EPIDEMIOLOGIA

Influenssa

"Of the 109 cases confirmed to date in Viet Nam, 52 have been fatal"

WHO, 19.02.2008

ERIK VEIGAARD / AP

Tutkijat selvittivät hautojen sisältöä maanalaisella tutkalla Huippuvuorilla viime torstaina.

Espanjantau
yhä hautausr

Tiedemiehet toivovat kehit

TERHI WIDTH

OSLO–Espanjantaudin aiheuttaneen viruksen etsintä jatkui keskiviikkona täyttä vauhtia Huippuvuorilla, vaikka virusjahdissa oleva kansainvälinen tutkimusryhmä koki alkuviikosta takaiskun.

Tutkimusryhmän tarkoituksena on kaivaa esiin Huippuvuorten ikiroutaan haudatun seitsemän norjalaismiehen ruumiit ja eristää espanjantaudin aiheuttanut virus kudosnäytteistä.

Viruksen löytyminen auttaisi espanjantaudin arvoituksen ratkaisemisessa ja vastaavien rajujen influenssojen rokotteiden kehittämisessä. Espanjantauti tappoi 20–40 miljoonaa ihmistä vuosina 1918–1920.

Tutkimusretkikuntaa avustava

kaivausryhm
päässyt puo
vyyteen ja
seen kahteen

Tutkimusr
tyi tiistaina,
syvyydestä,
ta löytyi sei

”Arkeolog
kaan arkut
teellisen uu
dollista, ett
tänne myöh
taiseksi ole
minkäänlais
sanoo tutki
naattori, pro
Hänen miel
syytä antaa
kaikki mah
tu.

Espanjant
viruksen lö
kaan ole ma

Espanjantauti eli vuoden 1918 influenssa oli maailman pahin *pandemia*

Espanjantauti tappoi 20-40 miljoonaa ihmistä maailmassa

Yhdysvalloissa kuoli 675 000, mikä on 10 kertaa enemmän kuin samanaikaisen ensimmäisen maailmansodan amerikkalaismenetykset

Erikoisen epämiellyttävää on tietää, että influenssavirus tappoi varsinkin nuoria, terveitä aikuisia ihmisiä

Epämiellyttävää on myös tietää, että influenssavirukset ovat koko ajan harrastamassa rekombinaatiota esimerkiksi kotieläimissä: kanoissa, sioissa, hevosissa

