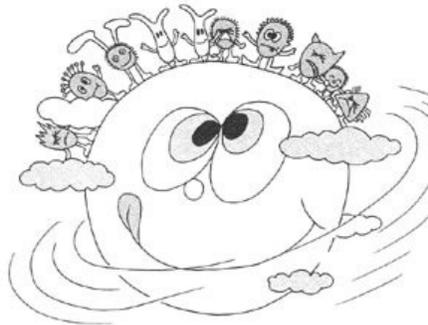


## CHAPTER TWO

### BIFIDOBACTERIA, THE GUARDS OF THE INTESTINES

1. **100 billion** bacteria living in the intestines
2. **The beneficial** and harmful bacteria
3. **Large** quantities of bifidobacteria in the intestines of infants
4. **The** overlord among the intestinal flora
5. **People** with too many harmful bacteria in the intestines are liable to diseases
6. **Taking** part in the Olympic Games with soy oligosaccharide
7. **The** vitamin-creating bifidobacteria
8. **Messages** from the intestines



**If the bacteria in the intestines were arranged in a line, there would be more than enough to encircle the earth twice.**

#### **100 BILLION BACTERIA LIVING IN THE INTESTINES**

There are numerous bacteria living around us, which enter our body through our hands, foods or respiration. Some of the bacteria may be killed by the gastric juice and bile, while part of them may directly enter the large intestine and live there. These bacteria not only live but also further multiply in the intestine, taking the intestine inside as their habitat.

Researches have proved that there live in the intestines of the people 70 to 80 varieties of bacteria, and in some cases, even as many as 100 varieties, amounting to about 100 billion bacteria. An adult's body is composed of about 60 billion cells, far less than the bacteria. It is said that if these bacteria were arranged in a line, there would be more than enough to encircle the earth twice.

The large quantity of bacteria in the intestine live in groups formed according to their varieties, which are thus called flora or populations. The so-called flora are like clusters of brushwood while the so-called populations, like various fields unevenly planted (hereafter called flora).

The bacteria invading from outside enter the stomach together with foods. As a result of the strong effect of hydrochloric acid, only those bacteria with strong resistance to it can enter the next digestive organ, the small intestine. Part of these bacteria will be further killed as a result of the fat-digesting bile and the strong sugar-digesting alkaline liquid secreted from the small intestine. The bacteria having entered the ileum from the small intestine will increase in quantity. That is because the intestine juice is neutralized here and the bacteria pass through the ileum in a

period longer than through the previous parts, therefore forming an environment easy for the bacteria to live.

The large intestine next to the ileum, which is like the home of the bacteria, is even easier for them to live in. The bacteria there rapidly increase in quantity.

The large intestine is the place where the foods and bacteria slowly arrive after the long process of digestion and absorption, and the residues turn into feces after the nutrition needed by the body is absorbed. The feces formed here are discharged out of the body through the anus once or twice each day. If this discharge is unable to be made smoothly, the feces will be stored in the large intestine. As a result, such toxic substances as indole, scatol, etc will be produced in the intestine. In the case of healthy people, these toxic materials will be detoxified in the liver after they are absorbed. If, however, these toxic materials fail to be detoxified, they will enter the blood, which may cause hepatic coma and give rise to such "rich man's diseases" as arteriosclerosis, etc.



**If the discharge is unable to be made smoothly, large quantities of toxic substances such as indole, scatol, etc will be produced in the intestines.**

### **THE BENEFICIAL AND HARMFUL BACTERIA**

The about 100 varieties of major bacteria living in the intestines may be divided into 15 communities according to the family and genus classifications of the systematic bacteriology. In respect of functions, they may be generally divided into 3 types, the beneficial, the harmful, and the neither beneficial nor harmful bacteria. They may also be divided into lactic acid bacteria, putrefactive bacteria, vitamin bacteria, decomposing bacteria, pathogenic bacteria and nonpathogenic bacteria. The representative of the beneficial bacteria is the bifidobacterium mentioned in chapter one of this book. The roles of bifidobacteria are all beneficial to our body without any harmful effects. Their major functions are as follows:

