THE INDEPENDENT

Bottled sunshine: The value of vitamin D

Why does flu break out as the nights draw in? Scientists have seen the light - we don't get enough of it.

Every winter, as the nights draw in and the weather grows cold, people start to cough, sniffle and run a fever. Patients crowd doctors' surgeries and sales of painkillers, hot lemon drinks and cough syrup soar. Flu is back.

But why? What is it about flu that means outbreaks only occur in the winter? Isolated cases occur throughout the year, as reported to the Royal College of GPs' Flu Monitoring Unit in Birmingham, proving that the virus is in constant circulation year-round.

Now a group of researchers has come up with a novel answer to the conundrum. The "seasonal stimulus" behind the annual winter flu epidemics is a lack of vitamin D due to shorter days and lack of sunlight.

And they have even suggested that by taking a mega-dose of the vitamin at the first sign of the illness, its worst symptoms might be alleviated - which could prove to be a potential life-saver in the event of the threatened avian flu pandemic.

Flu kills 3,000 to 4,000 mainly elderly people in the UK in a mild year, 20,000 to 30,000 in an epidemic year, and could kill tens or even hundreds of thousands more in the case of a pandemic.

The traditional explanation for the winter flu epidemics is that we tend to crowd indoors in the winter months, which aids the spread of the virus. Fifty years ago, when millions of manual labourers earned their living working outdoors, that may have been true.

But in the modern world, where most people work in offices and factories, travel on buses and trains, and share the same indoor spaces in summer and winter, the explanation rings hollow. Some of the people most vulnerable to flu - elderly people living in nursing homes - are there all year round yet are at greatest risk from the virus in winter, much like everybody else.

The seasonal nature of flu has puzzled scientists for decades. Twenty-five years ago, a British researcher called Edgar Hope-Simpson, who won fame after discovering the cause of shingles (he was the first person to link the painful condition to the chickenpox virus) proposed that an unknown seasonal factor lay behind the winter surfeit of flu.

He observed that countries lying on the same latitude, which have short winter days and long summer ones, tended to experience flu outbreaks at the same time. Epidemics that took place in Great Britain in the 17th and 18th centuries also occurred simultaneously across the country - long before modern transportation could explain its rapid dissemination.

Dr Hope-Simpson published his findings in a book which suggested that the missing link could be "solar radiation". Almost a quarter of a century later, in April 2005, an outbreak of influenza swept through Atascadero State Hospital in California, which is a maximum-security institution for the criminally insane similar to Broadmoor in England.

John Cannell, a psychiatrist at the hospital, watched as one ward after another ended up being quarantined at the hospital and more and more inmates fell ill with the chills, aches and fever that are typical of influenza. Then he noticed something unusual.

"First the ward below mine was infected, and then the ward on my right, left, and across the hall - but no patients on my ward became ill," he said. "My patients had intermingled with patients from infected wards before the quarantines. The nurses on my unit cross-covered on infected wards. How did my patients escape infection?"

While pondering this puzzle, Dr Cannell came across a paper published in Nature by a team of researchers from the University of California at Los Angeles showing that vitamin D stimulated the body's production of antimicrobial peptides which have been shown to attack bacteria, fungi and viruses, including the influenza virus, and which play a key role in keeping the lungs free from infection.

Dr Cannell had a long interest in vitamin D and had offered his patients large daily doses in the belief that they would ward off a range of illnesses from cancer to depression. He believes, along with a growing body of experts on the matter, that vitamin D deficiency is widespread and unrecognised because current recommended levels are too low for optimum health.

"A single, 20-minute, full-body exposure to summer sun will trigger the delivery of about 20,000 units of vitamin D into the circulation of most people within about 48 hours. Compare that to the 100 units you get from a glass of milk or the several hundred daily units the US government recommends as adequate intake," he said.

Throughout evolutionary history, humans obtained tens of thousands of units every day from the sun. Even after migrating to temperate latitudes, where skin colour rapidly lightened to allow for more rapid vitamin D production, humans worked outdoors. Only in recent decades as we have increasingly lived and worked indoors, travelled in cars and lathered on sunblock have levels of vitamin D sunk chronically low, according to Dr Cannell.

All the patients that were on Dr Cannell's ward were taking 2,000 units of vitamin D every day. Could that be why they avoided getting the flu? Although unknown to Dr Hope-Simpson, vitamin D not only increases production of antimicrobial peptides, helping the body fight infection, it simultaneously acts to "damp down" the immune system, which prevents it from releasing too many inflammatory cells - the cytokine response - into infected lung tissue.

