

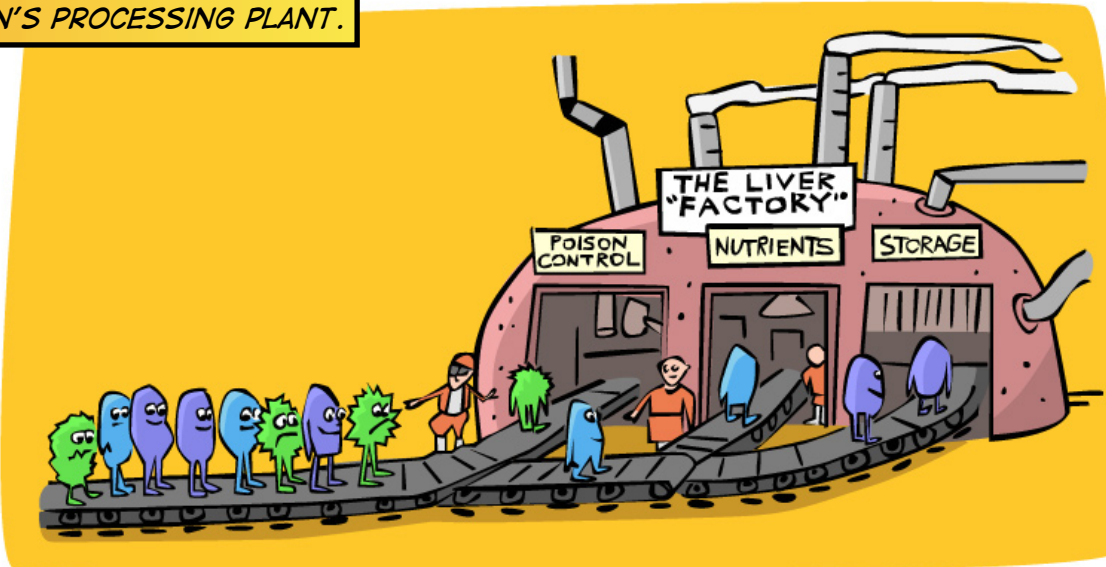
ADVENTURES WITH SUPERCELL

ADVENTURES IN THE BODY WITH SUPER CELL

THE LIVER

That was an awesome journey. The digestive tract has to be one of the Wonders of the World! What am I saying? The way a body works has to be our Creator's greatest marvel—a temple for us to help you keep clean. Now that we've traveled through the intestinal tract, let's find out what happens on the other side of the intestinal wall.

HUMAN'S PROCESSING PLANT.



Let's return to the small intestine. It seems we should whisper in here—like you do in a sacred place. See why the food you eat has to be digested to such tiny particles. The microvilli will catch us and pass us along to the villi for absorption through the lining. We have to be small enough—tiny molecules or no larger than a cell like me. You'll have to stretch thin enough to squeeze through one of the thousands of capillaries that carry nutrients (and toxins) into the main blood vessel leading to your liver. Human highway systems are designed like your body's capillary and blood system. Single feeder lanes allow vehicles to enter major highways that accommodate several lanes of traffic and single feeder lanes allow vehicles to exit to their destination. This system works well in here without any traffic jams as long as you develop healthy eating habits.

Squeeze into this capillary behind me. We're now in the portal vein! This river of blood is fed by thousands of capillaries, which are siphoning off the nutrients from the small and large intestines—about 25 feet of tubing—as well as from the stomach and pancreas, and also from the spleen. This vein leads directly to your liver. Why the liver? This blood can't be trusted to enter the main blood stream yet. Everything in this mighty stream must first go through the body's main filtering system. Nothing is allowed to enter your body's intricate system of nerves, glands, organs and tissues until it has been humanized or prepared by the liver.

Your liver is a filtering system. The oil filter in a car is changed every few thousand miles to keep the motor running well. If it isn't, the motor gums up, runs rougher and rougher and will eventually choke on the dirt. It's a tribute to the liver that we can feed on burgers, fries, pop, sugar, processed foods, etc. and despite the toxins it has to process, the liver keeps us going for an amazingly long time before it becomes gummed up to the point the body starts to sputter with symptoms of disease.

Unfortunately, a large amount of liver tissue must be damaged or destroyed before the customary tests of liver function reveal abnormality.