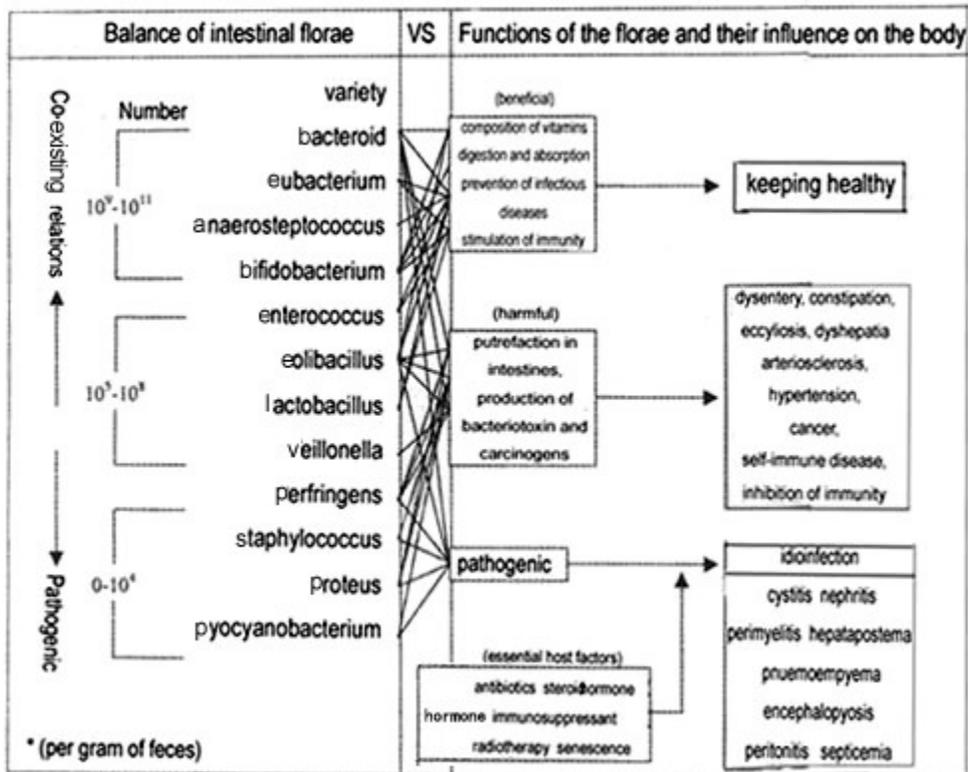
- 1.Preventing putridity and restraining the production of toxic materials in the intestines;
- 2.Composing vitamin B1, B2, etc. in the intestines;
- 3.Producing organic acids, preventing constipation, restraining the multiplication of pathogenic bacteria and guarding against infectious diseases as well;
- 4.Stimulating the function of immunity in the body and raising the immunity.





The representative of harmful bacteria is the nasty guy perfringens.

**Relationship between Intestinal Flora and the Body  
(hypothesis)**



## **LARGE QUANTITIES OF BIFIDOBACTERIA IN THE INTESTINES OF INFANTS**

There live in our intestines two kinds of bacteria, beneficial and harmful. However, while in the womb of the mother, the infant's intestines are in a bacterium-free state inside. Therefore, almost no bacteria can be found in the feces of the newly born infant.

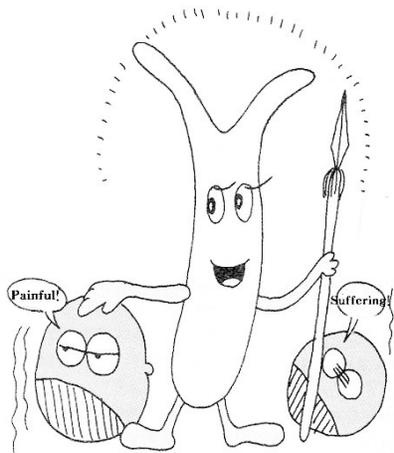
It only needs one day for the infant to change from being bacterium-free to a carrier of 100 billion bacteria. The infant's initial contact with bacteria is said to be in the birth canal, and is surrounded by them soon after birth. The bacteria enter and live in the infant's body through respiration, or the hands and skin of the mother and nurses, or the mother's milk and cow milk.

Colibacilli, staphylococci, etc. are the first to be found in the infant's feces.

Generally speaking, bacteria exist anywhere in the intestines of the infant. 3 to 4 days after the birth, bifidobacteria will appear, and occupy the dominant position on the fifth day, while other bacteria decrease rapidly. Therefore the infant's feces are in a very clean state, and even their smell, sweetish sour with fragrance, is different from that of adults. Their pH value measures 5.0, showing acidity, which is because of the organic acids such as acetic acid, lactic acid, etc produced by the bifidobacteria.

Before the bifidobacteria occupy the absolutely dominant position in the body, the infant is in an unstable period, in which the infant is apt to contract dysentery and infectious diseases. Soon after that, the bifidobacteria will take overwhelming superiority over other bacteria, and the beneficial bacterial varieties will remain stable in the intestines. So there is no need to worry any more. However when the infant, after weaning, starts taking in the same food as that of the adult, the harmful bacteria that cause bad smells in the feces will be on the increase, forming the same flora as the adult's in the intestines.

