



# Double-Stranded Ribonucleic Acid as Control Against Insects

**Unmet Need:** RNA interference (RNAi) is a standard technique for the knockdown, or silencing, of an individual gene within an organism. However, using RNAi to develop more effective pest control options has been slow. During the larval stage of life, insects appear to be more susceptible to RNAi, while in the adult stage, RNAi-induced mortality is difficult to replicate. One strategy suggested for using RNAi as a pest control involve targeting genes to produce short-term ovarian provisioning defects. As ribosomes are essential to protein synthesis and targeting of larval stage is most effective, using RNAi to knockdown ribosomal proteins for ovulation and egg maturation poses as a promising target for pest control methods.

**Solution:** Navy researchers, through the Naval Medical Research Unit, San Antonio (NAMRU-San Antonio), have developed a composition comprising double stranded RNA (dsRNA) constructs from ribosomal transcripts that are to be included into formulations for insect population control. The dsRNA used in this invention target transcripts of ribosomal protein S6 (RPS6) and ribosomal proteins L26 (RPL26), which are small and large ribosomal subunits, respectively. The dsRNA constructs can be delivered to the insects by application through spray equipment directly onto the insects or incorporation into a natural or artificial carbohydrate containing bait or bloodmeal. These methods overcome the difficulties of current pest control methods as they allow for effective delivery of constructs to natural environments and result in major alterations to the life trajectory of the species that can help reduce disease spread. In testing of RPS6 and RPL26 constructs, compared to controls, both result in significantly lower clutch sizes, with RPS6 displaying greater inhibition of egg maturation, thereby reducing mosquito and fly populations.

**Stage of Development:** The technology is in the prototype stage.

**IP or IP status:** This technology is embodied in US Patent App. No. 10,351,850 ([US 10,351,850](#))

- **Command:** NAMRU – San Antonio
- **Category:** Public Health, Pest Control and Disease Vector Control
- **License Status:** Available for exclusive or non-exclusive licensing and collaborations
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- **Invention No.:** 103235US03
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## Branding colors

The following colors are approved for additional use for charts, shapes, standout text etc.

- Red - 196/18/48
- Yellow - 232/176/16
- Blue - 2/42/58
- Turquoise - 0/118/169
- Gold - 140/123/33
- Moss - 68/82/35
- Peat - 0/40/30



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These colors are in RGB mode, which is PowerPoint's color model.

When creating shapes, flowcharts, and colored text, prioritize the blue red, and yellow above, as these are NMRC's primary colors. Avoid using yellow for text on white backgrounds.