



# Love Your Liver

It may not be pretty, but this massive gland is a key player in your health

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**Y**ou probably have a fairly good idea of what your heart or lungs do, but what about your liver? Though most of us don't give the largest solid organ in our bodies a lot of thought, it is actually vital to maintaining overall health. The liver suffers from a bad reputation linked to alcoholism and drug abuse. But according to the Canadian Liver Foundation, one out of 10 Canadians has liver-related disease. Thankfully, the most common ones are largely preventable.

## WHAT IT DOES

The liver is a multi-tasking overachiever that performs more than 500 different functions. Weighing two kilograms in a 154-pound (70-kilogram) adult, this amazing organ is the body's main filter, processing everything from food and drink to chemicals absorbed through the skin. It breaks them down, distributes their components into the blood and sends waste products for excretion. Bile, a digestive chemical produced by the liver and stored in the gallbladder, emulsifies fat, making it more easily absorbed. The liver warehouses sugar in the form of glucose and releases it into the bloodstream as needed, providing energy and staving off hypoglycemia.

It metabolizes drugs and alcohol and detoxifies gastrointestinal bacteria. A flourishing chemical factory itself, it produces proteins essential for blood clotting, and hormones that control blood flow and temperature. It also regulates sex and thyroid hormones. "The liver is a very complex organ and is very much underappreciated," says Dr. Gary Levy, a hepatologist and director of the Multi Organ Transplant Centre at Toronto General Hospital. "Because the liver is so big, its diseases don't manifest themselves until very late, so often by the time we specialists see patients, they have irreversible end-stage liver disease."

## GENETIC LIVER DISEASE

Though acquired diseases tend to show up in adults, genetic ones can strike at any age. Winnipeg police officer Diana Puzant Cross had never heard about children with liver disease until her baby daughter, Charlotte, was diagnosed with a blockage called biliary atresia at two months of age. "It was so shocking to us," says Diana. "I think a lot of people have no clue that liver disease can happen to a little baby."

The condition, a random genetic abnormality that strikes approximately one in 10,000 to 20,000 infants in Canada, occurs when the main duct that carries the digestive fluid bile from the liver to the intestines fails to develop properly. This causes first, a buildup of toxins in the liver and then, jaundice, liver damage and probable death by age two in untreated babies.

## Statistics

- ◆ Liver-related disease affects one in 10 Canadians.
- ◆ Liver disease kills about 6,000 Canadians a year and is the eighth leading cause of death, after diabetes mellitus.
- ◆ Non-alcoholic fatty liver disease, the most common liver disease, affects 1.4 million Canadians.
- ◆ About 300,000 Canadians have hepatitis C, a preventable viral disease.
- ◆ Approximately 280,000 Canadians have hepatitis B.
- ◆ Primary cancer of the liver represents more than 5% of all malignancies.

## Trouble in the Lab

Your liver is a living laboratory beside which the biggest big pharma facility pales. Elevated blood levels of enzymes with odd names like bilirubin, ALT, AST, SGOT and ALP signal the presence of problems. While this sturdy anvil-shaped organ is slow to complain, and will go on working with two-thirds of it damaged, here are a few warning signs to watch for:

- ◆ Yellowing of the skin or whites of the eyes
- ◆ General malaise
- ◆ Dark urine
- ◆ Diarrhea
- ◆ Light-coloured stools
- ◆ Abdominal pain on the upper right
- ◆ Nausea
- ◆ Vomiting
- ◆ Loss of appetite
- ◆ Unusual weight loss or gain
- ◆ Generalized itching
- ◆ Fatigue or depression

— Diana Swift

Thankfully, Charlotte underwent a surgical procedure called the Kasai to connect her liver directly to the intestine and allow bile to drain. Now almost three years old, Charlotte remains healthy, thanks to medication nine times a day and a balanced, low-salt mainly organic diet.

