

The Transgenerational Inheritance of RNAi in *C. elegans*

Professor Shouhong Guang

School of Life Sciences, University of Science & Technology of China, P.R. China

RNAi-elicited gene silencing is heritable and can persist for multiple generations after its initial induction *in C. elegans*. However, it remains mysterious how parental acquired trait-specific information of RNAi are transmitted into the progenies. Here, we identified a cytoplasmic Argonaute protein WAGO-4 necessary for the inheritance of RNAi. WAGO-4 accumulates at the perinuclear P-granule foci in the germline and is required for exogenous RNAi targeting germline expressed genes. WAGO-4 binds to 22G-RNA and the mRNA targets. Interestingly, WAGO-4-associated endogenous 22G-RNA target the same cohort of germline genes as CSR-1 and similarly contains untemplated addition of uracil at 3' ends. The poly(U) polymerase CDE-1 is required for the untemplated polyuridylation and transgenerational inheritance of RNAi as well. WAGO-4 exhibits an asymmetrical translocation to the germline along generations and deposits siRNA to the zygotes. Therefore, we identified a new mechanism that cytoplasmic Argonaute protein can transport siRNAs to the progeny to promote the inheritance of RNAi.