Researcher identifies genetic patterning in fruit fly development

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No matter the species, from flies to humans, we all start the same: a single-cell fertilized egg that embarks on an incredible journey. The specifics of this journey are being uncovered at Rutgers University–Camden, where a biologist is researching how from one cell a jumble of many are able to organize and communicate, allowing life to spring forth.

According to Nir Yakoby, a recently appointed assistant professor of biology at Rutgers–Camden, his work on cell communication is a lot like genetic play dough. His medium however is fruit flies, thousands and thousands of them from various genetic backgrounds.

Yakoby knows that manipulating certain genes in the fruit fly egg will result in very specific consequences in the development of its shell. He and his colleagues' research has been published this month in the prestigious journal *Developmental Cell* (http://www.cell.com/developmental-cell/abstract/S1534-5807(08)00390-0).

"Most people work on one gene at a time, but we're interested in gene networks," explains Yakoby, who earned his undergraduate and doctoral degrees from Hebrew University in Israel. "While riding on the new wave of biology, systems biology, we are still keeping the fundamentals of developmental biology by asking how many genes are expressed over time and space."

After four years of post-doctoral research at the Lewis-Sigler Institute for Integrative Genomics at Princeton University, the Rutgers—Camden scholar is interested in how *Drosophila* cells communicate and create genetic patterning during its eggshell formation. To gain this knowledge, Yakoby has studied eggshells from a range of Drosophila species for insight on how variations of patterns could reflect how actual structures have evolved.

Titled "A combinatorial code for pattern formation in *Drosophila oogenesis*," the *Developmental Cell* article offers precise outcomes for the tens of genes and hundreds of patterns involved in four developmental stages of the fruit fly's eggs. As part of a research team, Yakoby developed an innovative new coding language that allows them to formally follow and manage the dynamics of hundreds of genetic patterns. The team concentrated on the two main patterning pathways of the *Drosophila* egg development: bone morphogenetic protein and epidermal growth factor receptor. Most developmental and other diseases, such as cancer, are associated with these universal pathways.

Source: Rutgers University