Lay Summary

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Mechanistic insight into the regulation of mRNA decay and translational repression by microRNAs and their implication in glioblastoma tumourigenesis

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MicroRNAs, are an important family of regulatory molecules that control gene expression in our body. Therefore, the proper function of microRNAs is very important for maintenance of our health. Conversely, dysregulated function of microRNAs could lead to diseases such as cancer. Therefore, the proper function of the mechanism by which microRNAs control gene expression is crucial for maintenance of our health and prevention of diseases including cancer. Our current information shows that while this mechanism is tightly regulated in normal cells, cancer cells hijack it to promote expression of genes that are required for growth and metastasis of cancer cells to other tissues. Therefore, understanding this machinery and its critical linchpins that could be targeted in cancer cells would be invaluable for development of innovative and more effective anti- treatments. Glioblastoma is the most aggressive and lethal form of brain cancers. Currently, there are few options available for treatment of glioblastoma, mainly due to frequent resistance of glioblastoma cancer cells to the anti-cancer treatments. We have discovered two closely related proteins that coordinate the mechanism of microRNA-mediated regulation of gene expression. Importantly, we also found evidence that these two proteins may play key roles in formation and chemotherapy resistance of glioblastoma. This project aims to reveal the molecular function of these proteins and their role in glioblastoma cancer formation and chemotherapy resistance. Thus, the outcome of this project will likely have very positive impacts on our understanding of the glioblastoma cancer and provide new opportunities for development of more effective anti-cancer treatment. Therefore, this project has great potential to impact multiple beneficiaries such as clinicians and healthcare professionals, patients, and the general public.