

## **COLUMBUS (1492) AND THE ORIGINS OF EUROPEAN SYPHILIS?**

**(A) The Toronto Star, 15 January 2008**

### **New twist on old scourge: Syphilis spreads to the Old World**

1493: Earliest known European outbreak of the disease occurs in Spain. It very rapidly spreads across Europe.

1495: a plague broke out among invading French troops in Naples.

1530: The Italian physician, astronomer and poet Girolamo Fracastoro first publishes the term "syphilis" in his medical poem "Syphilis sive Morbus Gallicus." By this time, the outbreak has begun to subside.

18th century: Dr. Benjamin Rush, one of the signers of the U.S. Declaration of Independence, links masturbation to venereal diseases such as syphilis.

1842: In A Practical Treatise on Venereal Diseases, American-born French researcher Philippe Ricord identifies syphilis' three stages. He also describes the devastating effects of the tertiary, or final, stage.

1858: In History of Prostitution: Its Extent, Causes, and Effects throughout the World, Dr. William W. Sanger estimates at least 40 per cent of the prostitutes he interviewed for the book in New York's Indigent and Convict Hospital in the mid-1850s had syphilis or gonorrhea.

June 1943: After the widespread use of penicillin to treat battlefield infections in World War II, John Mahoney, a leading expert on the treatment of syphilis, begins a study of the effects of penicillin on the disease.

June 1944: The U.S. Army adopts penicillin as the standard treatment for syphilis.

1945: After centuries of experimental treatments with such substances as mercury and arsenic, penicillin is widely accepted as the most effective treatment for syphilis.

Compiled by Peggy Mackenzie and Andrea Hall/Star Library

Sources: [www.pubmedcentral.nih.gov](http://www.pubmedcentral.nih.gov), Oxford Online, Star files, News wires

**Research shows syphilis likely came to Europe through Columbus' men returning from America**

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Tanya Talaga  
Health Reporter

Christopher Columbus and his crew are likely to blame for the scourge of syphilis that began to sweep through Europe 500 years ago.

For years, scientists have debated the origins of syphilis, a sexually transmitted disease that drove scores of Europeans mad during the late Renaissance before killing them. New evidence, however, gives credence to the theory Columbus brought the disease to the Old World from the Americas.

"Essentially in the last few decades, there has been a movement that says syphilis always existed in Europe and prior to 1495, Europeans didn't know how to distinguish between it and other diseases like leprosy," said Kristin Harper, an evolutionary biologist from Atlanta's Emory University, who led the study of syphilis's origins. Harper's research is published online today in the Public Library of Science Neglected Tropical Diseases.

After examining the family of bacteria known as the treponemes, they discovered the sexually transmitted syphilis pathogen is closely related to yaws, a tropical disease found in some parts of South America and Africa. Yaws is spread through skin-to-skin contact and usually strikes during childhood.

"It looks like what happened is that syphilis evolved from yaws," said Harper, who studied strains of yaws from isolated people living in Guyana's interior. Ve'ahavta, the Canadian Jewish Humanitarian and Relief Committee, collected the samples on a medical mission.

"When we think about the contact between Europeans and native Americans we always think of diseases going one way. Europeans brought over smallpox and measles and other devastating diseases," she said in an interview. "This is an example of a disease that looks like it went the other way."

Columbus first landed in the Bahamas in 1492 with three ships, returning to Spain in March 1493.

In 1495, a plague broke out among invading French troops in Naples. The troops, who were largely for-hire or merchant soldiers, returned to their homes and spread the disease across Europe, the study said.

However, it's not clear how syphilis evolved from yaws. One theory is that a subspecies of treponema from the tropical New World mutated into the syphilis-causing subspecies to survive the colder, more hygienic climate of Europe.

Syphilis first appears as an open sore. Today, it is easily treated with medication. Untreated, it can cause heart, nerve and brain damage.

Toronto is experiencing a re-emergence of infectious syphilis, said Dr. Rita Shahin, associate medical

officer of health for Toronto Public Health. After decades of negligible numbers, an increase in cases started in 2002 and peaked in 2004. There were 212 cases reported to Toronto Public Health by October of last year and 247 cases in 2006.

The outbreak has occurred in gay and bisexual men and has yet to spread to the heterosexual population as it has in some western Canadian cities and the U.S., she said.

Caroline Cameron, an associate professor at the University of Victoria's department of biochemistry and microbiology, said she's always believed syphilis originated in the New World. "This gets us closer to establishing what the origin of this disease was," she said.

Perhaps it is an early example of globalization and the spread of disease, said Cameron, whose syphilis research is funded by the Canadian Institutes of Health Research.

**(B) The Globe and Mail: Wednesday, 15 January 2008**

## **AN AGE-OLD MYSTERY: INFECTIOUS DISEASES**

### **Columbus brought syphilis to Europe, study shows.**

Researchers say they have found the closest relative of the bacteria in South America, proving the disease originated in the New World

CAROLYN ABRAHAM

MEDICAL REPORTER

15 January 2008

The Dutch called it the Spanish disease. The Russians called it the Polish disease. The French blamed the Italians and the Italians blamed the French.

