

# SPIES

## LEFTOVERS

Peppi and Bollo have now seen more than their share of villi and microvilli. They've traveled nearly the entire 7 meters of the small intestine.

Just when they're about ready to stop for a break, they see an opening ahead.

"The large intestine, right?" says Bollo.

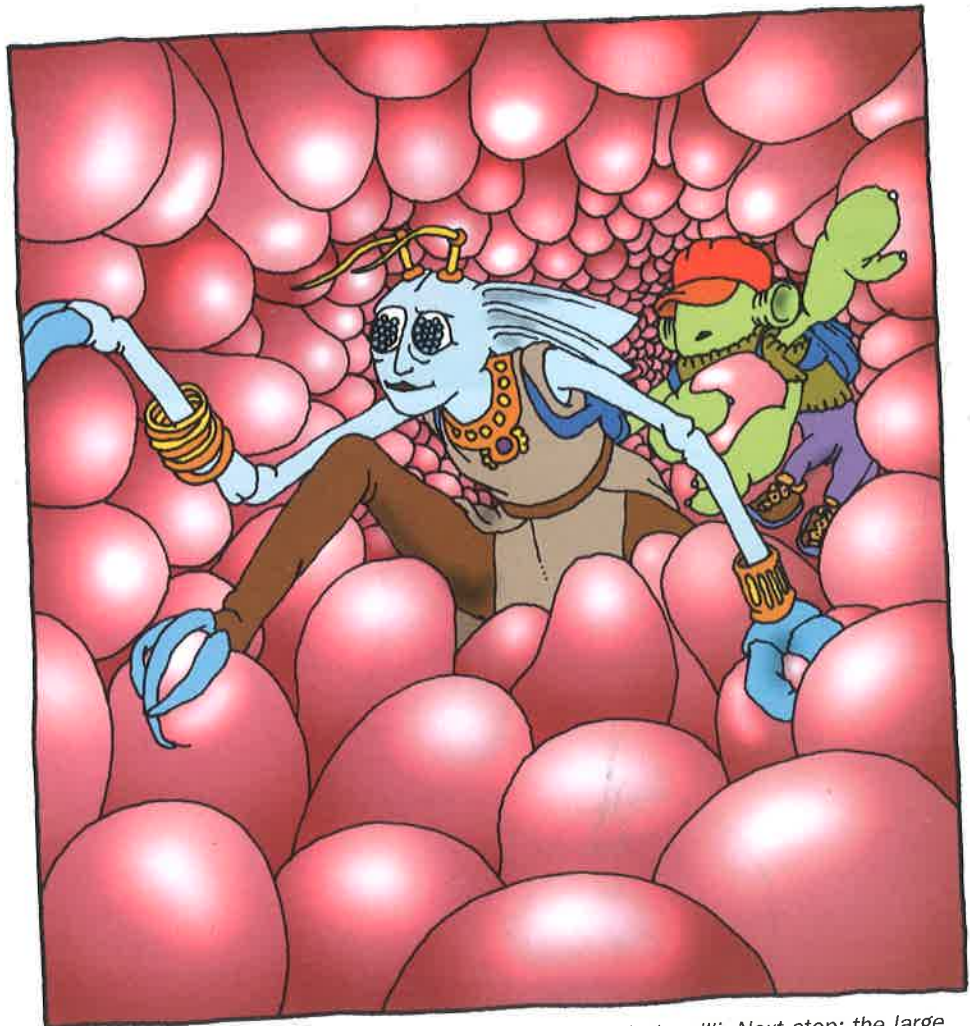
"That's one word for it," Peppi replies. "It's also called the colon."

"What's that opening?" Bollo asks, looking to his right.

"That's the entrance to the appendix," says Peppi. "Scientists on planet Earth believe that the appendix once helped humans digest the cellulose in plant matter."

"The only time humans ever hear about the appendix today is when it causes trouble—appendicitis. When the appendix becomes blocked, it

may become swollen and infected by bacteria. This causes pain. If the appendix bursts, it releases bacteria into the abdomen. This can be serious. Appendicitis is treated by surgery. Since the appendix no longer has a function, a human wouldn't miss it."



Peppi and Bollo have nearly completed their trip through the villi. Next stop: the large intestine!



*Peppi and Bollo in the large intestine. Peristalsis keeps things moving here!*

Peppi and Bollo continue their trip. First they go up. Then they turn sharply. As they travel, the amount of water decreases. The undigested waste clumps together.

"In some ways, the colon is like the body's storage tank," explains Peppi. "It doesn't produce enzymes. It doesn't need to, because the food is already digested. The leftover food, now undigested waste, spends time here before it is eliminated through the anus.

"The name for the material that passes through the colon is 'feces.' Feces are composed of water, undigested food, mucus, dead cells, and bacteria.

"Even though the colon has no role in digestion, it has an important part in keeping the body in balance. That's because of its role in the absorption of water and minerals. Water and minerals pass through the walls of the large intestine back into the bloodstream."

"Nothing very exciting about that," says Bollo. "I think we know a lot about absorption already."

"You're right. But things can go wrong here, even though no digestion is taking place. If the feces move through the large intestine too quickly, there's not enough time for water to be absorbed. The result? Diarrhea. Diarrhea is often accompanied by cramps, which are strong contractions of the wall of the large intestine. Diarrhea can be dangerous, especially in an infant or a young child. If humans lose too much water, they become dehydrated."

"Sometimes the opposite situation occurs. The feces move through the colon too slowly. Too much water is absorbed. The feces become larger, harder, and drier. The result is constipation. One way to prevent constipation is to eat foods with high fiber content. If that does not relieve constipation, humans sometimes take a laxative. A laxative is a medication that causes the peristaltic contractions to increase and to move wastes through the colon more quickly."

"Yuk. It smells awful in here," says Bollo.

"That's gas. It's released when bacteria in the large intestine start to feast on undigested food."

"If too much gas builds up, it causes pain. One way to relieve it is to let the gas pass out through the anus. But that isn't polite in most human societies!"

Pretty soon the action comes to a halt. The feces collect at the end of the colon, in a place called the rectum.

Suddenly the wall of the colon starts to contract powerfully. Peppi and Bollo try to hold on. Out they go into a brilliant white bowl with crystal-clear water!

"Let's get out of here before it's too late!" says Bollo. They grab the top rim of the bowl. Directly below, they see a powerful whirlpool. Water and feces disappear.

"We made it!" says Peppi. "Back to civilization at last!"

### Summing Up

"Let's review what we've learned," says Peppi, as they dry off on the top of the toilet tank.

"First, the digestive system works like a food-processing factory. Its job is to change raw materials into a form the body can use to grow and maintain health. The body does this through mechanical and chemical actions. Now what else have you learned, Bollo?"

"Well, the digestive system is specialized. Different organs have different functions," says Bollo.

"You're right. A pretty impressive system, wouldn't you agree? We have learned quite a bit, but we're far from finished. There's another exciting journey just ahead." □





*The spies' first journey is complete, but more adventures lie ahead.*