In other words, if the bifidobacteria fail to occupy maximum dominance in the intestines, the infant is unable to be deemed a healthy one.



**The harmful bacteria can only wail under the feet of bifidobacteria!**

## **THE OVERLORD AMONG THE INTESTINAL FLORAE**

From babyhood through childhood, adolescence to one's prime of life, bacteria increase with the age in varieties. In the case of a healthy person, even if the bacterial varieties increase, the bifidobacteria still occupy the dominant position, inhibiting the growth of other harmful bacteria.

Nevertheless, eating too much high-fat and high-protein foods such as meat, fish, etc may aggravate the putridity in the intestines and break the balance of bacteria inside. Perfringens, colibacilli and other septic bacteria may thus get extremely active and produce various harmful substances such as amine, ammonia, indole derivatives, ammonia sulphide and so on.

Frequently eating vegetables, fruits, seaweeds, etc may keep the intestines clean inside. If foods helping to increase intestinal bifidobacteria are often taken, that is, foods containing soy oligosaccharide are taken on purpose, the florae in disorder can be brought to normal.

Detailed studies on the intestinal bacteria have shown that some of them permanently live in the intestines and some disappear in a few days. Those living permanently are called resident bacteria while those soon disappearing, passing bacteria.

The pathogenic bacteria entering from outside, if not in a large quantity, can only exist in the intestines for a few days rather than reside there. That's because of the effect of immunity and the repulsion of them by those bacteria having been residing in the intestines.

On the one hand, the bacteria residing in the intestines often fight one another, and on the other, they form groups among themselves and live in the intestines, thus needing certain space there. In case the needed space can't be kept, the bacteria, unable to reside, will have no alternative but to pass.

Therefore, if the beneficial bacteria are strong enough to occupy much space, it will be difficult for the harmful bacteria to reside.



**Eating too much high-fat and high-protein foods such as meat, fish, etc may aggravate the putridity in the intestines.**

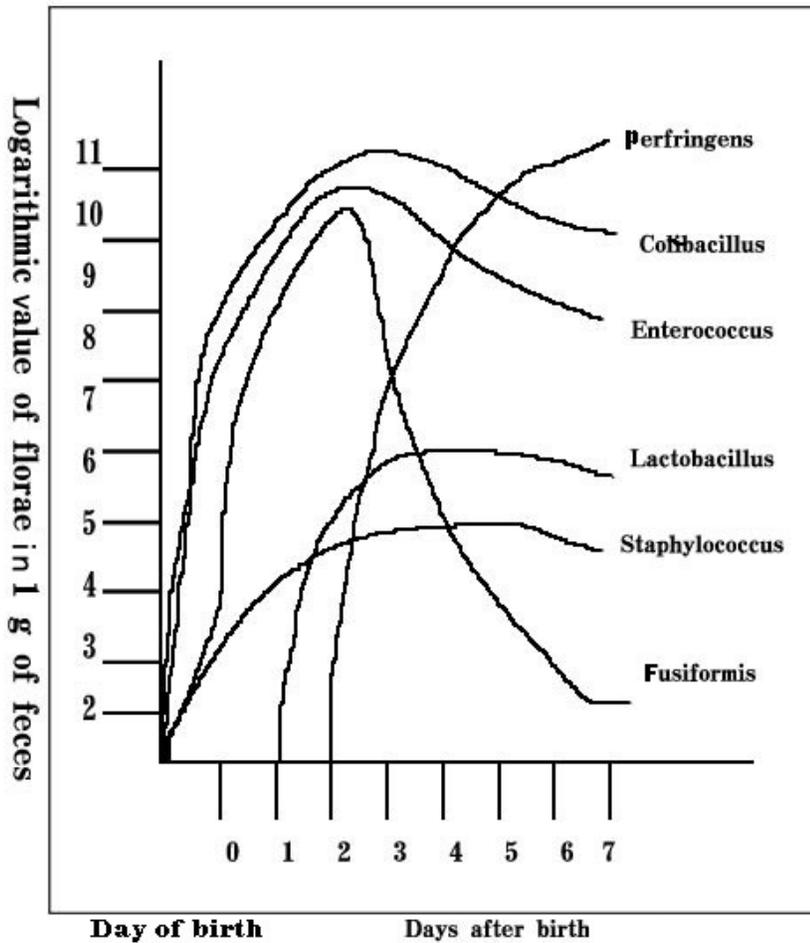
On the contrary, in case the harmful bacteria take a dominant position, not only will the intestines be seriously polluted inside, but the resistance to diseases will also be reduced, making us apt to contract infectious diseases.