Ever since Europe recorded the first epidemic of syphilis in 1495, fierce debate has raged over the origins of the best-known venereal disease. Was it a homegrown, Old World bug that suddenly stalked the boudoirs of Renaissance Europe? Or did Christopher Columbus bring the sexually transmitted infection back from the New World, just like tobacco?

The mystery has inspired poems, historical papers, scientific studies, books and, quite likely, barroom brawls through the centuries. But medical experts from Canada and the U.S. believe they have now solved it.

In an epic tale of detective work and serendipity, researchers say they have genetic evidence that Columbus and his men, after mingling with natives of the Americas, did indeed sail home to Europe with a secret stowaway - a bacterial strain that spawned one of human history's deadliest plagues.

"I definitely think that syphilis, or the progenitor strain that led to syphilis, came from the New World to the Old World. ... We found the closest relative of [the syphilis bacteria] in South America," said Kristin Harper, a researcher with Emory University in Atlanta and lead author of the report published online today in PLoS, the Public Library of Science journal.

The researchers tout their work as the most extensive genetic study ever undertaken of *Treponema*, the bacterial species behind syphilis, and determined the sexually transmitted germ to be a mutated version of a microbe that originally came from the Western hemisphere.

Collected by a team of Canadian doctors who happened to be tending Guyana's poor, the crucial sample was scraped from the sores of children in a remote corner of the Amazon.

Co-author Michael Silverman, an infectious diseases specialist and assistant professor of medicine at the University of Toronto, said the children are Akwio, relatives of the native people Columbus encountered on his famed voyages to the New World.

"Europeans gave them guns, smallpox, tuberculosis and so many other illnesses," Dr. Silverman said, "so in a way it's nice to know something went the other way."

Both Ms. Harper and Dr. Silverman - who became unlikely partners working an age-old puzzle - believe syphilis to be a tragic story of a New World bug transformed by sexual contact with Old World men.

### **European plague**

Before antibiotics made syphilis a highly curable infection, it killed five million after it emerged in 15th-century Europe, some estimates say.

Ulcers and weeping sores spread from the genitals to cover the entire body. It could scar bones and dement the brain, casting the sheen of madness over its victims.

Ms. Harper was captivated by the syphilis mystery after reading a book about it as a 21-year-old college student. "It was the most amazing thing. I was totally fascinated. I knew I was going to try and answer that question."

She read that the plague first broke out among French troops invading Naples in 1494 and that Columbus and his men, just returned from the Americas, were immediately suspect; there were reports of syphilis symptoms among Columbus's crew. But others felt it had always been there, and only after 1495 did Europeans distinguish syphilis from other diseases such as leprosy.

In 2002, working toward her doctorate at Emory, Ms. Harper decided genetics might hold the answer. Scientists had just sequenced the full genome of *T. pallidum*, the syphilis-causing bacteria, in 1998, and Ms. Harper thought if she could compare its DNA to related strains, she might be able to pinpoint its ancestor.

Dr. Silverman never intended to work in South America. He had just graduated as an infectious disease specialist and was eager to start a practice, but an older physician who had spent a lifetime caring for patients in impoverished regions convinced him to fly to Guyana in 1993.

That trip launched an annual expedition, and in 1996 Dr. Silverman helped found Ve'ahavta, a Canadian Jewish Humanitarian and Relief Committee. As its medical director, he now leads professional volunteers to Guyana each winter.

"Some of these communities had never seen a doctor before," he said. "We started along the coast and worked our way into the interior."

By 1998, the medical mission reached Bartica, the last semblance of urbanity for gold and diamond hunters heading deep into the bush. In the surrounding communities, reachable only by boat, Dr. Silverman saw the infection on the native children for the first time.

### **Children covered in sores**

Ms. Harper, now 27, knew from the outset it would be complicated.

Syphilis belongs to a family of *Treponema* bacteria that includes three other subtypes that cause skin infections, but only *T. pallidum*, the syphilis bug, is sexually transmitted.

Untreated, all *Treponema* infections can leave telltale lesions on the bones, and a few reports of scarring found on the skeletons of pre-Columbian remains has suggested syphilis might always have existed in Europe. But Ms. Harper said there is no way to know if such bone lesions were the result of syphilis or other *Treponema* skin infections, such as yaws.

At the same time, *Treponema* bacteria don't grow easily in a lab and not many are available for study. Only five labs were known to keep strains of yaws. Meanwhile, yaws was believed to have vanished from most of the world, and it had not been seen anywhere in the Americas for decades - until Dr. Silverman discovered it in Guyana.

The children were hard to miss, creeping through the villages like lobsters with their sore-covered limbs and infected bones, bent and bowed. The maiming infection had spread among children playing sleeveless and bare-legged.