Genetic diseases that strike adults can be harder to detect. The exception is hemochromatosis, in which excess iron is stored in the liver and pancreas. Over time, the buildup can lead to liver failure and heart failure from iron accumulation in the cardiac muscle. "About one in 200 people carry this very common gene," says gastroenterologist Dr. Eric Yoshida, division head of gastroenterology at the University of British Columbia in Vancouver. A blood test detects the disorder, and the treatment is a procedure called phlebotomy, the regular draining of a pint of blood to remove excess iron.

The other more common genetic diseases include primary biliary cirrhosis (PBC), primary sclerosing cholangitis (PSC) and autoimmune hepatitis (AH). "These all fall under the category of autoimmune liver disease, in which the immune system, for reasons unknown, starts aggressively attacking the components of the liver," explains Yoshida. With PBC and PSC, the bile ducts become damaged over time, causing similar problems to those with biliary atresia in children: an accumulation of bile in the liver with subsequent damage. AH is a chronic inflammation of liver tissue, eventually leading to cirrhosis (scarring) and loss of function.

Diseases that occur primarily in adults can go undetected for decades, resulting in serious damage and limited treatment options. For 46-year-old Edmonton office manager Wanita Maurice, diagnosis came almost too late. The mother of two had been unwell for months with a swollen abdomen, nausea and jaundice when, in late July 2007, she finally went to the emergency department of the University of Alberta Hospital. Eight years earlier, her older sister, Melvia, had passed away there after a liver transplant for unspecified hepatitis. "They pulled my sister's file and did a bit more checking and came up with autoimmune hepatitis," says Wanita. A biopsy confirmed the diagnosis, and treatment with immunosuppressants and anti-inflammatory steroids likely saved her from an emergency transplant.

Now, in addition to taking immunosuppressives and a daily dose of the synthetic bile acid ursodiol to prevent gallstones, she has altered her diet to eliminate alcohol and include more fruits, vegetables and fibre. She has also increased her level of physical activity. Her doctors say it will likely be 10 years before she'll need a transplant. "I feel very privileged to have been able to get through this and given a second chance at life," she says.

## ACQUIRED DISEASES

The prevailing image of the liver disease sufferer is of an intravenous drug user or alcoholic. As Charlotte and Wanita illustrate, that stereotype is often very wrong. But many liver diseases can be attributed to risky behaviour, such as drug use (especially intravenous) and unprotected sex. "You could go unscathed for 10, 20, maybe even 30 years," says Yoshida. "It's only later in life that suddenly you find you need an urgent liver transplant or you have liver cancer."

Viral hepatitis is generally the best known in this category. Hepatitis A (HAV) can be contracted by consuming contaminated food or water and is a risk when travelling, especially in Africa, Asia or Eastern Europe. Hepatitis B (HBV) infections are spread through sexual activity and contact with blood and other bodily fluids; it can also be passed from mother to child. HBV is also one of the leading causes of primary liver cancer. Hepatitis C (HCV) is carried in the blood and transmitted

# Rx for a Healthy Liver

**DON'T DRINK ALCOHOL** As little as two average-size drinks a day can contribute to liver damage.

**AVOID UNNECESSARY MEDICATIONS** Even over-the-counter drugs can be harmful at high enough doses. Acetaminophen (Tylenol) is the main culprit. Taken with alcohol, it has been known to cause liver failure.

**EAT WELL** Consume plenty of fruits, vegetables and whole grains. Opt for lean white meats, which contain fewer additives and put less strain on the liver during digestion and metabolism than their fatty red counterparts.

**EXERCISE** Combined with a healthy diet, exercise helps to ward off obesity, a risk factor for liver disease.

**GET TESTED** Get a regular physical exam and make sure that your liver is being checked for abnormalities.

**AVOID RISKY BEHAVIOUR** Illicit drug use, unsafe sex and piercings or tattoos from iffy establishments increase the risk of contracting viral hepatitis.

