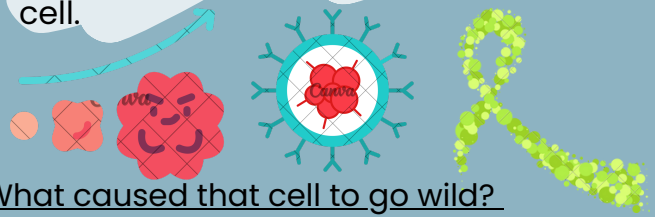
Genetics

HEPATIC CANCER & SMOKING

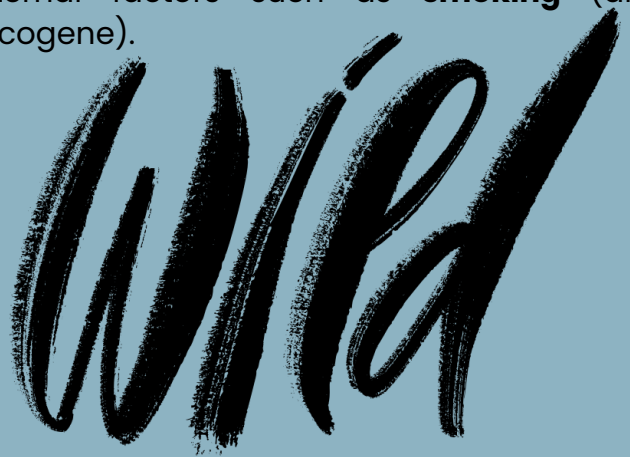
What is Cancer?

A cell has gone wild. It starts to reproduce and grow rapidly. It forms a bulk of cells. It continues multiplying. This is cancer. A bad, bad cell.



What caused that cell to go wild?

A **mutation** (change in the DNA sequence, resulting in a different set of instructions) causes **different** proteins to be made. This change allows the cells to **escape death** and avoid the immune system. This mutation can be random, genetic or due to external factors such as **smoking** (an oncogene).



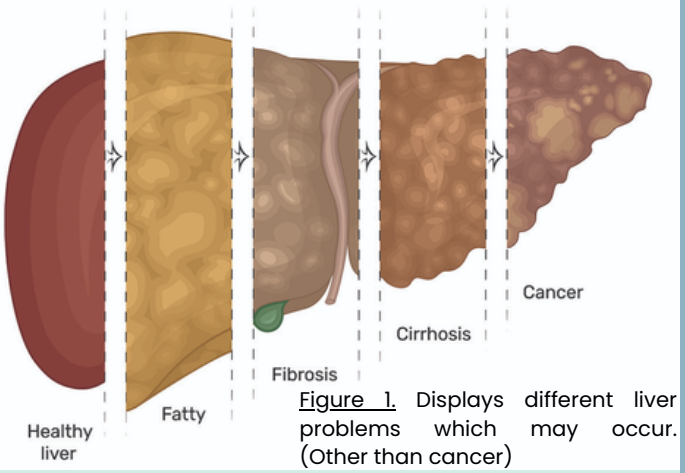


Figure 1. Displays different liver problems which may occur. (Other than cancer)

The Liver

-> The largest internal organ <-

- Situated in the upper right part of the abdomen, 'wedge shaped'
- Weighs ~1.5 Kg in adults

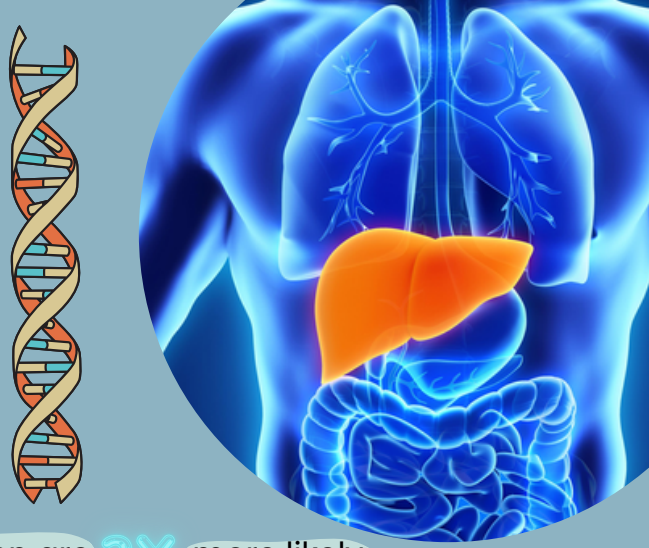
Vital for many processes including:

1. Metabolism - breaks down foods and drugs (detoxification)
2. Synthesis of clotting factors - helps stop bleeding in cuts, etc.
3. Secretes bile into the intestine - to absorb nutrients
4. Vitamin Storage
5. Immunity

Did You Know?