But still it nagged him - how could this be yaws? During the 1950s and 1960s, the World Health Organization had waged a treatment campaign against yaws. In 1985, he recalled, a report had declared the disease eradicated in the Western hemisphere.

"There had been no reported cases since the '70s," he said.

Nor did the disease look like textbook cases. Instead of the hallmark raspberry-shaped sores of yaws, the Guyanese children were riddled with round, red ulcers.

"It looked like syphilis!" he thought. For a moment, Dr. Silverman was struck sick. Had he stumbled into a widespread network of child sex abuse? But that made no sense. "These children had sores on their shins and elbows, not where you would expect to see them if it was syphilis."

So what was it? And how could he find out without power or proper lab equipment, in a remote patch reachable only by boat and 16 kilometres of portaging?

The Ve'ahavta team dragged generators up Guyana's muddy slopes, jumped them with battery cables and strapped flashlights to their heads. The blood analysis confirmed Dr. Silverman's first assumption - yaws.

Further study revealed the disease was endemic in the region, infecting 5.1 per cent of children. But by 2001, after the Canadians gave the children penicillin tablets, the incidence dropped to 1.6 per cent and the numbers kept shrinking.

In 2003, Dr. Silverman and his colleagues reported the success of their South American yaws control program in an issue of the journal of Clinical Infectious Diseases that Ms. Harper happened to read.

"It was such a lucky coincidence that I saw it," she said.

In the winter of 2005, Ms. Harper reached Dr. Silverman on his cellphone; he was at Toronto's Pearson airport on his way to Guyana.

"She sounded really young and she told me she loved our work," Dr. Silverman recalled. "I said I was in airport security and it wasn't the best time."

"You know you're the only person to have seen yaws in the Western Hemisphere for about 35 years?" she said.

"I hope to be the last," he said, "We're heading down there right now. ... We're trying to make it extinct."

Ms. Harper explained her study and asked Dr. Silverman to collect bacterial samples from the Guyanese children. He said he didn't know if any children would still be infected - but he promised to try.

On that 2005 trip, the Canadian doctors found no yaws cases in or around Bartica. But they flew deep into the interior, over waterfalls and rapids, then sailed to the villages of the Akwio people. There, in the Jawalla area, they found the only two cases of yaws, in girls, aged eight and 13, both with lesions on their knees.

Since Ms. Harper had called after he packed, Dr. Silverman had no way to properly collect a bacterial sample for storage. "We ended up using tongue depressors to scrape the wounds," he said. "It wasn't as perfect as we would have liked, but they're probably the last cases we'll ever see."

### **The Guyana strain**

Although the samples were degraded, Ms. Harper, after comparing the DNA from more than 20 *Treponema* subtypes, said it was possible to identify the Guyana strain as the closest ancestor of the sexually transmitted bug.

"It gave us an insight into an organism in transition," Ms. Harper said. She called Dr. Silverman immediately: "Guess what?" she said. "You found the missing link!"

Ms. Harper said it's likely that *Treponema* emerged first in Africa, became yaws and followed the

route of modern humans off the continent and up through Asia. It was then likely carried into the Americas by the Asian ancestors who gave rise to America's native populations and thrived in South and Central America.

"It may be that it is so hot and wet in these tropics," Dr. Silverman said, "that [the bacteria] evolved the ability to form ulcers, more like syphilis."

But when Columbus and his men met the New World natives, he said, they would not have contracted the disease in the same way it had spread among the local children.

"It didn't develop sexual transmission in the Amerindians because of their different clothing. But Europeans wore long pants and long sleeves, and the bacteria evolved quickly" to find another mode of transfer - sexual contact.

The only skin-to-skin relations Columbus's men conceivably had with natives, Dr. Silverman said, was "when they dropped their pants."

Once Columbus and his crew ferried the bug back to the colder climates of Europe, researchers say it became an advantage for the bug to bury itself in the body's warmer, moist and less-exposed folds.

In a commentary also published in PLoS, some researchers warn that firm conclusions should not be drawn from the degraded Guyana samples. But Ms. Harper said the genetic similarity between the two strains "is a pretty high coincidence."

Michael Gardam, infectious disease specialist at Toronto's University Health Network, called the findings "fairly striking" and "convincing." He said the new work jibes with the epidemiology of syphilis as a new infection that struck Europe.

"Often when a new organism gets introduced into a new population that has no existing immunity ... you would expect that at first it would be quite virulent," he said. But over time, Dr. Gardam explained, "it's not in a pathogen's best interest to kill everybody."

Dr. Silverman has continued to look for yaws in South America over the past two years. "But we haven't seen a single case," he said.

As for syphilis, Ms. Harper doubts her project will halt centuries of debate. "I'm sure there will still be a lot of controversy," she said. "We've seen it with HIV and other infections, especially sexually transmitted diseases. People are always so tempted to blame someone else."