**21 Chapter 1**

**Infants’ Intestinal Benefits of Breastfeeding**

**Chapter Outline**

1.1 The Importance of Bacteria

1.2 Healthy Microbiomes

**Introduction**

Microorganisms are found almost everywhere on our planet. For example, microorganisms (like bacteria, fungi and viruses) can be found on the ground, in the air, on our skin and even inside our bodies. Most of the time microorganisms are not seen with the naked eye; they are only seen by using a microscope.

Though microscopic, these microorganisms effect people in a huge way. When we hear terms like ‘bacteria’ many people immediately associate these microorganisms as being bad. We hear things like, “He is at home sick with a bacterial infection” and assume all bacteria are bad, but that is not always the case. Many types of bacteria pose no threat to people, and some bacteria are even beneficial. The beneficial bacteria are important for humans and other animals to maintain a healthy immune system.

We differentiate beneficial bacteria from harmful bacteria by calling beneficial bacteria ‘good’ and harmful bacteria ‘bad’. For instance, good bacteria are found all over our bodies. If we have good bacteria on our hand and put it in our mouth, it probably will not cause illness. But bad bacteria on our hands, however, could make us very ill if we put our hands in our mouths. Illnesses can vary from strep throat, diarrhea, nausea, staph infection, etc.

Good bacteria can protect us from bad bacteria. This is very vital for humans because it helps us stay healthy and boost our immune systems. It is very important for humans to be exposed to these good bacteria at infancy when their microbiomes are forming. The good bacteria ultimately help support immune and digestive health, so it is important to have these bacteria in our microbiomes.

So, how do infants receive the good bacteria that is crucial to their developmental health? In this chapter we will discuss the importance of bacteria, healthy microbiomes, and how breastfeeding impacts these microbiomes.

**1:1 The Importance of Bacteria**

**Learning Objectives**

* Describe the difference between good bacteria and bad bacteria
* Describe how good bacteria protects us from bad bacteria
* Describe why it is important for humans to receive good bacteria at infancy

Bacteria— one of the smallest organisms on Earth found virtually everywhere. Most people think of bacteria as germs that cause a variety of illnesses. That is true for many types of bacteria. They can cause infection, disease and sometimes even death.

Fortunately for humans not all bacteria are bad. Some bacteria provide multiple benefits that are crucial from human infancy to adulthood. In this section we will explore both harmful and beneficial bacteria, in order to understand why certain bacteria is important for our bodies.

**Harmful Bacteria**

There are many types of bacteria on the planet, some being very harmful to humans. Certain bacteria can cause illnesses with very dangerous side effects. Diarrhea, vomiting, skin sores, headaches, difficulty breathing, and strep throat are some of the many symptoms that certain bacterial infections can cause. Infections such as Salmonella, *E. coli*, gonorrhea and bacterial meningitis are a few bacterial infections that you may have heard of. *Staphylococcus aureus*, *Clostridium difficile* and *Neisseria gonorrhoeae* are a few of the harmful, disease-causing bacteria.

People develop bacterial infections by being exposed to the harmful bacteria. Whether it be in the air, having contact with an infected person or in contaminated food, people can be exposed to harmful bacteria nearly everywhere. If bacterial infections are left untreated, what can happen? People can lose limbs, have seizures, develop cellulitis, become septic or even die. Antibiotics can help people get over some of these infections but being able to prevent getting an infection is more important.

**Beneficial Bacteria**

*Lactobacillus* and *Bifidobacteria* are a few species of bacteria that are beneficial to humans. They help strengthen our immune systems, fight-off bad bacteria, and aid in maintaining a healthy digestive system. Most strains of *E. coli* are also beneficial, but some can be harmful to people by producing dangerous toxins that cause infection (*E. coli* O157:H7*).*

The healthy, good bacteria that we expose ourselves to for health benefits are known as probiotics. They are live strains of bacteria that people take in order to help immune support, digestive support and fighting off harmful bacteria and pathogens. Probiotics can be taken as supplements and they are found in certain foods, like yogurt and cheese. Good strains of bacteria are extremely important in helping build healthy environments in our bodies called microbiomes. They also help maintain these microbiomes throughout life, which is why it is important that people receive these healthy bacteria from infancy.

**1:2 Healthy Microbiomes**

**Learning Objectives**

* Describe what a healthy microbiome is and why they are important
* Describe the importance of breastfeeding on microbiomes

It is important to maintain healthy microbiomes in our bodies to help fight off pathogens and harmful bacteria as well as provide immune and digestive support. Our microbiomes form by ingesting bacteria, whether it is good bacteria or bad bacteria. To create a healthy microbiome, it is vital that people ingest more beneficial bacteria than harmful bacteria. In this section we will explore the infant microbiome, specifically the infant gut microbiome. We will also learn about the benefits of breastfeeding on the developing gut microbiome.

**Human Microbiomes**

Microbiomes are incredibly diverse environments thriving with bacteria. They are found in multiple places on the body. In humans, microbiomes can be found in our mouths, digestive tracts (guts), urogenital tracts and on our skin. The type of bacteria that colonize these microbiome’s is very important. Having an abundancy of good bacteria will cause the individual to be healthier and less susceptible to diseases. Likewise, an individual with bad bacteria thriving in their microbiomes will be more susceptible to diseases and receive less health benefits.

The gut microbiome is unique in that it contains the most bacteria out of all the microbiomes on the human body. Microbiomes start developing very early-on in life. Receiving healthy bacteria in the first two months of life is crucial as bacteria is colonizing the infant microbiome. As soon as a child is born, they become exposed to multiple strains of bacteria, some good and some bad.

**Breastfeeding and Bacteria**

During infancy, children get most of their bacteria from their mothers. If a child is breastfed, they receive the same bacteria that can be found in their mother’s body. If a mother has a disease like gonorrhea for example, the infant will receive the harmful bacteria and disease from their mothers’ urogenital microbiome, that is if the infant is born naturally. If a mother has a gut microbiome flourishing with healthy bacteria, the infant will then be provided the same bacteria via their mothers’ breast-milk.

It is vital for infants to be given breast-milk especially during the first two months of life as their microbiomes are beginning to be colonized by bacteria. It would be beneficial if a mother could breastfeed the infant for the entire first year of their lives as their microbiomes are still forming. Infants that are bottle-fed formula are exposed to more harmful bacteria because this method lacks the healthy bacteria given from their mothers’ through breastmilk.

Developing a strong gut microbiome early in life is very important for our health because these microbiomes stick with us from infancy to adulthood. A very important reason for infants to be breastfed is to help them start developing a strong, healthy environment of good bacteria known as a microbiome.

**References**

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