

Article

## Hypolipidemic Effects and Safety of *Lactobacillus Reuteri* 263 in a Hamster Model of Hyperlipidemia

Wen-Ching Huang <sup>1,†</sup>, Yi-Ming Chen <sup>2,†</sup>, Nai-Wen Kan <sup>1,3</sup>, Chun-Sheng Ho <sup>4,5</sup>, Li Wei <sup>6</sup>, Ching-Hung Chan <sup>7</sup>, Hui-Yu Huang <sup>7,\*</sup> and Chi-Chang Huang <sup>2,4,\*</sup>

- Graduate Institute of Athletics and Coaching Science, National Taiwan Sport University, Taoyuan 33301, Taiwan; E-Mails: 1010503@ntsu.edu.tw (W.-C.H.); kevinkan@tmu.edu.tw (N.-W.K.)
- <sup>2</sup> Graduate Institute of Sports Science, National Taiwan Sport University, Taoyuan 33301, Taiwan; E-Mail: 1021302@ntsu.edu.tw
- <sup>3</sup> Center for Liberal Arts, Taipei Medical University, Taipei 11031, Taiwan
- College of Exercise and Health Sciences, National Taiwan Sport University, Taoyuan 33301, Taiwan; E-Mail: 1031213@ntsu.edu.tw
- <sup>5</sup> Division of Physical Medicine and Rehabilitation, Lo-Hsu foundation, Inc., Lotung Poh-Ai Hospital, Yilan 26546, Taiwan
- <sup>6</sup> Department of Neurosurgery, Taipei Medical University-WanFang Hospital, Taipei 11696, Taiwan; E-Mail: nsweili@gmail.com
- Department of Food Science, Nutrition, and Nutraceutical Biotechnology, Shih Chien University, Taipei 10462, Taiwan; E-Mail: llfonly\_520@hotmail.com
- † These authors contributed equally to this work.
- \* Authors to whom correspondence should be addressed; E-Mails: maggieh@g2.usc.edu.tw (H.-Y.H.); john5523@ntsu.edu.tw (C.-C.H.); Tel.: +886-2-2538-1111 (ext. 6223) (H.-Y.H.); +886-3-328-3201 (ext. 2409) (C.-C.H.).

Received: 11 March 2015 / Accepted: 12 May 2015 / Published: 15 May 2015

**Abstract:** We aimed to verify the beneficial effects of probiotic strain *Lactobacillus reuteri* 263 (Lr263) on hypolipidemic action in hamsters with hyperlipidemia induced by a 0.2% cholesterol and 10% lard diet (*i.e.*, high-cholesterol diet (HCD)). Male Golden Syrian hamsters were randomly divided into two groups: normal (n = 8), standard diet (control), and experimental (n = 32), a HCD. After a two-week induction followed by a six-week supplementation with Lr263, the 32 hyperlipidemic hamsters were divided into four groups (n = 8 per group) to receive vehicle or Lr263 by oral gavage at 2.1, 4.2, or  $10.5 \times 10^9$  cells/kg/day