Role of MicroRNA Polymorphism in Myocardial Infarction Risk

A Pre-microRNA-149 (miR-149) Genetic Variation Affects miR-149 Maturation and Its Ability to Regulate the Puma Protein in Apoptosis

MicroRNAs (miRNAs) are noncoding RNAs that negatively regulate gene expression. The role of genetic variation in the precursors to these miRNAs has not been explored in depth. In this Paper of the Week, a team led by Dong-Feng Gu at the Chinese Academy of Medical Sciences and Peking Union Medical College and Pei-Feng Li at the Chinese Academy of Sciences in Beijing showed that a single-base polymorphism in a human miRNA called miR-149 could change the structure of the stem-loop region in the precursor molecule and influence its processing into the final product. When the polymorphism consisted of an adenine instead of a guanine, more miR-149 was generated. The investigators found that the higher expression of miR-149 promoted cell survival by targeting a pro-apoptotic factor called Puma. In mice, the targeting of Puma translated into a lower risk of myocardial infarction. “These data suggest that this polymorphism in the miR-149 precursor may result in important phenotypic traits of myocardial infarction,” concluded the authors. “Our findings warrant further investigations on the relationship between miR-149 polymorphism and myocardial infarction.”

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The rs71428439 polymorphism affects the maturation of miR-149. The hairpin loop structures of the A- and G-allelic miR-149 precursors are different.

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