The more harmful bacteria there exist, the more toxic materials will be produced and the easier it will be to induce arteriosclerosis, cancer, liver diseases, etc., thus accelerating the ageing process.

While in primary and middle schools, we once learnt the method of taking the 6 kinds of basic foods in a balanced way. If these foods could actually be taken in this way, the balance of bacteria in the intestines would be able to be maintained. But unfortunately, it is almost impossible in reality.

Such being the case, soy oligosaccharide becomes so useful for increasing bifidobacteria.

Florae in the Intestines of Infants



**PEOPLE WITH TOO MANY HARMFUL BACTERIA IN THE INTESTINES ARE LIABLE TO DISEASES**

Harmful bacteria may produce toxic substances harmful to our body, such as carcinogens, hypertension-inducing materials and so on. These harmful substances not only increase the burden of the liver, but may also reduce the immunity of the whole body. If the immunity is weakened, a slight change in certain factors may cause influenza and other diseases.

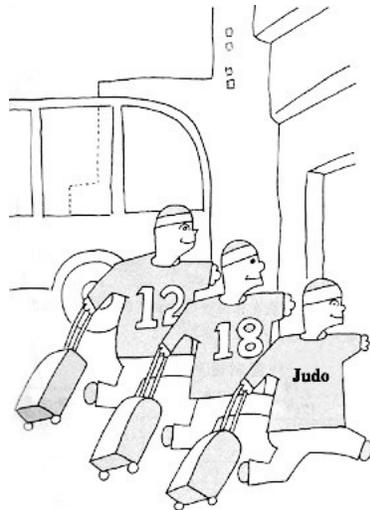
Antibiotics taken for influenza may weaken the bacteria beneficial to the body while inhibiting the bacteria causing influenza. In this case, the bacteria, which were in an inferior position, start multiplying and injuring the body, thus causing the reduction of immunity. The bacterial balance in the intestines of people liable to influenza and other diseases is easily broken in comparison with that of healthy people. Therefore, the earnest recovery of intestinal health is the basis for good health.

### **TAKING PART IN THE OLYMPIC GAMES WITH SOY OLIGOSACCHARIDE**

Healthy people keep a certain balance between beneficial and harmful bacteria on the basis that the beneficial bacteria occupy the dominant position. This balance, however, is very sensitive. It can be easily lost as a result of mental strain. For instance, constipation on tours and dysentery before examinations are all the results of the imbalance of the intestinal flora caused by the outer factors such as mental strain.

As a part of the manned space flight program, the National Aeronautics and Space Administration of America once made consecutive investigations in the intestinal flora of 3 astronauts, with the result that all the upsets and anger of the astronauts might cause distinct changes in the flora in their intestines.

In addition, intestinal flora may vary with diets, meteorological conditions, antibiotics, bacterial infections and other kinds of factors. The colorful Olympic Games are like fierce "battlefields" for athletes. Many athletes are said to have constipation or dysentery because of mental strain.



**The Japanese athletes will bring soy oligosaccharide with them whenever they go to take part in the Olympic Games.**

The athletes of the Japanese delegation taking part in the world judo competitions held in Belgrade, the capital of Yugoslavia, brought soy oligosaccharide with them to adjust the state inside the intestines. In addition, the well-known Japanese skiing athletes, whenever going out to take part in competitions abroad (including the Olympic Games), will also bring soy oligosaccharide with them to adjust their intestinal state.

**THE VITAMIN-CREATING BIFIDOBACTERIA**

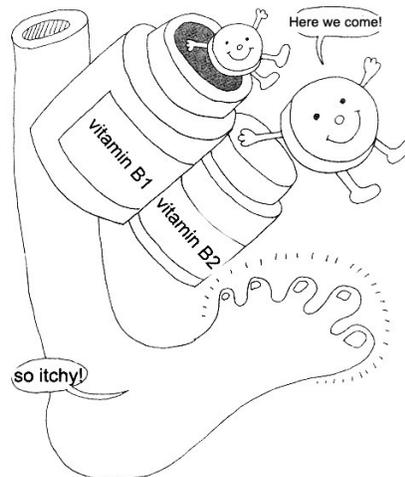
Vitamins are known as an important component of the lubricant of the body. Vitamin deficiency may reduce the various functions in the body.

Some of the vitamins are able to be composed in the body and some, unable. Vitamins may be supplemented through foods and drinks.