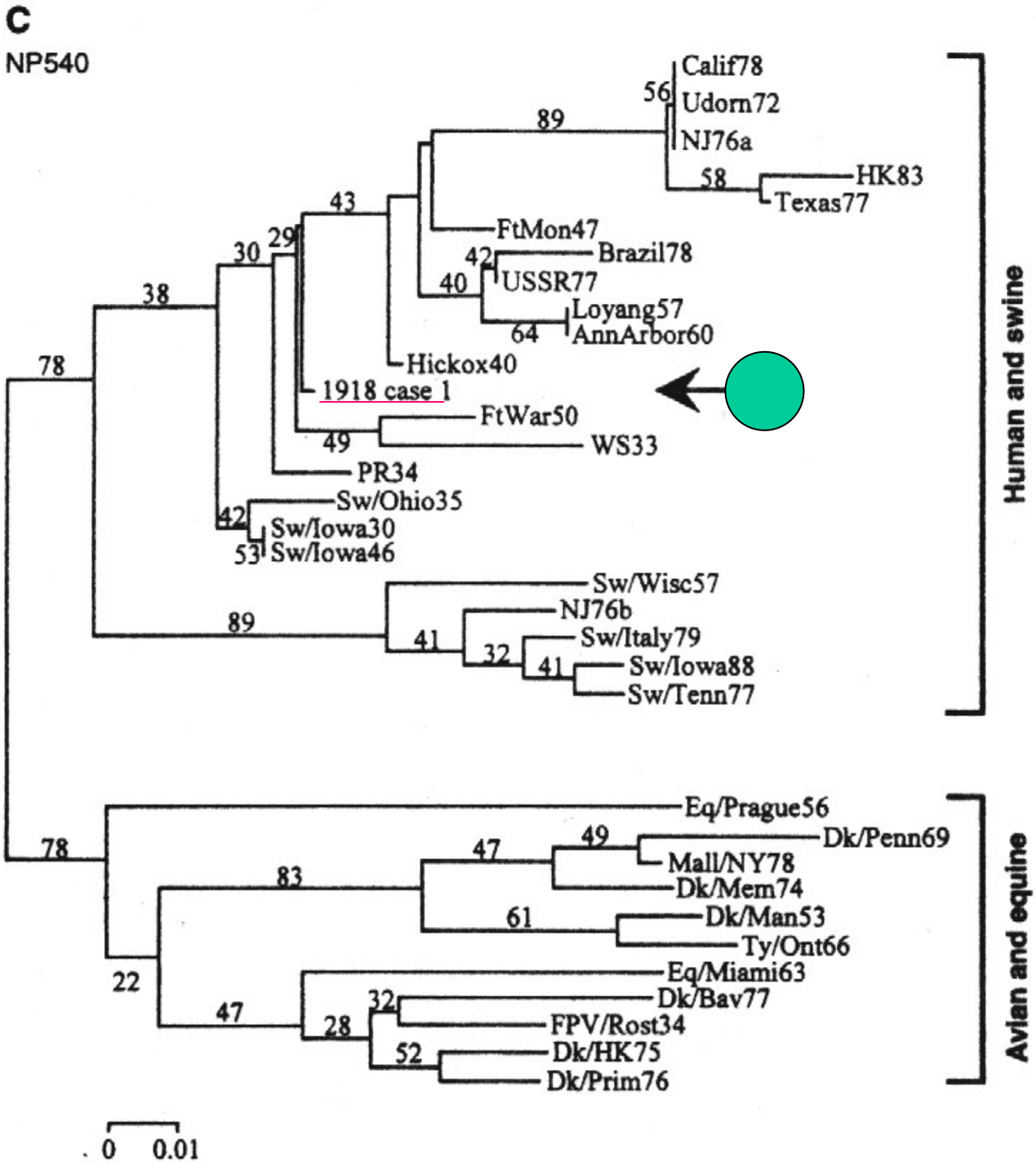
Rekombinaation “tarkoitus” on löytää heikko kohta ihmiskunnan immuunipuolustuksessa

Taubenberger, J.K., Reid, A.H., Kraft, A.E., Bijwaard, K.E. & Fanning, T.G. (1997) Initial genetic characaterization of the 1918 “Spanish” influenza virus. -Science 275: 1793-1796.

RNA eristettiin formaliinilla fikseeratuista ja parafiiniin istutetuista histologisista blokeista, joita armeijan patologi oli tehnyt vuonna 1918 kuolleista sotilaista.

Influessaviruskin on RNA:ta, joten ensin pitää suorittaa **käänteinen transkriptio** DNA:ksi, sitten PCR.

Työssä tutkittiin kolme geeniä, hemagglutiniini, neuramidaasi ja nukleoproteiini NP450. Näitä verrattiin muiden influessavirusten vastaaviin geeneihin.



Ihmisten ja sikojen viruksia

Lintujen ja hevosten viruksia

WHO Ramps Up Bird Flu Vaccine Efforts

TOKYO—While a killer avian influenza decimates poultry flocks in Asia, scientists in a World Health Organization (WHO) flu network have started work on a vaccine to protect humans from the often-fatal disease. Because this virus stymies traditional egg-based vaccine production methods, they are using a novel genetic modification technique to hatch a tame virus. But a flu vaccine produced this way has never before been used in humans, raising questions about safety and efficacy. Intellectual-property rights are also an issue, as is the capacity for mass production.

Addressing these issues "has to be expedited," says Klaus Stöhr, a virologist who heads influenza preparedness efforts at WHO in Geneva.

Since last December, the H5N1 strain of avian influenza has appeared in at least eight Asian countries. Human infections are rare and so far appear to result from direct exposure to diseased birds. But researchers worry that if the virus infects a person already carrying a human flu, it will reassort into a new virus easily transmissible from person to person, touching off a global pandemic. WHO hopes to get a vaccine that could help prevent not only rare human deaths from bird flu but also this potentially devastating viral reassortment. If the virus does acquire human transmissibility, however, yet another new vaccine may be required.

