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Title: Natural variability in jasmonate expression among parental recombinant inbred lines in maize

Abstract

On a day-to-day basis, plants are exposed to a vast range of environmental stresses. Despite unfavorable conditions, they must maintain Darwinian fitness, setting up defense systems that do not compromise their growth and development. The phytohormone jasmonic acid (JA) and its receptor-active derivative, jasmonic acid isoleucine (JA-Ile), are key components in induced immunity against a variety of stresses such as attacks by herbivores and pathogens as well as other forms of tissue damage. Our research had two parts: firstly, we used mass spectrometry to profile the parental recombinant inbred lines of maize for variation in levels of JA and its conjugates, collectively known as jasmonates. We also used genotyping techniques with the intention of elucidating the functions of specific genes in the JA biosynthesis and response pathways, and comparing their roles in maize to those previously discovered in model plants, such as *Arabidopsis*. We hypothesized that there is significant natural variation in jasmonate levels among maize lines, and while the functions of jasmonate signaling genes will be largely conserved in maize, there will be divergence specific to the defensive and developmental needs of the maize plant. The study of jasmonic acid and other forms of maize defense is vital in its potential to increase crop yield while decreasing use of chemicals such as pesticides and insecticides, positively contributing to both the world economy and the environment.

My Experience

Although my weeks at BTI included several exciting successes, a large portion of my time was spent troubleshooting, frequently backtracking to pinpoint the cause of my disappointing results. Not only was this valuable to my understanding of the experimental process, my frustration gave me a new appreciation for the timeframe of research; each discovery summarized in a paper or magazine article represents months, if not years, of the concerted effort of many scientists. Working closely with a mentor showed me the value of collaboration and especially mentorship in the laboratory environment. Coming in with little to no prior experience in plant science, my mentor was invaluable in getting me up to speed in no time. The positive experience I've had in my brief time at BTI has shown me the potential for research, regardless of field, to be both fulfilling and inspiring.