The liver can regenerate itself.

Even if up to 70% of the liver is extracted, the leftover tissue can regenerate and restore the liver's function.



Men are 2X more likely to develop liver cancer than women.

Liver Cancer Symptoms

- Symptoms don't usually occur in the early stages of primary liver cancer.

- Unintentional weight loss
- Loss of appetite
- Upper abdominal pain, swelling, bruising, bleeding
- Enlarged veins on the abdomen
- Nausea and vomiting
- Weakness and fatigue
- Abdominal swelling
- Jaundice - skin looks yellow
- White chalky stools
- Sometimes fever

By Elisa Westerhof

Diagnosis

As seen in figure 2 (to the right), Ultrasound imaging is used to see the internal structure without having to operate. This allows doctors to determine the extent, size, stage and location.

- Imaging Tests: ultrasounds, MRI, CT
- Blood Tests: reveal liver function abnormalities (enzymes, proteins e.g. bilirubin)

Classifying into Stages:

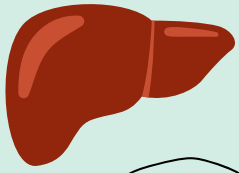
1 Small, hasn't spread

2 Grown, hasn't spread

3 Larger, may have spread
e.g. into the lymph nodes

4 Has spread from another organ
"Secondary" "Metastatic"

Risks:



- Chronic Hepatitis B or C
- Cirrhosis
- Inherited liver diseases
- Diabetes
- Non-alcoholic fatty liver disease
- Exposure to aflatoxins (mold)
- Excessive **alcohol** consumption over many years

OCTOBER
IS LIVER CANCER AWARENESS MONTH

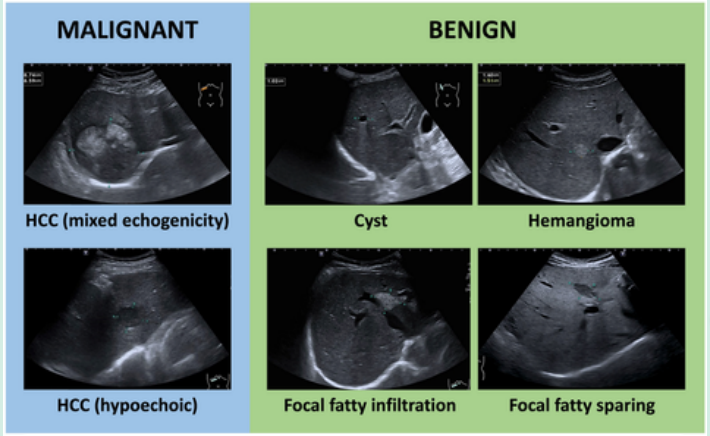
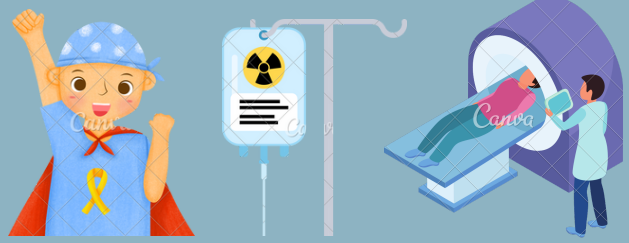


Figure 2. Displays an ultrasound of the liver, showing what different cancers look like (what the doctor sees).

Treatment

- **Surgery** to remove the tumour or have a live transplant
- **Radiation** (high powered energy from x rays and protons to destroy cancer cells and shrink tumours)
- **Chemotherapy** (powerful chemicals to combat and kill cancer cells)
- **Targeted drug therapy** (target specific abnormalities specific in cancer cells), specialised treatment

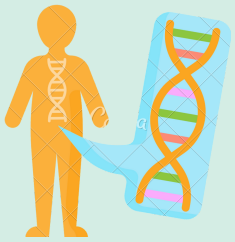


Commonly, liver cancer will metastasise (spread) from other organs. This will require different treatment depending on the origin.

Smoking & Genetics

Smoking a cigarette generates over 4000 CHEMICALS

A study in Europe showed that **47.6%** of **HCC** was associated with **smoking**!



A study from China and Taiwan, found that patients not suffering other diseases, the tumour suppressor gene p53 (considered as the "genome guardian") has been linked in decreased gene expression due to tobacco smoking.

Tar and **Nicotine** suppress the immune system, which in turn cannot examine tumour cells, **preventing** the initiation of **cell destruction**, allowing the tumour cells to grow.