Journal of
Microbial & Biochemical Technology

OPEN ACCESS Freely available online

Rapid Communication

Symbiosis with Microorganisms in Microbial Ecology

Wegener Gordon*

Department of Biochemistry and Molecular Biology, Northeastern University, Toronto, Ontario, M5G 1Z8, Canada

INTRODUCTION

Symbiosis is a phenomenon in which two distinct creatures live together in an intimate relationship that benefits both of them. Microbial symbiosis is a little broader term that refers to the coexistence of two microorganisms. Microbial symbiosis manifests itself in a variety of co-existence patterns. Mutualism is one type of pattern. Both organisms profit from this interaction. Commensalism is a different sort of partnership. In this case, the interaction benefits one of the organisms while causing no harm to the other [1].

Another type of interaction is parasitism, which benefits one creature at the expense of the other. A symbiosis between a microbe and its host is not considered in parasitism.

Microbial symbiosis has been a component of bacteria's survival from their inception. The presence of energy factories known as mitochondria in eukaryotic cells is the finest example of this. Mitochondria developed as a result of a symbiotic relationship between an ancient bacterium and a eukaryote [2]. The symbiosis became permanent over time, and the bacterium became a part of the host. Even today, the distinctions in the makeup and organization of mitochondrial genetic material and that of the host cell's nucleus speak to mitochondria's symbiotic origin.

Several well-known examples of bacterial mutualism can be found. The presence of large numbers of bacteria in the intestinal tract of warm-blooded animals such as humans is one example. Bacteria make up 10% of the dry weight of an adult human. Bacteria break down nutrients and so have a direct role in the digestive process [3-5]. In addition, some intestinal bacteria create compounds that are essential to the host's health. As an example some gut bacteria in humans produce vitamin K, vitamin B_{12}, biotin, and riboflavin. The host needs certain vitamins, but they are not produced by the host. The bacteria gain from living in such a welcoming environment. The host is also protected from disease-causing microbes due to the bacteria's normal activity and abundance. The negative health effects on the host that can arise when the symbiotic equilibrium is disrupted by antibiotic therapy demonstrate the relevance of this sort of symbiosis.

The colonization of the nodules of leguminous plants by bacteria of the genus Rhizobium is a second example of symbiotic mutualism [6]. The bacteria convert free nitrogen gas to nitrate, a type of nitrogen. This form of nitrogen is easily absorbed by plants that are unable to use the gaseous form of nitrogen. The plant gains access to a readily available nitrogen source, while Rhizobium, the intestinal bacterium, gains access to a favorable environment for growth.

A variety of bacteria, including those belonging to the genera Staphylococcus and Streptococcus, invade the skin. The bacteria have access to a constant source of nutrients, and their colonization of the skin serves to protect it against less desirable microbes. Microbial symbiosis can be rather Delicate. The Gram-negative bacterium Xenorhabdus nematophilus is an example. Steinernema carpocapsae is a nematode that harbors this bacterium. Both organisms are dependent on one another to survive. As a result, the symbiosis is required. The bacterium produces toxins that are used to kill insects infected by the worm.

REFERENCES

1. Archibald JM. Endosymbiosis and Eukaryotic Cell Evolution. Curr Biol. 2015;25:11-21.
2. Doolittle WF, Booth A. It's the Song, not the Singer: an Exploration of Holobiosis and Evolutionary Theory. Biol Philos. 2017;32:5-24.
3. Douglas AE, Werren JH. Holes in the Hologenome: why Host-Microbe Symbioses are not Holobionts. Ame Soc Microbiol. 2016; 7:e02099.
4. Embley TM, Martin W. Eukaryotic Evolution, changes and challenges. Nature. 440:623.
5. Eme L, Spang A, Lombard J, Stairs CW, Ettema TJG. Archaea and the Origin of Eukaryotes. Nat Rev Microbiol. 2017;15:711.
6. Lozupone CA, Stombaugh JI, Gordon JI, Jansson JK, Knight R. Diversity, Stability and Resilience of the Human gut Microbiota. Nature. 2012;489:220.

***Correspondence to:** Wegener Gordon, Department of Biochemistry and Molecular Biology, Northeastern University, Toronto, Ontario, M5G 1Z8, Canada, E-mail: wegener.gordon@musc.edu

Received: November 03, 2021; **Accepted:** November 17, 2021; **Published:** November 24, 2021

Citation: Gordon W (2021) Symbiosis with microorganisms in Microbial Ecology. J Microb Biochem Technol. S17:002. DOI: 10.35248/1948-5948.21.S17.002.