The protein Gurken (grk) is a developmentally important morphogen that helps to determine dorsal/ventral polarity in the developing oocyte of Drosophila melanogaster. Like many mRNAs, grk is translated by the canonical binding of the pre-initiation complex to the 5′ 7-methyl-guanasine cap. We hypothesize that grk mRNA also has structural features in the 5′ UTR that facilitate internal ribosomal entry site (IRES) activity. This hypothesis was made based on the observation that grk translation persists when cap dependent translation is repressed, via nutrient deprivation or ingestion of rapamycin. SHAPE RNA structural analysis suggests that there are two hairpin stem loops in the 5′ UTR that coincide with the general characteristics of known IRES structures. In vivo reporter constructs with mutations in the stem loops have been generated and transgenically inserted in Drosophila. Luciferase assays were performed, concluding a possible negative regulatory function of these stem loops. Further mutations were made in the 5′ UTR to investigate the role of a downstream sequence, complementary to the essential AUG start codon, providing possible secondary structure that may contribute to IRES translation. These mutations will be cloned into reporter constructs and transgenically inserted in Drosophila. The resulting data will provide insights into the function of these structures in grk translation during Drosophila development.

*Keywords: Gurken, Internal Ribosomal Entry Site (IRES), RNA structure/function, Regulation of Gene Expression, RNA Biology*