In either case, vaccine developers have a head start, thanks to work done on an H5N1 strain that briefly appeared in Hong Kong in 2003.

Traditional flu vaccine development relies on mixing the target flu virus and a harmless flu strain in chicken eggs and then screening for an appropriate vaccine candidate. This doesn't work for H5N1 because it kills chicken embryos. To sidestep this problem, a group at St. Jude Children's Research Hospital in Memphis, Tennessee, adapted a reverse genetics process in which genes from different viruses are individually cloned and reassembled into an inactivated vaccine virus.

CREDIT: VINAI DITHAJOHN/EPA/AP

Dirty and dangerous. Workers culling diseased birds could be among the first to be vaccinated if a bird flu vaccine gets into mass production in time.

Working with the 2003 H5N1 strain, the researchers cloned the two genes that code for the virus's surface glycoproteins: hemagglutinin and neuraminidase. The remaining six genes needed for a viable virus were cloned from a "safe" influenza virus strain long used in vaccines. All the cloned genes were introduced into a cell line where replication was initiated. The resultant virus is incapable of causing disease but carries the surface glycoproteins that stimulate the immune system to produce antibodies to H5N1.

Unfortunately, the H5N1 strain circulating this year differs so dramatically from the 2003 strain that a new seed vaccine is needed. Producing it will take at least until late February, according to WHO officials. And that is just the first step. Stöhr explains that normal efficacy trials, which determine if a flu vaccine reduces deaths or hospitalizations, will be difficult to carry out. He also worries that some countries may object to a vaccine based on a genetically modified organism.

Another challenge is that MedImmune Inc. in Gaithersburg, Maryland, holds the patent for the reverse genetics process. Although company spokesperson Jamie Lacey says that the firm offered "to license our patent rights to the manufacturers of a pandemic vaccine," details remain to be negotiated. And other individuals and institutions hold rights over other aspects of the process used by the St. Jude team. A final issue is how quickly drug manufacturers can ramp up mass production.

"These are humanmade problems and humans can solve them," says Robert Webster, a flu expert who directs the WHO collaborating center at St. Jude. It's unfortunate, he says, but it seems that the only way to focus attention on solutions is for "people to start dying in serious numbers."

