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How SARS spread its tentacles worldwide

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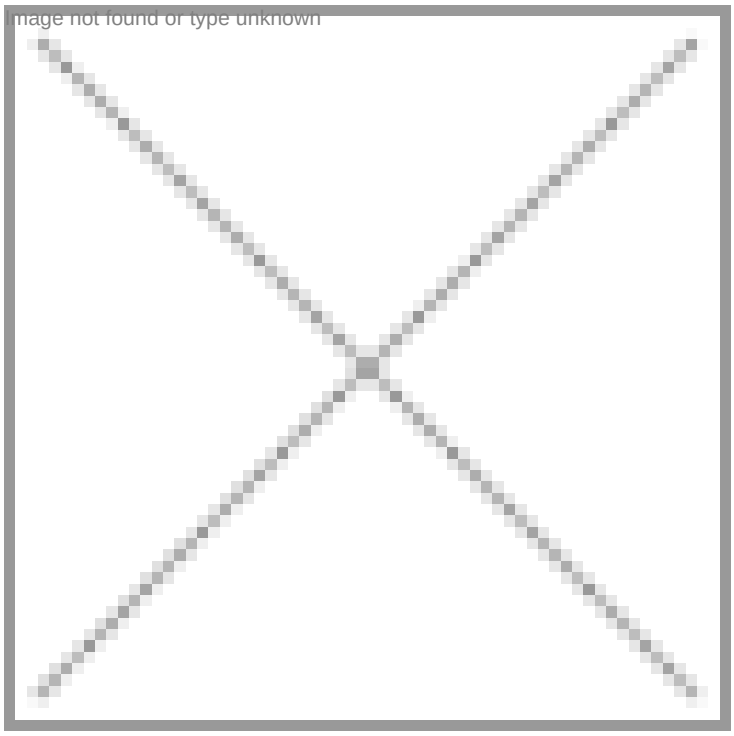

In retrospect, it has now emerged that an outbreak of a similar illness in Guangdong Province in Southern China which started in November 2002, was the start of SARS. It is a new viral infection that hundreds of scientists around the globe are working on. SARS is a respiratory illness that has recently been reported in Asia, North America, and Europe. Dr Carlo Urbani, the WHO (World Health Organization) scientist first alerted the world to the existence of SARS in Hanoi, Vietnam. While checking about the illness, he too contracted it and died in Bangkok hospital on March 29.

The signs and symptoms in infants and children may not follow the exact pattern that is seen in adults. Consequently, doctors are on the lookout for atypical forms of presentation in very young infants. In adult patients with SARS, there is usually a fever, which may be accompanied by chills and other symptoms such as headache and general body aches. In the early stages of the illness, patients may have these nonspecific symptoms (headaches and general body aches). In addition to these symptoms, SARS may be associated with other symptoms including loss of appetite, malaise, confusion, rash and diarrhea. Severe respiratory illness may occur before abnormalities are noted on chest X-rays. At the outset the illness may be very mild.

Scientists have concluded that the virus belongs to the coronavirus family which is mostly known to cause cold or mild pneumonia. The virus family is known after its crown-like shape of the surface. A coronavirus is transmitted from person to person by droplets. When the sick person coughs or sneezes, the virus can be carried in saliva droplets to people nearby and infect them. The incubation period for SARS is typically two to seven days; however, isolated reports have suggested an incubation period as long as 10 days. The illness usually begins with a fever (100.4°F [38.0°C]). SARS infected person gets a high fever accompanied by cough in Stage I. Respiratory distress may occur in Stage II. In Stage III, the patient may go into an acute respiratory distress syndrome and may die. The patient could also have shortness of breath or other breathing

problems and a dry cough. Some people may get a headache, stiff or achy muscles, a loss of appetite, fatigue and diarrhoea.

The epidemic has so far infected 4,000 people and killed at least 250. SARS originated in mainland China. While cases there may be declining, according to health officials, they seem to be on the rise in far-apart places like Hong Kong and Canada. A few cases have been reported in India too from people who had apparently picked up the infection during travel in the affected areas of Asia.

