

**FROM IN-SILICO PREDICTION TO IN-VIVO VALIDATION: EVO101 – A
NEW GENE CANDIDATE WITH KEY ROLE TO MODULATE COTTON FIBER**
Sharon Ayal, Rodrigo Yelin, Dotan Dimet, Evgenia Gold, Gil Ronen and Hagai Karchi
Evogene
Rehovot, Israel

Evogene identified a novel set of candidate genes for cotton fiber improvement using a unique comparative genomics-based bioinformatic approach. Cotton fibers and other trichome cells share many developmental processes. We designed a comparative genomics approach that utilizes data from trichome databases of cotton, Arabidopsis and tomato. The candidate genes were studied for their expression pattern during fiber development and in other plant tissues. This analysis allowed the isolation of 20 previously unknown genes and their association to one of the four major stages of cotton fiber development (i.e.: initiation, elongation, cell wall thickening and maturation). We present here the results obtained for one of the genes, Evo101, which encodes for a novel unknown protein. Evo101 expression was specific to cotton fiber. The expression pattern associates Evo101 to the elongation stage of fiber development. In order to correlate between the expression level of Evo101 and phenotypic differences in fiber features, we measured its expression level in different commercial cotton lines representing a wide variation of fiber characteristics. The ecotypes used in this study included the very good quality and high lint index of Pima types and different Hirsutum types representing poor, medium and good quality and high and short lint index. We found a clear positive correlation between Evo101 expression levels and fiber length. In addition, in order to evaluate the role of the novel genes in fiber development, we overexpressed those genes in Arabidopsis and assessed the consequent changes in growth and cell wall properties. Evo101 plants had slightly longer petioles and larger leaf blades than controls. Although Evo101 gene is not an expansin like protein, its phenotype closely resembles the phenotype of Arabidopsis plants overexpressing expansin as was characterized by Cho and Cosgrove et al. (PNAS, 2000 97:9783-8). A further study on the molecular mechanism of the gene is still carried out. The overall results suggest a central role for Evo101 in fiber length. Based on those results Evo101 is currently being transformed into cotton.