**GET VACCINATED** Prevention is the best medicine, so ask your doctor about the hepatitis vaccine — especially if you'll be travelling outside of North America.

## **NIX "NATURAL" CLEANSING PROGRAMS AND SUPPLEMENTS**

Though some studies have suggested that the herb milk thistle (*Silybum marianum*) can lightly improve function in compromised livers, many herbal or homeopathic products contain untested and possibly liver-toxic ingredients.

**UP YOUR VITAMIN B INTAKE** While the evidence is inconclusive, getting your full complement of these B vitamins, especially folic acid (B<sub>9</sub>), may benefit your liver and have other health benefits as well.

**Eggs and green leafy vegetables such as spinach are good sources of folate**





*“I always call non-alcoholic fatty liver disease ‘Big Mac’ disease, says Levy, “because it’s associated with eating high-fat diets and taking in way too many calories for your body to handle”*

by sharing needles during intravenous drug use, undergoing tattooing or piercing with unsterilized equipment or receiving transfusions of tainted blood.

Both HAV and HBV can be prevented with a vaccine such as Twinrix, which Levy recommends as a smart choice for all Canadians. “I would make vaccination mandatory because the benefits far outweigh the costs of administering the vaccine, and we could thereby eliminate one of the causes of cancer of the liver,” he says.

The most common liver disease today is actually a fairly new kid on the block: non-alcoholic fatty liver disease (NAFLD), which currently affects about 1.4 million Canadians. As the rate of obesity approaches 25% of the adult population — an additional 36% are overweight — weight-related disorders such as NAFLD are also increasing. “I always call NAFLD ‘Big Mac’ disease,” says Levy, “because it’s associated with eating high-fat diets and taking in way too many calories for your body to handle.”

A more serious form of NAFLD called non-alcoholic steatohepatitis (NASH), occurs when the liver becomes so clogged with fat that the immune system begins attacking it, eventually resulting in cirrhosis or cancer.

Hepatocellular carcinoma (HCC), the most common form of primary liver cancer (as opposed to metastatic cancer originating in the breast or colon), is also on the rise. Between 1984 and 2001, the incidence of HCC in males rose from four cases per every 100,000 Canadians to 5.5 per 100,000, and in females from 1.6 to 2.2 cases per 100,000.

Though there are some genetic components to NAFLD and NASH, for the most part, acquired liver disorders are preventable.

## TREATMENTS AND RESEARCH

Advances in antiviral and immunosuppressive treatments have made living with liver disease a possibility for many who would otherwise have faced transplantation or death. “I can see a time five years from now where, if everybody has access to the medications and takes them, hepatitis B and C will no longer be issues,” says Yoshida.

Researchers are also looking at ways to create an artificial liver akin to an artificial heart, bladder or dialysis machine — though the incredible complexity of the liver is making this task difficult. Others are working on regenerative stem cells to gene-transfer therapy to restore liver tissue and exploring the immunology of liver disease with a view to halting damage or facilitating repair.

In the meantime, as head of the largest organ transplant centre in the country, Levy is proud of the improvements in his specialty since the first successful liver transplant 40 years ago. “Transplantation has revolutionized the treatment of liver disease,” he says. Unfortunately, however, “there is a tremendous and tragic discrepancy between the number of patients who need a transplant and the number of organs available,” adds Yoshida.

In 2007, 480 liver transplants were performed across Canada, but 625 patients failed to receive an organ. Almost 70 transplants were performed with tissue from living donors — possible because the amazing liver is the only human organ that can regrow itself in host and donor.

Despite the great strides in treatment and research, there is still much to do, but that takes money. “Liver disease is underfunded,” says Levy, “because people tend to think that all liver disease is the product of bad living habits.” With new therapies and public awareness, Yoshida and Levy hope to see the need for transplants decrease steadily. “The whole thing is to prevent liver disease from developing into end-stage liver disease,” says Yoshida. “And I think that’s something that, with effort, can be accomplished over the next 15 to 20 years.”