

piRNAs and Their Functions in the Brain

Lingjun Zuo ^{1*}, Zhiren Wang ², Yunlong Tan ², Xiangning Chen ³ and Xingguang Luo ^{1,2*}

*¹Division of Human Genetics, Department of Psychiatry, Yale University School of Medicine,
New Haven, CT, USA*

²Biological Psychiatry Research Center, Beijing Huilongguan Hospital, Beijing, China

*³Nevada Institute of Personalized Medicine and Department of Psychology,
University of Nevada, Las Vegas, NV, USA*

KEYWORDS Biogenesis. Brain. Distribution. Function. piRNA

ABSTRACT Piwi-interacting RNAs (piRNAs) are the non-coding RNAs with 24-32 nucleotides (nt). They exhibit stark differences in length, expression pattern, abundance, and genomic organization when compared to micro-RNAs (miRNAs). There are hundreds of thousands unique piRNA sequences in each species. Numerous piRNAs have been identified and deposited in public databases. Since the piRNAs were originally discovered and well-studied in the germline, a few other studies have reported the presence of piRNAs in somatic cells including neurons. This paper reviewed the common features, biogenesis, functions, and distributions of piRNAs and summarized their specific functions in the brain. This review may provide new insights and research direction for brain disorders.