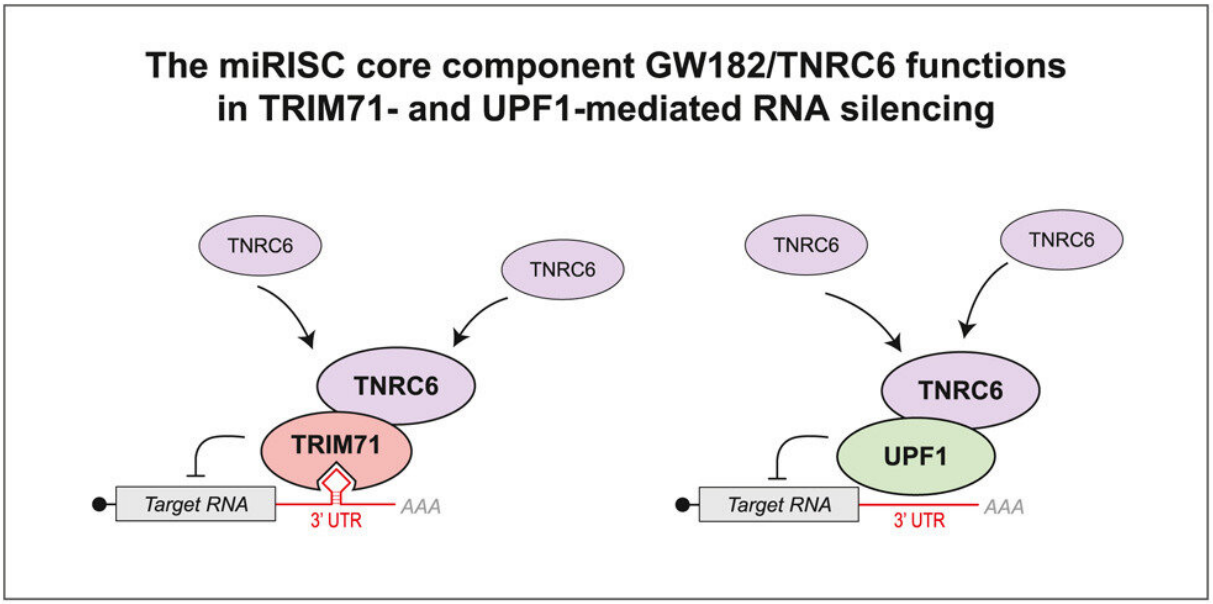
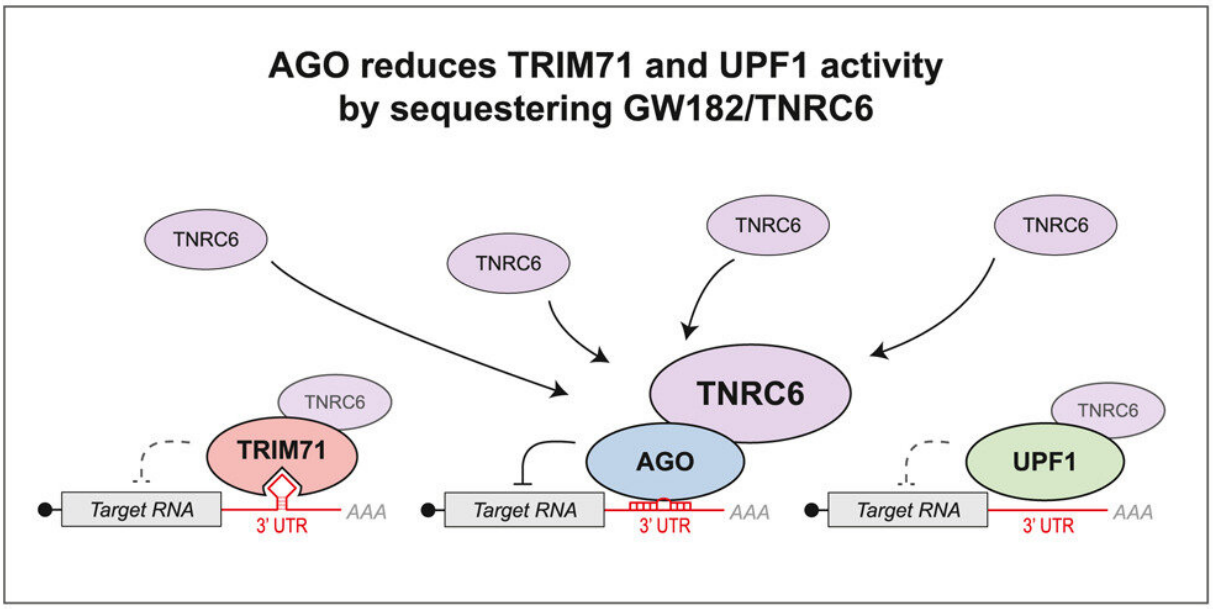
Molecular 'hub' regulates gene-silencing proteins

June 27 2023





Credit: *Molecular Cell* (2023). DOI: 10.1016/j.molcel.2023.06.001

To keep their vital functions in balance, many organisms use small snippets of RNA to "silence" messenger RNAs that code for certain proteins. New research from FMI scientists has revealed a molecular hub that integrates the activities of different protein complexes involved in such RNA silencing. The findings provide insights into a key mechanism that helps to coordinate cellular functions.

In many plants and animals, small RNAs called miRNAs identify messenger RNAs that must be silenced by two proteins called Argonaute and GW182/TNRC6. Together, the two proteins and the miRNA form something called an RNA-induced silencing complex.

Researchers in the Grosshans lab and their collaborators at the University of Freiburg's Medical Center and the Novartis Institutes for BioMedical Research found that when GW182/TNRC6 doesn't latch onto Argonaute proteins, it hobnobs with other RNA-binding proteins. All these different proteins appear to compete to bind with GW182/TNRC6: reducing Argonaute levels boosts the activity of the other proteins, which instead are inhibited when Argonaute is around, the researchers found.

The results suggest that GW182/TNRC6 acts as a hub to integrate the activities of different RNA-binding proteins. The findings also indicate that treatments that inhibit the miRNA pathway may boost the activity of other gene-silencing proteins, the authors say.

The research is published in the journal *Molecular Cell*.

More information: Thomas Welte et al, Convergence of multiple

RNA-silencing pathways on GW182/TNRC6, *Molecular Cell* (2023).
DOI: 10.1016/j.molcel.2023.06.001