGH-PRESSURE GAS FOAMING POLY-(LA-SERINE)-ESTER AS A NITRIC OXIDE DONOR

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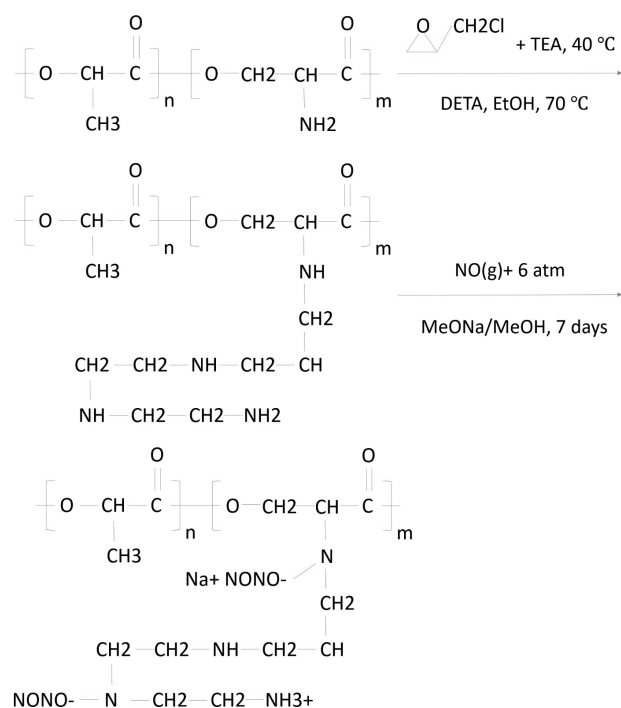
**Objectives** Because of its excellent biocompatibility, non-toxicity and biodegradability, polylactide (PLA) is a natural choice for various types of biomaterials, for example as a drug carrier. However, the use of PLA as a base substance for nitric oxide (NO) used as the donor has not been previously reported. On the other hand, high pressure gas foaming preparation of porous polylactide for tissue engineering or other biomedical applications has been developed for decades and proven to be a successful method to manipulate PLA. We employed nitric oxide as the pressure gas injected into amorphous amino acid modified-PLA solid to obtain a gas-solid solution, while the amino acids provided the amino group for EDTA modification, which may serve as a candidate for donating NO.

**Methods** We synthesized poly-(la-serine)-esters to introduce the diazo-group on the side chain, which can be loaded with NO and acts as a NO donor (diazoniumdiolate). The bulk poly-(la-serine)-ester was formed by high pressure NO and CO<sub>2</sub> gas to obtain a NO-loaded porous scaffold (Figure 1).

**Results** The block ratio of LA:serine 50:50 is feasible for fine products with both good properties and NO capacity. Thermal and mechanical characterization shows good thermal, tensile and processing properties. SEM observation confirms the porous structure induced by gas foaming. The Griess method applied to measure NO release in PBS (pH 7.4) showed 1082 mol/mg release in 7 hours.

**Conclusions** The results indicate this methodology is feasible. The block-polyester we synthesized shows a practical NO capacity with a convenient loading process, while good thermal and mechanical properties are maintained, and therefore may serve as a candidate for donating NO.

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**Abstract 3 Figure 1** The NO carrying process of Poly-(LA-Serine)-esters.

#### 4 STUDY ON THE ANTIDEPRESSANT-LIKE EFFECTS OF YUZHJIEYU TEA AND ITS COMPOSITION RATIO IN VIVO

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**Objectives** *Cornus officinalis* Sieb. et Zucc. pulp (COP) and *Gardenia jasminoides* Ellis fruit (GJF) are both medicinal and edible herbs with a good taste. Yuzhi Jieyu tea (YZJYT) is mainly prepared using COP and GJF teabags and boiling water. The present study aimed to investigate the antidepressant-like effects of YZJYT and its composition ratio *in vivo* for the first time.

**Methods** Male mice were treated with YZJYT (4 g/kg) at different ratios and fluoxetine hydrochloride (10 mg/kg) once a day for 7 consecutive days by intragastric administration. The forced swim test (FST), tail suspension test (TST), open field test (OFT) and reserpine reversal test 1 hour after the last administration were used to evaluate the antidepressant-like effects and the composition ratio of YZJYT, and brain tissues were used for serotonin determination through enzyme-linked immunoassay.

**Results** YZJYT (COP:GJF ratio ranging from 1:2 to 4:1) administration exerted antidepressant-like effects in mice, as indicated by the reduced duration of immobility in the FST and TST, but it

had no effect on locomotor activity in the OFT. YZJYT treatment significantly counteracted the decrease in rectal temperature induced by reserpine. Furthermore, YZJYT increased levels of serotonin (5-HT) in the brains of mice. These antidepressant-like effects of YZJYT are essentially similar to the effects of the clinical antidepressant fluoxetine hydrochloride.

**Conclusions** These findings indicate that YZJYT exerts an antidepressant-like effect when the composition ratio of COP:GJF ranges from 1:2 to 4:1, and suggest its mechanisms may be partially involved in the central serotonergic system.

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## Natural Medicines

### 5 FERMENTATION AND EXTRACTION CONDITIONS OPTIMIZATION FOR THE PRODUCTION OF POLYSACCHARIDES OF *LEPISTA SORDIDA*

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**Objectives** *Lepista sordida* (Schum.: Fr.) Sing. is a type of edible *Agaricus* mushroom. It exhibits several activities including immunomodulation, and antioxidant and anti-fungal properties. The objective of this investigation was to investigate the fermentation and extraction conditions of polysaccharides from the mycelium of *L. sordida*.

**Methods** This single parameter experiment was performed to identify the optimal culture conditions including culture temperature, culture cycle and initial pH. Furthermore, an orthogonal experimental design L<sub>9</sub> (3<sup>4</sup>) was used to evaluate the combination effects of carbon sources, nitrogen and minerals on the extracts from mycelia. Extraction conditions optimization including the ratio of water to material (v/w), temperature and extraction time based on response surface methodology was employed to identify the optimum conditions.

**Results** The maximum mycelium dry weight was obtained when cultured in an optimal composition of sucrose 30 g/L, yeast extract 6 g/L, KH<sub>2</sub>PO<sub>4</sub> 0.1 g/L and MgSO<sub>4</sub> 1 g/L at temperature 28° C, culture cycles of 7 days and initial pH 7.0. The optimum conditions for polysaccharide extraction from *L. sordida* mycelia were a ratio of water to material of 72.1:1, temperature 92.6° C and time 2.9 hours. Under these conditions, the predictive and practical extraction efficiency was 16.5% and 16.5±0.1%, respectively.

**Conclusions** The results are helpful for building an efficient and controllable model to improve the extraction efficiency for industrial production of bioactive polysaccharides from *L. sordida*.

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