Scientists who were studying the victims of the 1918 flu pandemic, the worst in history in which an estimated 40 million people died around the world, were shocked to find that in some cases their lungs were destroyed. Inflammatory cytokines triggered the complete destruction of the normal epithelial cells which lined the respiratory tract. In effect, the flu virus triggered an overwhelming response from the body's defences that ended in death. Vitamin D has since been found to prevent this severe inflammatory reaction, Dr Cannell said.

"I subsequently did what physicians have done for centuries. I experimented, first on myself and then on my family, trying different doses of vitamin D to see if it had any effect on viral respiratory infections," Dr Cannell said. "Several of my medical colleagues experimented on themselves by taking three-day courses of pharmacological doses (2,000 units per kilogram of bodyweight per day) of vitamin D at the first sign of flu. I also asked numerous colleagues and friends who were taking physiological doses (which was 5,000 units per day in winter and fewer or none in summer) if they ever got colds or flu and if so how severe the infections were."

The results of this personal research convinced Dr Cannell that vitamin D did indeed confer protection against the virus. "Physiological doses reduce the incidence of viral respiratory infections and pharmacological doses significantly ameliorate the symptoms if taken early in the course of the illness," he said.

However, he added that the observations were too personal and anecdotal to qualify as scientific evidence. Instead he contacted Professor Rheinhold Vieth, from the Mount Sinai Hospital in Toronto, and Ed Giovannucci from the Harvard School of Public Health and suggested his hypothesis that vitamin D could be the "seasonal stimulus" for winter flu that was first put forward 25 years ago by Dr Hope-Simpson.

Together with five other experts, who included Professor Michael Holick of Boston University and Professor Cedric Garland of the University of California, they drew up the paper that was published online last week in the journal titled Epidemiology and Infection, where Dr Hope-Simpson had published most of his work three decades previously.

"We propose that annual fluctuations in vitamin D levels explain the seasonality of influenza. Although our paper also discusses the possibility that [high] doses of vitamin might be useful in treating some of the one million people in the world who die of influenza every year, this is only a theory. Like all theories it must be tested in well controlled scientific experiments.

However, as vitamin D deficiency has repeatedly been associated with many of the diseases of civilisation, it is not too early for physicians to aggressively diagnose and adequately treat it." Professor John Oxford, who is an expert on influenza and a professor of virology at Queen Mary College, London, welcomed this theory. "This is a reasonable hypothesis with some scientific underpinning but it needs putting to the test. Vitamin C has been discussed in relation to flu and had its ups and downs for years. It is interesting to put vitamin D in the frame for people to take a look at."

"However, I wouldn't advise anyone to rely on vitamin D to protect themselves against flu. People should think about anti-flu vaccination first, followed by anti-viral drugs, good personal hygiene and then vitamin D," he said.

"We could test the theory by getting some young volunteers, whacking up their vitamin D levels in one group while holding it down in the other and then giving both groups a dose of flu. It could be carried out quite easily and it would not be a silly thing to do."

Sunlight, skin and vitamin D: the facts

* About 90 per cent of the body's supply of vitamin D comes from the action of sunlight on the skin, but grey skies and short days between October and March mean that 60 per cent of the UK population are deficient in the vitamin.

* Vitamin D is essential for healthy bones and skin and protects against rickets in children and osteoporosis in the elderly.

* The vitamin cuts the risk of pancreatic cancer by almost half (43 per cent) when taken at the recommended daily dose of 400IU (international units), according to a study of 46,000 men and 75,000 women by researchers from the University of Wisconsin that was published this week.

* A daily dose of Vitamin D could cut the risk of cancers of the breast, colon and ovary by up to half, a 40-year review of research concluded last year.

* Doctors writing in the American Journal of Public Health proposed a daily dose of 1,000 international units, two and a half times the current recommended dose in the UK.

* Countries around the world have begun to modify their warnings about the dangers of sunbathing, as a result of the growing research on vitamin D. The Cancer Council Australia said for the first time last year that some exposure to the sun was healthy.

* Vitamin D lowers insulin resistance which is one of the major factors leading to heart disease.

* The vitamin influences the growth of a variety of cell types and plays a role in the repair and remodelling of lung tissue.

* It acts as an immunosuppressant and may help protect against the development of type 1 diabetes.

* It influences production of a hormone that regulates calcium levels, in the body which in turn help to regulate blood pressure.

* Lack of vitamin D in the months before birth may affect the developing foetus in the womb and increase the risk of schizophrenia.

* Lack of the vitamin has been linked with the development of multiple sclerosis.

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http://www.independent.co.uk/life-style/health-and-wellbeing/health-news/bottled-sunshine-the-value-of-vitamin-d-415808.html