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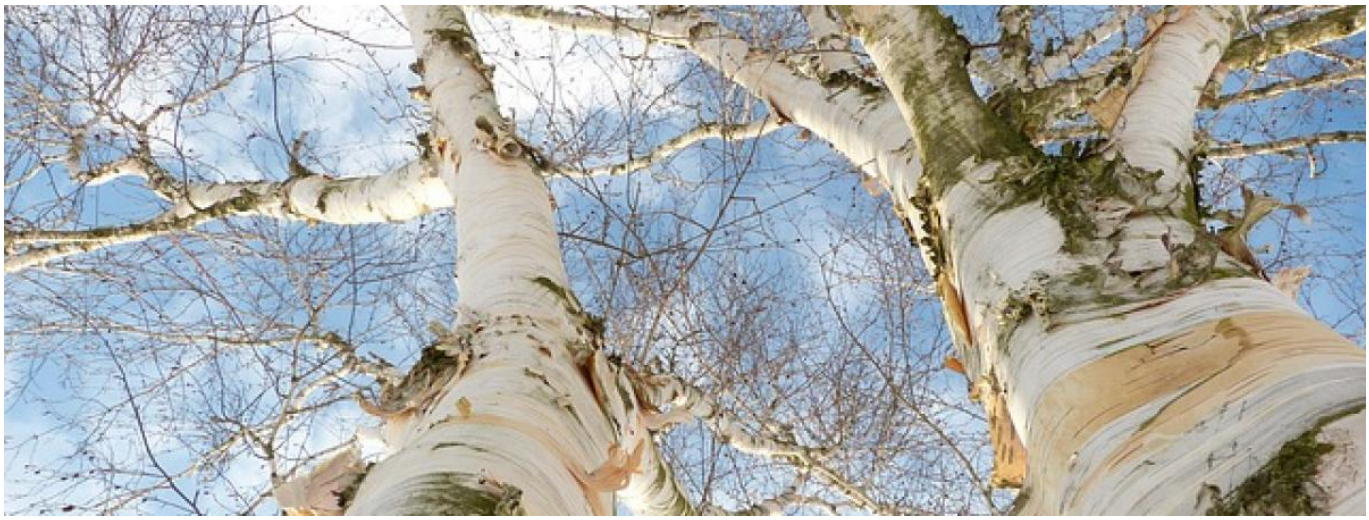

Faints can pose a real health risk, accounting for up to six per cent of all hospital admissions, but what causes them in the first place?

Paying off the debt

Although your brain makes up only two per cent of your body's weight, it needs about 20 per cent of the oxygen used by your entire body, and this is supplied by the three quarters of a litre of blood that passes through your brain each minute. If insufficient oxygen is received—even for a few seconds—the brain will cease to function; deprive the brain of oxygen for four minutes and damage may be permanent. Fainting lays you horizontal and so restores blood flow to the brain, paying off the oxygen debt.

Here are some of the reasons that blood (and oxygen) supply to the brain might be reduced.

The pump

When the heart fails to pump properly, perhaps after a heart attack when part of the heart muscle is damaged, it is difficult to maintain an adequate oxygen supply to the brain.

If the heart beats too quickly, such as in certain rhythm disorders [6], or in the condition known as POTS [7] (Postural Tachycardia Syndrome), it will not fill completely with blood before contracting, each beat being then reduced in blood volume, and in oxygen supply. A slowly beating heart, meanwhile, leaves the brain gasping for oxygen between each beat.

Heart valves [7], acting rather like swinging doors, can fail to fully open, limiting how much blood can leave the heart for the brain.

The pipes

Your blood vessels expand and contract, altering blood flow according to what you're doing. After a meal, for example, blood vessels in the abdomen widen, allowing for increased blood flow to aid digestion. Your brain may be momentarily deprived of oxygen, and you feel tired or faint.

Hot weather and exercise also expand blood vessels in your body; both reduce brain blood flow and you may faint, especially if dehydrated.

Why, though, do we faint at the sight of blood, or in response to pain, strong feelings or even passing urine? A strange "switch" in our nervous system that causes our hearts to paradoxically, and suddenly, slow down, instead of speed up, and our blood vessels to dilate, robs the brain of blood—and so you faint. The exact mechanism [8] involved is "one of the unresolved mysteries" of heart science, according to Professor Roger Hainsworth.

The pressure sensors

When we stand up, gravity causes almost a litre of blood to pool in our legs, dropping our blood pressure (and blood supply to the brain). Just as a barometer measures air pressure, we have baroreceptors near the heart that detect the pressure change. Acting very quickly, they can counter the drop by narrowing blood vessels in the legs and abdomen, forcing blood back brainwards. For some [9], this compensation doesn't happen and a faint is the only way to restore blood brain flow.

The pills

Have you ever wondered why your doctor gives you tablets to make you pass urine when the problem is with your heart and not with your kidneys? For heart failure and high blood pressure, water tablets can really work. Simply put, so-called diuretics [10] increase urine output to rid the lungs of water (reducing breathlessness), remove swelling from the limbs and drop blood pressure. However, too much fluid can be lost at times, resulting in low blood pressure and, perhaps, fainting.

Other drugs [11] reduce blood pressure by relaxing blood vessels in your lower body. This can make it difficult to return sufficient blood back to the brain, though.

The provisions

Sometimes your brain lacks oxygen because your whole body does. Fluid loss through haemorrhage, vomiting, diarrhoea or excessive sweating reduces the amount of blood available for the brain and the body—as does dehydration.

If your blood lacks glucose (the primary energy source for the brain), red blood cells or iron (important oxygen carriers), then your brain, being deprived, may lose consciousness and cause you to faint. Whilst some debts can be paid in instalments over time, with provisions promised presently, debts to the brain need repaying right away.

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