COMMENTARY

Biochemical engineering and its tool

Tom David

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ABSTRACT

Cells convey and process information through intricate networks of interacting molecules. These "computational devices of live cells" control a variety of crucial cellular functions, such as signal transduction and cell-cycle regulation. Here, we talk about how sensitive the networks are to changes in their biological characteristics. We suggest a method for basic signal transduction networks to adapt robustly. We demonstrate how this mechanism specifically pertains to bacterial chemotaxis. This is shown in a mathematical model that unifies the explanation of several facets of chemotaxis, including appropriate reactions to chemical gradients. Changes in serotonin turnover have received attention as one of the biological co-morbidities of depression for a number of years. Low serotonin levels in the brains of suicide victims are one source of evidence supporting the neurotransmitter's involvement in depressive illness. Low concentrations of its metabolite, 5-hydroxyindoleacetic acid (5-HIAA), were found in the Cerebral Fluid (CSF) of patients with depression.

Key Words: *Biochemical; Serotonin; Engineering*

INTRODUCTION

A change in reaction rates or molecule concentrations can have an impact on a variety of cellular functions because cellular biochemical networks are extensively linked. The stability of biochemical networks' operation is a concern given their complexity. According to one theory, in order to achieve the desired function, a network's reaction rate constants and enzyme concentrations must be selected in a very precise manner, and any departure from the 'fine-tuned' values will negatively impact the network's performance. Another option is that the fundamental characteristics of biochemical networks are robust, i.e., relatively unaffected by the specific values of biochemical parameters. Here, we investigate the durability of a bacterial chemotactic biochemical network, one of the best-known and simplest signal transduction networks. Escherichia coli and other bacteria can detect (temporal) gradients of chemical ligands in the area. A swimming bacteria moves in a sequence of "smooth runs," which are broken up by "tumbling" events in which the next run's direction is decided at random. A bacteria can steer its motion either toward attractants or away from repellents by altering the tumbling frequency. The ability of chemotaxis to adapt is a well-known characteristic.

Stress or disturbance refers to an environmental element that reduces crop productivity or eliminates biomass. One of the main pressures, salinity in soil or water, especially in dry and semi-arid locations, can significantly restrict crop output. The detrimental effects of salinity on plant growth are related to the particular ion action (salt stress), nutritional imbalance, low osmotic potential of the soil solution (water stress), and a combination of these factors. All of these have detrimental pleiotropic effects on molecular, physiological, and biochemical levels as well as on plant growth and development.

CONCLUSION

With relatively little direct assistance from physiologists or biochemists, plant breeders have successfully increased the salinity tolerance of various crops during the past few decades using conventional selection and breeding approaches. Without a complete grasp of the underlying molecular mechanisms, these successes obviously depended on the phenotypic traits of the plants. There is general agreement among scientists that selection is more practical and convenient if the plant species being tested has distinct signs of salt tolerance, whether at the level of the entire plant, specific tissues, or individual cells.

Editorial Office, Journal of Biomedical Engineering Current Research, Sydney, Australia

Correspondence: Tom David, Editorial Office, Journal of Biomedical Engineering Current Research, Sydney, Australia, E-mail: davidtom32@gmail.com

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Therefore, it is imperative to understand cellular pathways in order to provide plant breeders with useful guidance. Despite several investigations on plants' ability to tolerate salt, neither the biochemical locations where salt stress causes plants harm nor the adaptive aspects of salt tolerance have been identified are thoroughly comprehended. Because of this, plant breeders are unable to use well-defined plant markers for salinity tolerance in their breeding programs to practically increase salinity tolerance in a variety of agricultural crops.