–DENNIS NORMILE

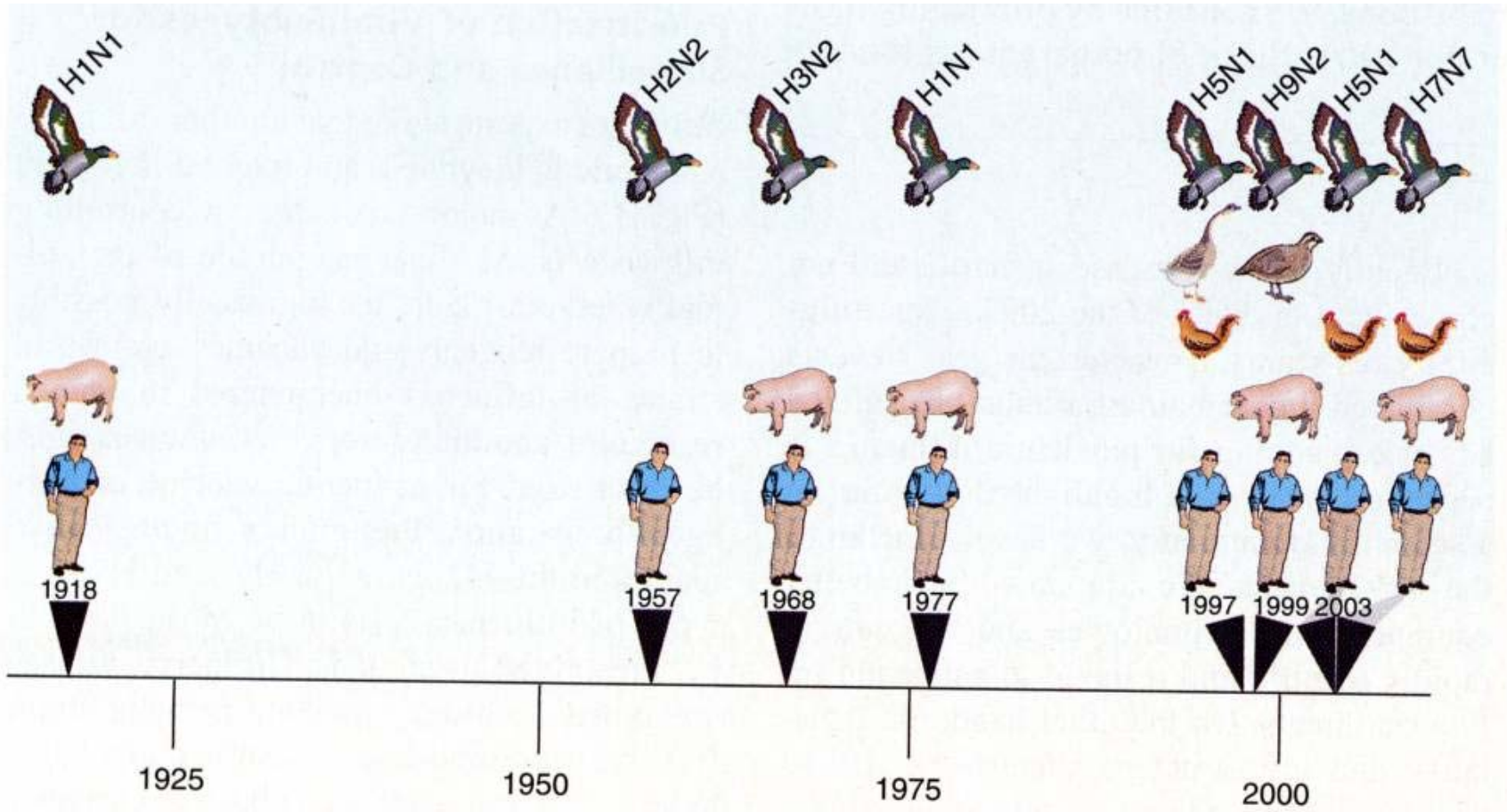
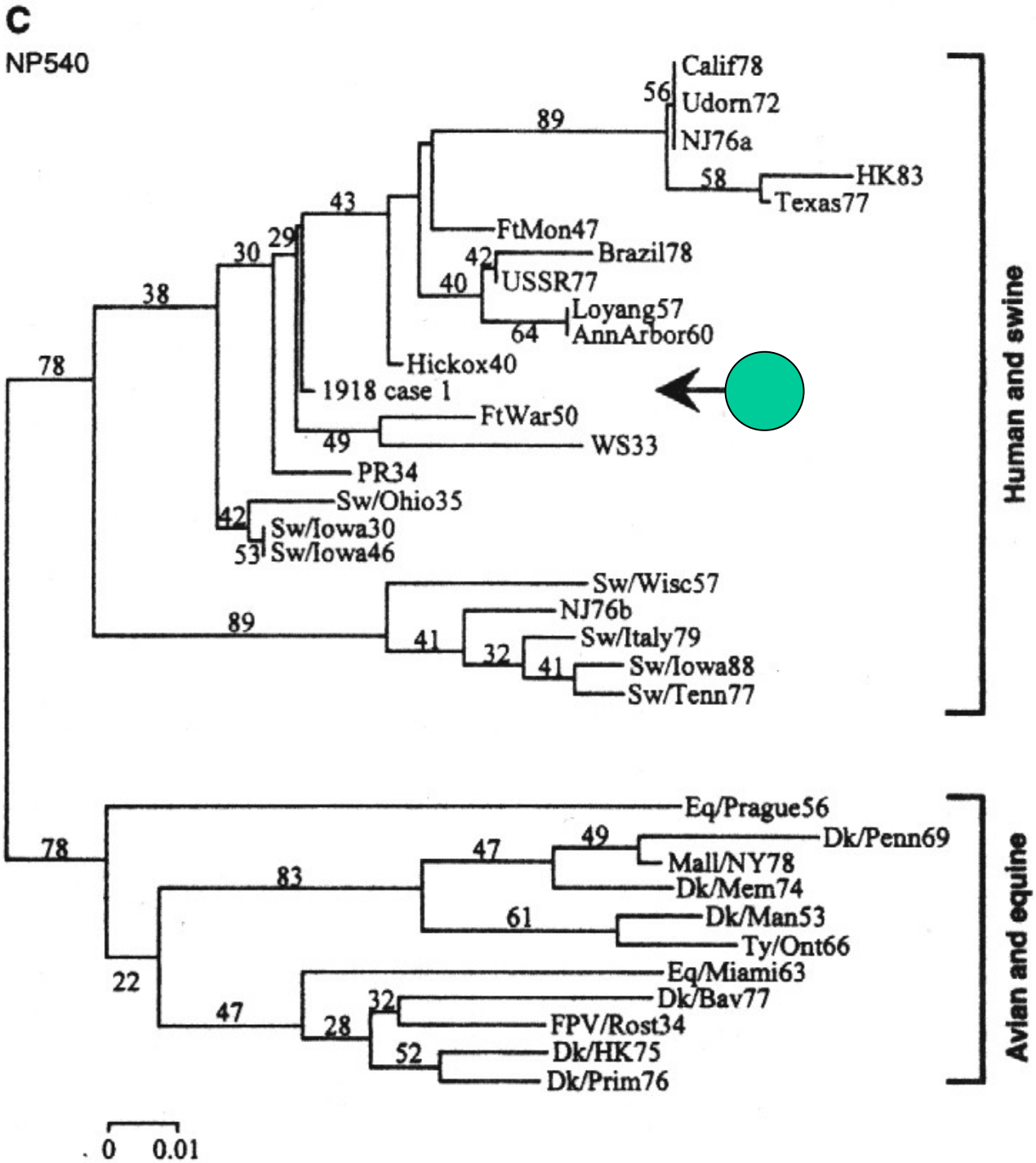