Diet & Nutrition,
Rudolph Ballentine, MD

While we're swimming along, here are some facts: The liver is the heaviest and largest organ in your body, weighing in at 3 to 5 pounds or approximately 2 kilograms. Its dark red color reflects the blood it is processing. How much blood? About 1½ quarts or litres of blood are filtered every minute. The average adult has 4 to 5 quarts or litres of blood so your liver holds about 30% of your blood at any given time. Approximately every 3 minutes all the blood in your body has been filtered through your liver. It's a fluid looking organ because of the amount of blood it holds and also because it is at least 75% water. In fact, your liver is shaped by the organs surrounding it. The lower edge of your liver sits level with the bottom rib on your right side so it's well protected in front. Your kidney, colon and the beginning of the small intestine underneath all hold it in place. Your stomach and esophagus shape it on the left side.

You don't grow up to be a liver cell unless you're prepared for a lot of traffic and work. In fact, the cells in the liver work so hard that at times they're using 20% of all the energy the trillions of us cells produce in your body. Powered by electromagnetic reactions, these cells work to produce some 13,000 different chemicals using about 50,000 systems of enzymes to perform over 500 functions. The results are released into the blood and bile to keep you functioning—thinking, moving, crying, laughing and loving. In many adults these cells perform like Super Heroes because the liver has become so clogged only 30% of it is working. That's an amazing thing about the liver—only 30% of the cells may be able to function yet the body won't show serious symptoms. And the good news? The liver is the easiest tissue to

regenerate. Once we cells get what we need, we can rebuild and keep each new generation of cells healthy.

What does all this mean? It means whatever is bothering you probably stems from an ailing liver. It also means, like Human, once you give your body what it needs to heal itself, get your digestive tract working well again and cleanse and rebuild your liver, you should not only regain good health but you should be able to stay healthy.

Let's have a look at this milieu we're swimming in. This vein is rich in glucose, amino acids, fatty acids and minerals—the materials the cells need to do their jobs. There are still toxins floating with us but I don't think they're enough to overwhelm the liver cells anymore. Human's clean up efforts have definitely paid off.

Get ready for another squeeze. The portal vein is narrowing to bring us into the liver. To enter for inspection and processing we must squeeze through one of the thousands of capillaries that permeate the liver. Made it! See that rich red stream of blood blending with us. That's blood coming in from the hepatic artery fresh from the lungs and heart. It supplies the liver cells with the oxygen they depend on to do their onerous tasks.

Watch out for the bodyguards! About 30% of these cells are poised to capture harmful bacteria coming in with us from the gut. Notice how they handily handcuff the culprits. That wasn't the case before Human cleaned up in here. Those destructive types kept these bodyguard cells battling without a rest and sometimes overpowered them.

Liver cells are rich in enzymes. Enzymes and oxygen power them to work tirelessly. Each cell has two groups of enzymes specifically designed to tackle the many toxins you take in through the gut, by breathing or through your skin—toxins like foreign chemicals from synthetic food additives, household cleaners, body care products, off-gassing from carpets and other synthetic building materials, chlorine and fluoride from water ... that's enough of a list for now. The teamwork between the two groups of enzymes is awesome. The first group, Phase 1 or Team 1 prepares the toxins for the Phase 2 or Team 2 enzymes. These teams aren't competitive—they want to work in harmony. Here's how the ball game works in here: Each toxin is a ball. To prepare the ball, Team 1 must strip off the cover. This reveals the toxins truly dangerous intent. It's the job of Team 2 to quickly wrap the ball with a new cover. The new cover renders the toxin harmless. Once the toxins are disarmed in this way, they are safely excreted in bile and out the intestines or through the blood stream to the kidneys. Here's the problem: Once stripped of their cover by Team 1, if Team 2 can't keep up, these toxins are left exposed. They're more dangerous than when they entered the liver! These villains not only escape into the bile and blood stream but they destroy liver cells as well.

Health problems then start to develop. Blood doesn't flow readily through a sluggish liver. Blood backs up both entering and leaving. Early warning signs that blood from the portal

vein isn't flowing readily into the liver and is creating backpressure are digestion or bowel problems. The digestive tract acts like one long muscle so problems can pop up anywhere—possibly bloating, heartburn, constipation, colitis or hemorrhoids. Early warning signs that the flow of blood and bile out of the liver is toxic and slowing are plaque forming on your teeth, weakened eye sight, irritability, gallbladder attacks, high blood pressure and eventually heart problems.

How is the gallbladder affected? As the liver cells and surrounding fluid get plugged up, they fail to properly humanize the nutrients we need.

Proteins are not properly prepared so poisonous protein overflows and enters the bile stream.