It is a disease caused by a virus and, therefore, antibiotics are not effective. The British Medical Journal says steroids and the antiviral agent, ribavirin, have been tried but their efficacy remains unproven. The National Institute of Communicable Diseases says the only possible treatment is medicine for fever and syrups for cough relief. WHO says about 3 per cent of those infected have died. It seems that close contact with someone who has it is necessary. A large number of people who have contracted SARS so far have either been hospital workers or members of a victim's family.

Scientists have offered several explanations for why SARS has turned deadly. An unknown human coronavirus could have undergone some mutations and changed its genetic makeup. Or an animal coronavirus could have mutated before jumping to humans.

The new findings suggest that the SARS virus probably underwent natural mutations. While the DNA sequencing does not establish the source of the virus, it is believed to have come from livestock. How it entered humans is not known.

Scientific Details

Bronchial tissue from a victim of SARS in Toronto was grown in Vero cells (African green monkey kidney cells) in order to reproduce the ribonucleic acid (RNA) of the disease causing coronavirus. In a process known as 'reverse transcription,' the team made a DNA copy to be used in a biochemical reaction. The Centers for Disease Control and Prevention (CDC) announced that it has sequenced the genome for the coronavirus believed to be responsible for the global epidemic of severe acute respiratory syndrome or SARS. The CDC sequence is nearly identical to that determined by a Canadian laboratory. The significant difference is that the CDC-determined sequence has 15 additional nucleotides, which provides the important beginning of the sequence, CDC scientists said.

All of the sequence, except for the leader sequence, was derived directly from the viral RNA. The genome of the SARS coronavirus is 29,727 nucleotides in length and the genome organization is similar to that of other coronaviruses. Members of this viral family tend to have between 29,000 and 31,000 nucleotides. Open reading frames corresponding to thepredicted polymerase protein (polymerase 1a, 1b), spike protein (S), small membrane protein (E), membrane protein (M) and nucleocapsid protein (N) have been identified.

Dr Steven Jones, head of bioinformatics at the Genome Sciences Centre, Canada, says the virus detected appears to be a new type of coronavirus bearing only modest similarity to those coronaviruses previously characterized. 'The next step for the Genome Sciences Centre is to analyze the proteins that the virus produces, to try and find clues for why this is such a virulent pathogen.

Treatment

At present, the most efficacious treatment regimen, if any, is unknown. In several locations, therapy has included antivirals such as oseltamivir or ribavirin. Steroids also have been given orally or intravenously to patients in combination with ribavirin and other antimicrobials. In the absence of controlled clinical trials, however, the efficacy of these regimens remains unknown. Early information from laboratory experiments suggests that ribavirin does not inhibit virus growth or cell-to-cell spread of one isolate of the new coronavirus that was tested. Additional laboratory testing of ribavirin and other antiviral drugs is being done to see if an effective treatment can be found.

Scientists around the globe are trying to get to the depth of this problem and to find a permanent cure but by the time the problem is fixed there may be many more innocent victims of SARS. We hope an effective test procedure and treatment is discovered at the earliest.

Anna Susan Jacob

Country	Cumulative number of case(s)	Number of new cases since last WHO update	Local chain(s) of transmission	Number of deaths	Nu
Australia	3	0	0	3	
Brazil	2	0	0	0	
Canada	132	0	12	54	
China	1959	447	86	1187	
China, Hong Kong Special					
Administrative Region	1402	44	94	436	
China, Taiwan	29	0	0	17	
France	5	0	0	1	
Germany	6	0	0	4	
India	1	0	0	1	
Indonesia	1	0	0	0	
Italy	3	0	0	2	
Japan	5	1	0	0	
Kuwait	1	0	0	1	

Malaysia	6	1	1	0	
Mongolia	3	0	0	3	
Philippines	2	1	1	1	
Republic of Ireland	1	0	0	1	
Romania	1	0	0	1	
Singapore	178	1	16	104	
South Africa	1	0	0	0	
Spain	1	0	0	0	
Sweden	3	0	0	0	
Switzerland	1	0	0	1	
Thailand	7	0	2	5	
United Kingdom	6	0	0	5	
United States	39	NA	0	NA	
Viet Nam	63	0	5	46	
Total	3861	495	217	1873	

Cumulative number of reported probable cases of Severe Acute Respiratory Syndrome (SARS)