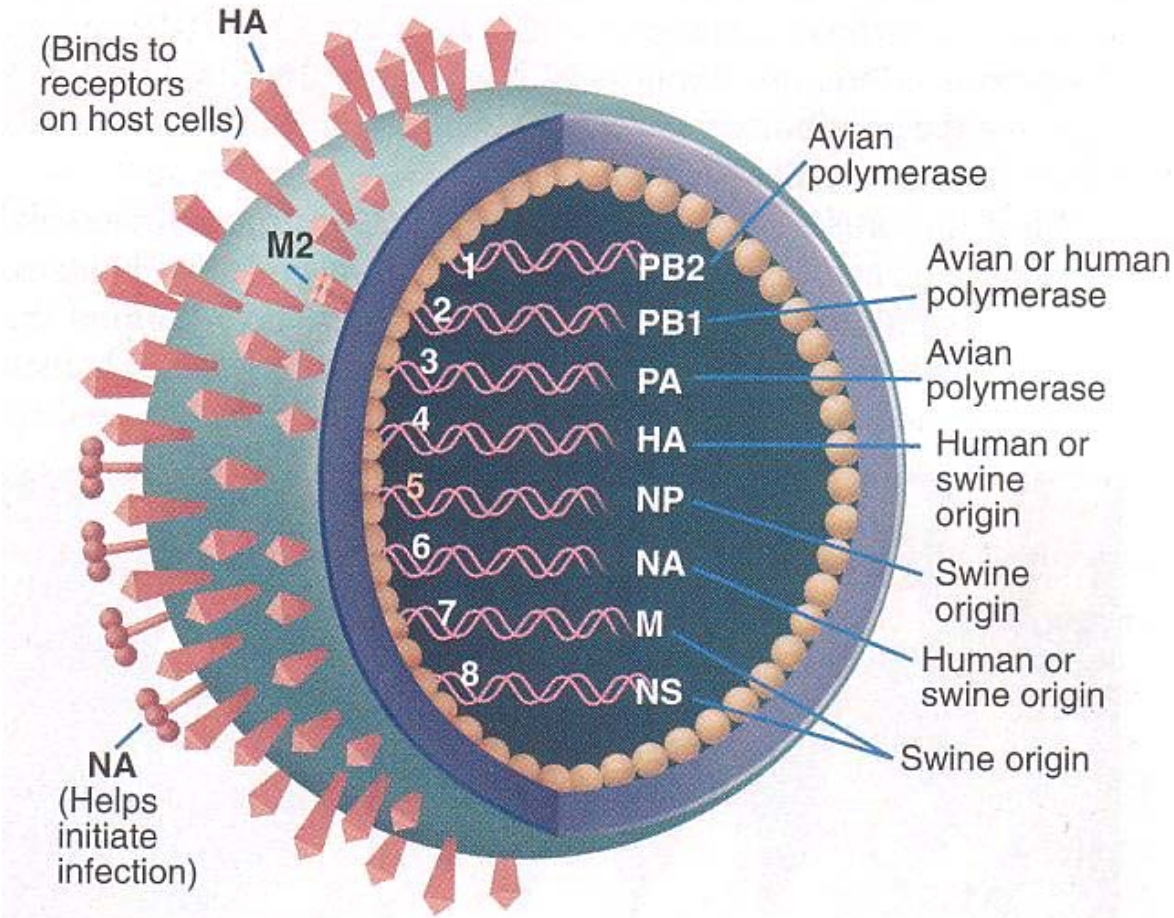
Fig. 1. Timeline of human influenza over the past 100 years. The black triangles represent documented human influenza A infections characterized by multiple cases. In each instance the species of animals implicated in the emergence of disease is highlighted. Since 1997 there has been a disproportionate increase in the number of reports of novel subtypes in humans and in the number of animal and bird species involved, suggesting that the next influenza pandemic is imminent.