**Vitamin Bs Produced by Bifidobacteria**

VitaminB	B1	B2	B6	B12	Nicotinic acid	Folic acid
bacteria						
B. bifidum	+	+	+	(+)	+	+
B. infantis	+	—	+	(+)	+	+
B. breve	+	+	++	(+)	+	+
B. longum	+	++	++	(+)	+	+
B. adolescentis	—	—	+	(+)	-	+

(+) little composed ++very much composed  
 + much composed -- not composed at all



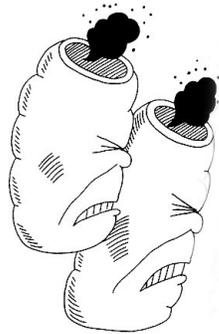
**Beriberi is the disease caused by the lack of vitamin B1**

By making studies on the intestinal flora, scientists have realized that there exist in the intestines bacteria that can produce vitamins, and bifidobacteria are one kind of them.

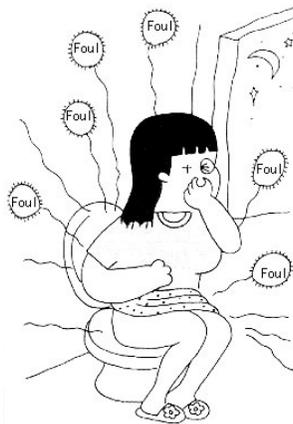
So far, it has been verified that vitamin B1, B2, B6, B12, nicotinic acid and folic acid in vitamin B group are among the vitamins produced by the bifidobacteria.

Colibacilli have this function, too. However, the bifidobacteria, in large quantities in the intestines, have stronger ability of composing vitamins, about 2 to 20 times that of the colibacilli.

On the contrary, there are in the intestines also vitamin-damaging bacteria known as acidiphilia aminolytica, which decompose vitamin B1. Beriberi is a disease caused by the lack of vitamin B1. When the acidiphilia aminolytica multiply in large quantities in the intestines, beriberi may be caused by the lack of vitamin B1 even if much vitamin B1 is taken in.



**There are in the intestines also vitamin-damaging bacteria**



**If high-protein food such as meat is taken, the intestines will turn alkaline inside as a result of the putrefaction in the intestines, with the feces being in black and with very foul smells.**

The incomplete absorption of vitamin B12 may lead to pernicious anemia. It hasn't been verified yet how pernicious anemia is caused. But as considered by a convincing theory, it is caused by a certain kind of harmful bacteria that assimilate vitamin B12.

## **MESSAGES FROM THE INTESTINES**

To look into the beneficial and harmful bacteria in the intestines, we are unable to get into our own intestines, or see them in the mirror, and it is too complicated and expensive to have a check-up and an analysis in a specialized institute.

There is a simple method for it, that is, observing the feces, as they are the messages from the intestines.

What may the color of feces tell us?

-----While the beneficial bacteria, bifidobacteria in particular, occupy the dominant position, the intestines are acidic inside with the feces in yellowish brown color. This is because the pigment of the bile turns yellow with the action of the bacteria and the acidic environment in the intestines.

-----While the harmful bacteria are in large quantities, the intestines are alkaline inside with the feces in brown color.

-----Diets may also cause changes. If high-protein food such as meat is taken, the intestines will turn alkaline inside as a result of the putrefaction in the intestines, with the feces being in black as in the case of constipation.

The shape and hardness of feces may provide information to us as well.

If the feces are right like a banana in thickness, neither hard nor soft, weighing 150 to 250 g or amounting to 2 to 3 small bananas in weight (by the way, the Europeans' feces are only about half a banana in weight), it can be said that people discharging feces like this are with comfortable intestines. In this case, there must be a lot of bifidobacteria in the intestines and the feces are not so foul.

The conditions inside the intestines can also be known from the smell of feces.

The smell of feces is composed of tyrosine, indole, scatol, metacetone, hydrogen sulphide, etc. Among them, the indole, scatol, and hydrogen sulphide, the source of the offensive odor, are the putrid substances produced by the harmful bacteria. If the toilet is filled with bad smells, there may be quite a lot of harmful bacteria among the intestinal flora. Soy oligosaccharide and bifidobacteria must be used the earliest possible to improve this condition. This is also true to the stinking flatus with constipation.

We can roughly check the health conditions of the intestines by observing, with a little attention, the feces when using the toilet every day.

Eye-observation of the State of the Intestines

(shapes of the feces)

Lump-like		With spasmodic constipation
Club-like		With sustained constipation
Banana-like		With comfortable intestines
Semichain-like		With soft feces
Mud-like		With dysentery
Water-like		