

MiR-29b negatively regulates cell cycle activity of human embryonic stem cell-derived cardiomyocytes

E Poon¹, CW Kong², HM Yeung³, SN Rushing⁴, YS Li³, RA Li³

¹LKS Faculty of Medicine, The University of Hong Kong, Hong Kong

²HBHA and Medicine, The University of Hong Kong, Hong Kong

³Department of Medicine, The University of Hong Kong, Hong Kong

⁴Center of Cardiovascular Research, Mount Sinai School of Medicine, New York, NY, United States

Introduction: Cardiomyocytes (CM) withdraw from the cell cycle when they enter adulthood and mature in terms of their electrophysiological and Ca²⁺ handling properties. However, the mechanisms underlying human CM cell cycle exit and maturation are poorly understood. We previously demonstrated that miR-29b is upregulated in human adult CM relative to fetal CM and human embryonic stem cells (hESC)-derived CM. Here, we aimed to test our hypothesis that miR-29b is important for hESC-CM cell cycle exit and maturation.

Methods: We overexpressed miR-29b in hESC-CM by lentiviral transduction. We then compared the proliferation potential of control and miR-29 overexpressing hESC-CM by immunostaining for the presence of Ki67, a proliferation marker. The mRNA expression of cyclins and cyclin-dependent kinases were examined by quantitative real-time PCR. We also performed functional assays including patch-clamp and Ca²⁺-imaging to assess the maturation of control and miR-29 overexpressing hESC-CM.

Results: MiR-29b overexpression inhibited hESC-CM proliferation by decreasing the mRNA expression of multiple cyclins and cyclin-dependent kinases. However, electrophysiological and Ca²⁺ handling properties were unchanged, indicating that hESC-CM maturation was not affected by miR-29b overexpression.

Conclusion: We conclude that miR-29b is a negative regulator of hESC-CM cell cycle, but miR-29b induced cell cycle exit does not promote hESC-CM maturation.

Pharmacological management of obesity in the National Health and Nutrition Examination Survey (NHANES) 2007-8

N Samaranayake, KL Ong, RYH Leung, BMY Cheung

Department of Medicine, The University of Hong Kong, Hong Kong

Introduction: Obesity is a growing problem worldwide. We set out to investigate the use of anti-obesity drugs in the United States in recent years.

Methods: We included 2630 men and 2702 women who took part in the National Health and Nutrition Examination Survey (NHANES) in 2007-8. We analysed their demographic and anthropometric data, and their weight and drug history. Sampling weights were used to adjust for non-response bias and the oversampling of blacks, Mexican Americans, and the elderly.

Results: 46.0% of men and 44.9% of women were candidates for anti-obesity medication (initial body mass index ≥ 30 kg/m², or ≥ 27 kg/m² in the presence of other risk factors [eg hypertension, diabetes or dyslipidemia]). Among these participants, 85.1% considered themselves overweight and 90.1% would like to lose weight. However, only 61.9% had dietary changes, 36.5% exercised, 3.7% took non-prescription diet pills and 2.2% took prescription diet pills to control weight during the preceding year. During the preceding month, 0.4% and 0.1% of participants were taking phentermine and orlistat, respectively. There were no participants on sibutramine.

Conclusions: Obesity is highly prevalent in the United States, but only a very small percentage is on anti-obesity medication. The withdrawal of sibutramine in October 2010 would have minimal impact on the general population. While improvements in pharmacological treatment of obesity are needed, our study revealed that there is also a need for more lifestyle changes in the majority of obese individuals.