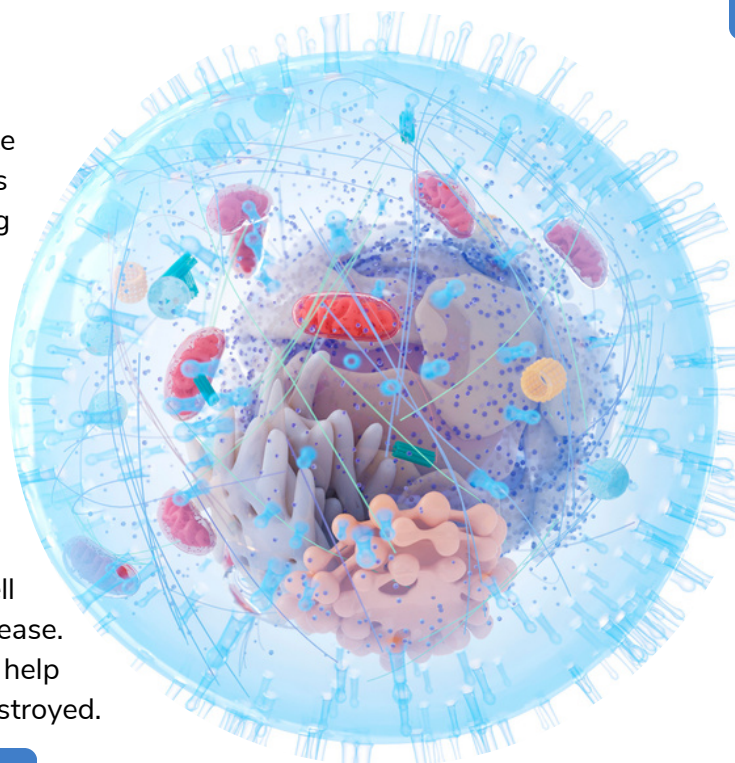


# What is Mitochondrial Dysfunction?

an impairment in the mitochondria's ability to convert food and oxygen into energy

## Mitochondrial Function



### Heat

When we are cold, we shiver to keep warm. Mitochondria can generate heat using brown fat. This is known as non-shivering thermogenesis.

### Cell Death

Mitochondria control the intrinsic pathway to apoptosis (the highly controlled process of programmed cell death), helpful for maintaining cell numbers and fighting disease. Simply put, mitochondria help decide which cells are destroyed.

### Calcium Homeostasis

Mitochondria help regulate the flow of calcium in and out of a cell's mitochondria. Calcium is necessary metabolic regulation, neurotransmitter function, muscle function, and blood clotting, and more.

### Gene Expression

Mitochondria have their own set of DNA (known as mtDNA) which holds the instructions for a number of proteins and other cellular support equipment across 37 genes.

### Energy Production

Mitochondria are the "powerhouse" of the cells. 90% of the energy (called ATP) needed to sustain life and grow is produced by the mitochondria inside our cells. Impairment to ATP energy production can trigger mitochondrial disorders.

### Innate Immunity

Mitochondrial antiviral signalling protein (MAVS) plays a key role in the innate response to viral infections, helping to induce antiviral and anti-inflammatory pathways and protect from infection.

## Mitochondrial Dysfunction **implicated as a possible trigger in the development of disease**

The DNA within mitochondria is more susceptible to damage than the rest of the genome. This is because free radicals, which can cause damage to DNA, are produced during ATP (energy) synthesis. When mitochondria dysfunction occurs, disruption and impairment of energy production leads to cell starvation and can cause a ripple effect of symptoms, resulting in disordered cell function and development of a broad range of diseases. Mitochondrial Disease refers specifically to a genetic mutation in the DNA.

## Diet & Nutrition **Diet and Lifestyle support for Mitochondrial function**

There are many ways to support mitochondrial health and energy function with a personalised nutrition and lifestyle approach. BANT nutrition practitioners assess and identify potential nutritional imbalances to understand how these may contribute to an individual's symptoms and health concerns, and recommend personalised dietary and lifestyle protocols to optimise nutrient intake in support of energy regulation.