Science 28 Nov 2003: Are we ready for pandemic influenza?



Ihmisten ja sikojen viruksia

Lintujen ja hevosten viruksia



New flus. The influenza viruses now found in North American pigs have genes from both human and bird viruses.

Uusi sikaflunssa USA:ssa: Science 7 March 2003

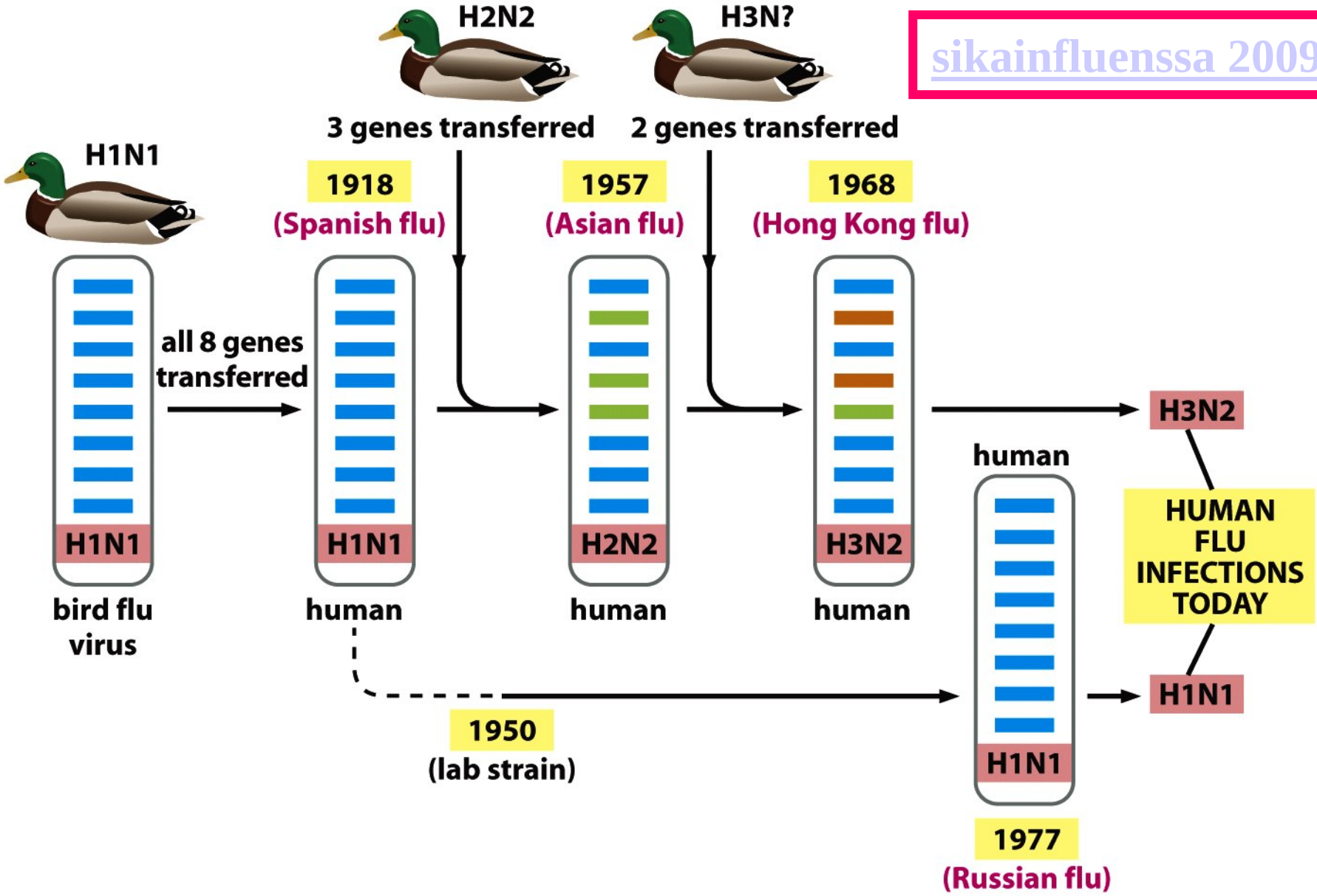
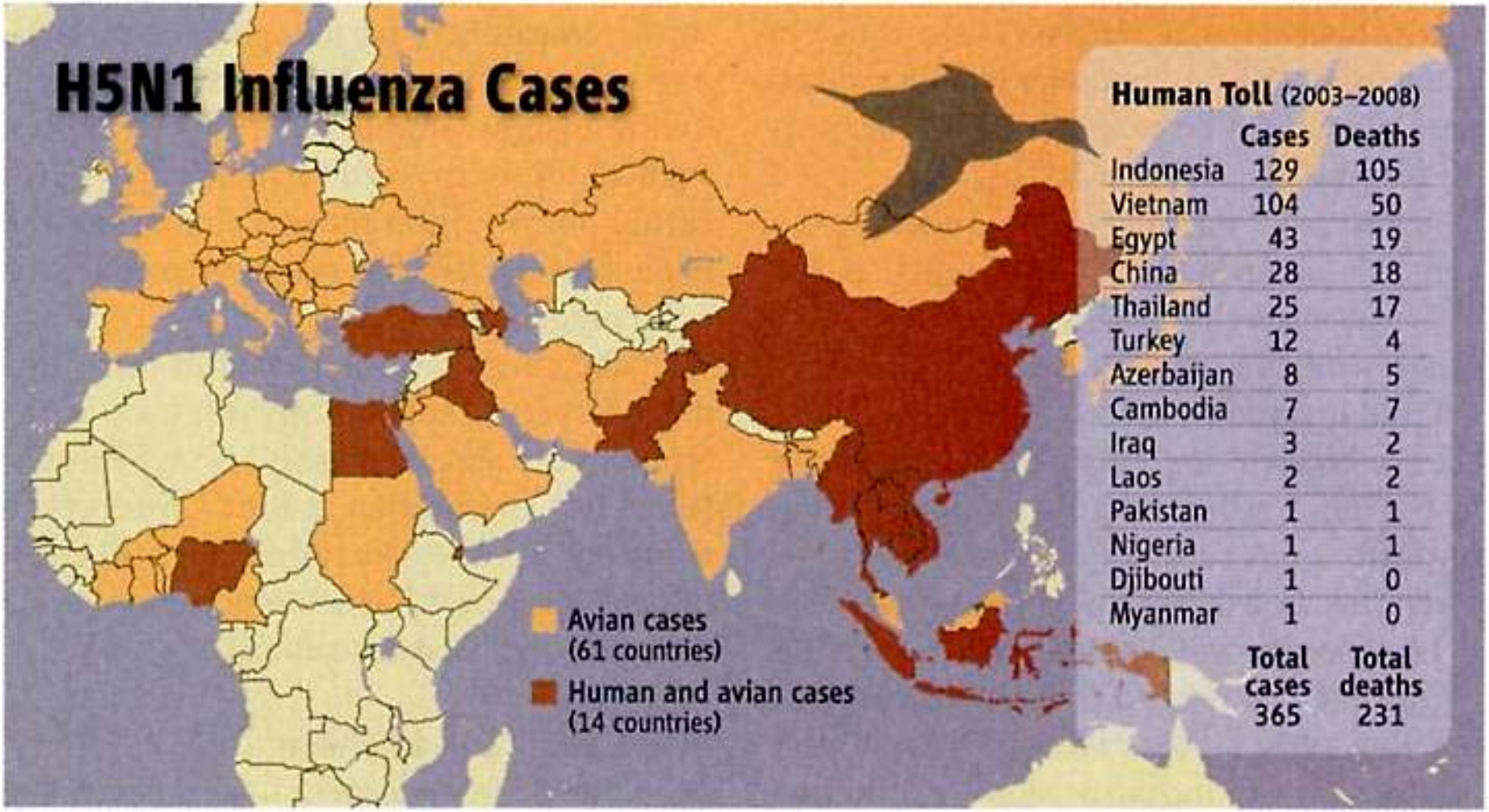


