Why do we sweat more in summer?

By Rudrashis

Being born and brought up in Kolkata, and nowadays working in Bhopal, I can say that the friendship between sweat and summer is far more intimate in the place of my birth than in the place of my current residence. And this is just one of the many peculiarities about sweating. But first, let us see why we sweat at all.

Our bodies sweat in order to keep our body temperature within a physiologically harmless, normal range of 37-38C. Here we are talking about the core temperature of our bodies - the temperature of our inner tissues, of our organs and our blood. In comparison, the temperature of our skin and outer tissues is slightly lower and subject to more variation. So, when a body's core temperature increases to 39-40C, its brain sends messages to the muscles to slow down and the person begins to feel fatigued. Above 41C chemical processes are affected, cells are damaged and organs may stop working. So, when our core body temperature increases beyond the normal, the hypothalamus in our brain turns on a 'sweating switch' – it sends messages to the sweat glands to produce sweat and our skin produces a liquid that is a mixture of water and salts. This is an involuntary response of our bodies. When this liquid sweat evaporates/ vaporizes from the surface of our skin it removes excess heat from the skin, cooling it along with all the blood vessels in and around it. Cooled venous blood in blood vessels of the skin then returns to the body's core and counteracts rising core temperatures.

Summer Sweat

Now to answer Sawaliram's question. Our body is constantly producing heat – our muscles, many chemical reactions work to make heat. This heat increases our core body temperature and one way in which our body dissipates this heat is by sweating. In fact, much of the times we may be sweating a and not even notice it. At an ambient temperature of 21C our body dissipates heat efficiently enough to maintain a core body temperature easily (and we don't feel hot). As the air temperature increases above this, our body has to work harder to maintain its core temperature. In the blazing heat of summer, our core body temperature increases very quickly even with no exertion. And so, in response, our bodies sweat more in summer. While how much we sweat depends on various factors, in deserts or tropical regions, your ability to produce sweat can increase to about two to three liters per hour! This appears to be the maximum amount that you can produce.

Other Reasons to Sweat

How much you sweat also depends on factors other than ambient air temperature – amount of physical activity, age, gender, even how fit you are. For example, a fit person will start sweating earlier and easier. It may sound strange at first but as someone becomes fit, the body becomes more efficient at regulating the body's temperature. When you start sweating earlier the body cools down faster, which releases extra body heat and allows you to work out harder for longer. Body weight can have a say too. A heavier body has more mass, so cooling it properly requires more sweat to be pumped out than compared to a lighter body. Have any of these situations made your palms become sweaty and cold – the prospect of facing an interview panel, exams, before facing a tough questioning session in front of your parents or teachers, or before going out onto the stage to perform in front of a big audience? In

such situations the sweat glands of your palms, soles, armpits and sometimes the forehead are stimulated. That's when you feel a 'cold' sweat, or as that popular saying goes – you "break out in a cold sweat".

Sweat and Humidity

But what is so special about places like Chennai and Kolkata where summer and sweat seem to enjoy such a 'warm' relationship in comparison to places like Jodhpur and Bhopal?

A major factor that influences the rate of evaporation of water, like that in sweat, is the relative humidity of the air in the surrounding. If the air is humid, then it already has water vapour in it. And the nearer to saturation (where relative humidity will be 100%) it is, the lesser it will be able take from our sweating bodies. Chennai and Kolkata, with above 60% and above 70% average relative humidity respectively in May last year, have more humid air in general than in Jodhpur and Bhopal, with average relative humidity near or below 50% and 40% respectively in that same period. Therefore, sweat does not evaporate quickly enough in Chennai and Kolkata and starts to run down the skin instead, leaving the hot summer air with lots of time to forge a closer friendship. You are also likely to feel more wet/sweaty in a hot and humid place because of this. But sweat is not all about heat – you can break out into a cold sweat. Let's see how that happens.

Different Kinds of Sweat

In our bodies sweat is produced by glands. The average human being has nearly two and a half million sweat glands distributed over their body, except for the lips, nipples and external genital organs. The sweat gland is in the layer of skin called the dermis, where we also find nerve endings, hair follicles and so on.

There are two kinds of sweat glands that produce different kinds of sweat. The more numerous eccrine glands are found all over the body, particularly on the palms of the hands, soles of the feet and forehead. These glands are active from birth and open out as pores on our skin surface. The larger but fewer in number apocrine glands are however mostly confined to the armpits and the anal-genital area. They typically end in hair follicles rather than pores. They become active only at puberty producing sweat similar to that of the eccrine glands but with fatty acids and proteins in it, making it thicker and yellowish in colour. This is why underarm stains in clothing appear yellowish. Sweat itself has no odour, but when bacteria on the skin and hair metabolise the proteins and fatty acids, they produce an unpleasant odour. This is why deodorants and anti-perspirants are applied to the underarms instead of the whole body.

All this talk has made me a bit hot…anyone for a cold glass of buttermilk now? Or maybe a few months later!