About four cups of bile flows to the gallbladder daily. Your gallbladder looks like a pear and sits just below the liver. It concentrates bile up to four times the original strength for use in digesting fats. Remember the bile we got squirted with when we entered the small intestine? Recall how the bile emulsified the fats? Once the fats were broken into tiny globules there was a lot more surface for the fat digesting enzymes to work on. Those enzymes were readily able to break the fats into fatty acids—molecules small enough to be absorbed through the intestinal wall. Poisonous bile isn't able to do that. Instead it interferes with fat digestion.

WAYS TO AID THE LIVER

1. Drink fresh green vegetable juice or pulp on a regular basis. Adding beets is also beneficial.
2. Drink a glass of water upon arising with the juice of a fresh lemon.
3. Exercise regularly as this massages and stimulates the liver.

Bile is rich in alkaline salts, especially sodium. This alkalinity helps neutralize the highly acid mixture from the stomach. This natural alkalinity, however, gets acidified when toxins build up. Bile is also rich in cholesterol. Toxins and harmful bacteria increase the concentration of cholesterol. Excess cholesterol precipitates to form gallstones. When the stones obstruct the flow of bile, the gallbladder will ache or be downright painful. The gallbladder's cleansing time is from 11:00 p.m. to 1:00 a.m. so a gallbladder problem will usually wake you in the wee hours of the morning. We'll talk more about cholesterol when we visit the blood stream and the heart. You can see bile has a big impact on digestion. Some folks eventually have their gallbladder removed. Does that solve the problem? It does take away the ache of a congested gall bladder and pain from gallstones, but it doesn't rejuvenate these liver cells! What is the solution? We need to restore balance so Team 2 can disarm the toxins prepared by Team 1. We can only do that if you send fewer refined sugars and other toxins, and also send us a rich supply of oxygen and nutrients.

Among the liver cells awesome responsibilities are three broad categories:

- 1) As the blood flows through, they operate a **POISON CONTROL CENTER**. We've seen the

teamwork needed for this onerous task. Poison control means the cells must identify and neutralize every toxin coming in through the mouth, lungs or skin. It also means every molecule the body has used—hormones for example—must be rendered inactive so they can safely be sent either to the bile for elimination through the bowels or to the bloodstream for elimination through the kidneys. (We'll talk more about hormones later.)

- 2) As the blood flows through, some cells are **MASTER CHEMISTS** as they convert each and every nutrient into a form your body can use.
- 3) As the blood flows through, some act as **WAREHOUSE MANAGERS** to store nutrients and supply them on an as needed basis—offering instant delivery service when needed.

Liver cells provide finishing touches to the digestion of our meals. They humanize and serve us the three basic food groups—proteins, carbohydrates and fats. Each food group is used for a primary purpose but also has other uses. First, we need energy. Without energy you can't function. Natural carbohydrates provide us with energy. Carbs have a specific combination of carbon, hydrogen and oxygen molecules— $C_6H_{12}O_6$ is the magic formula that provides a lot of the energy for us to work and you to move. High quality carbs like veggies, fruits and whole grains have complex sugars that are released slowly to give lasting energy. Enzymes from saliva (chewing) and enzymes from the pancreas ensure the sugars are broken down to glucose—a sugar molecule small enough to pass through the intestinal wall and into the hepatic artery. The pancreas plays a key role in keeping glucose levels stable so you don't suffer ups and downs in blood sugar or develop diseases such as hypoglycemia or diabetes. We'll talk about the pancreas later. Glucose that is not immediately needed for energy is stored by liver cells as glycogen. When other cells need it—such as the brain—liver cells respond immediately. The next conversion of glycogen to glucose may be just what you need for a brilliant idea, an uplifting thought or a smile.

As you know we get flooded with glucose when you eat refined sugar, pasta or other flour products. We can't store it all as glycogen so we convert it to fatty acids. What do we do with these fatty acids? Sorry, but we have to store them as fat tissue—on your bum, under the chin, along your arteries ... you get the picture. Unfortunately, unless you're getting a lot of exercise or strenuous physical work, the muscle cells can't burn this fat. We just keep adding fat tissue.

Sugar is addictive and it creates chaos in the liver. Excess sugar makes it impossible for your two enzyme teams, Team 1 and Team 2 to work in harmony to protect you. The resulting toxins spew into the bile and blood. Don't forget these teams are also handling pesticides, hormone-mimicking residues from plastic wrap and plastic storage containers, synthetic vitamins ... over 70,000 man-made chemicals with more added daily. We have to buffer these chemicals with a layer of fat and we also hang on to as much water as possible to try to protect you. Now that Human refuses as many servings of foreign chemicals as possible,

we're not kept so busy trying to protect organs. That means we're not storing as much fat or retaining water either!

No matter where annoying symptoms may erupt, the cause can usually be traced back to Human's filtering and processing plant—the liver.

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