Figure 24-43 Molecular Biology of the Cell 5/e (© Garland Science 2008)



Human Toll (2003–2008)

	Cases	Deaths
Indonesia	129	105
Vietnam	104	50
Egypt	43	19
China	28	18
Thailand	25	17
Turkey	12	4
Azerbaijan	8	5
Cambodia	7	7
Iraq	3	2
Laos	2	2
Pakistan	1	1
Nigeria	1	1
Djibouti	1	0
Myanmar	1	0
	Total cases 365	Total deaths 231

Still on the move. Although not headline news, in 2007 the H5NI virus spread to poultry flocks in eight new countries and returned in 23 others stretching from Japan to the United Kingdom while human cases continued to mount.

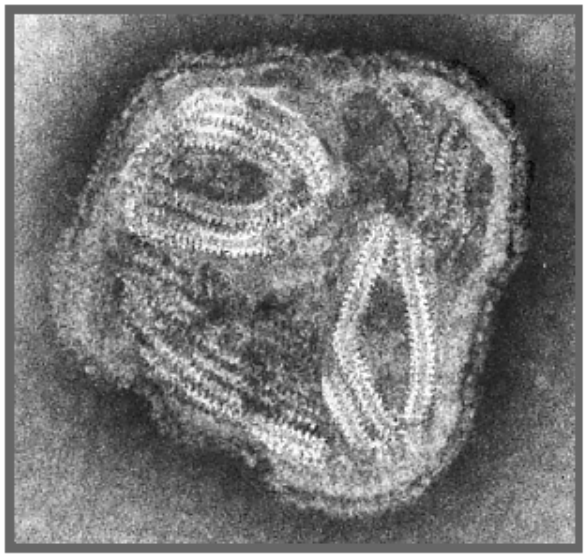
Science 29 Feb 2008

Flu naming system

SARS

Paramyxoviruses

The family of Paramyxoviridae contains viruses that induce a wide range of distinct clinical illnesses in humans:-
These include **measles** virus, which in rare instances is followed by subacute sclerosing panencephalitis (SSPE); **mumps** virus, which has symptoms of parotitis, orchitis and encephalitis, and the **parainfluenza viruses** which are respiratory pathogens .

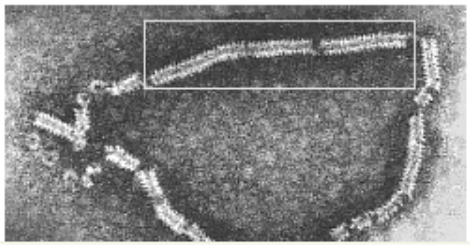


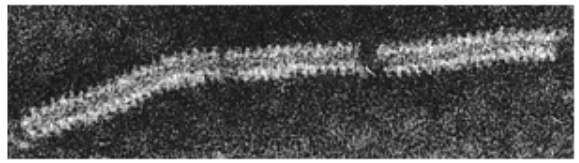
Virions are enveloped and enclose a helical nucleocapsid containing single-stranded RNA.

Most virions are roughly spherical (about 200nm in diameter) but they can be much larger and more pleomorphic.

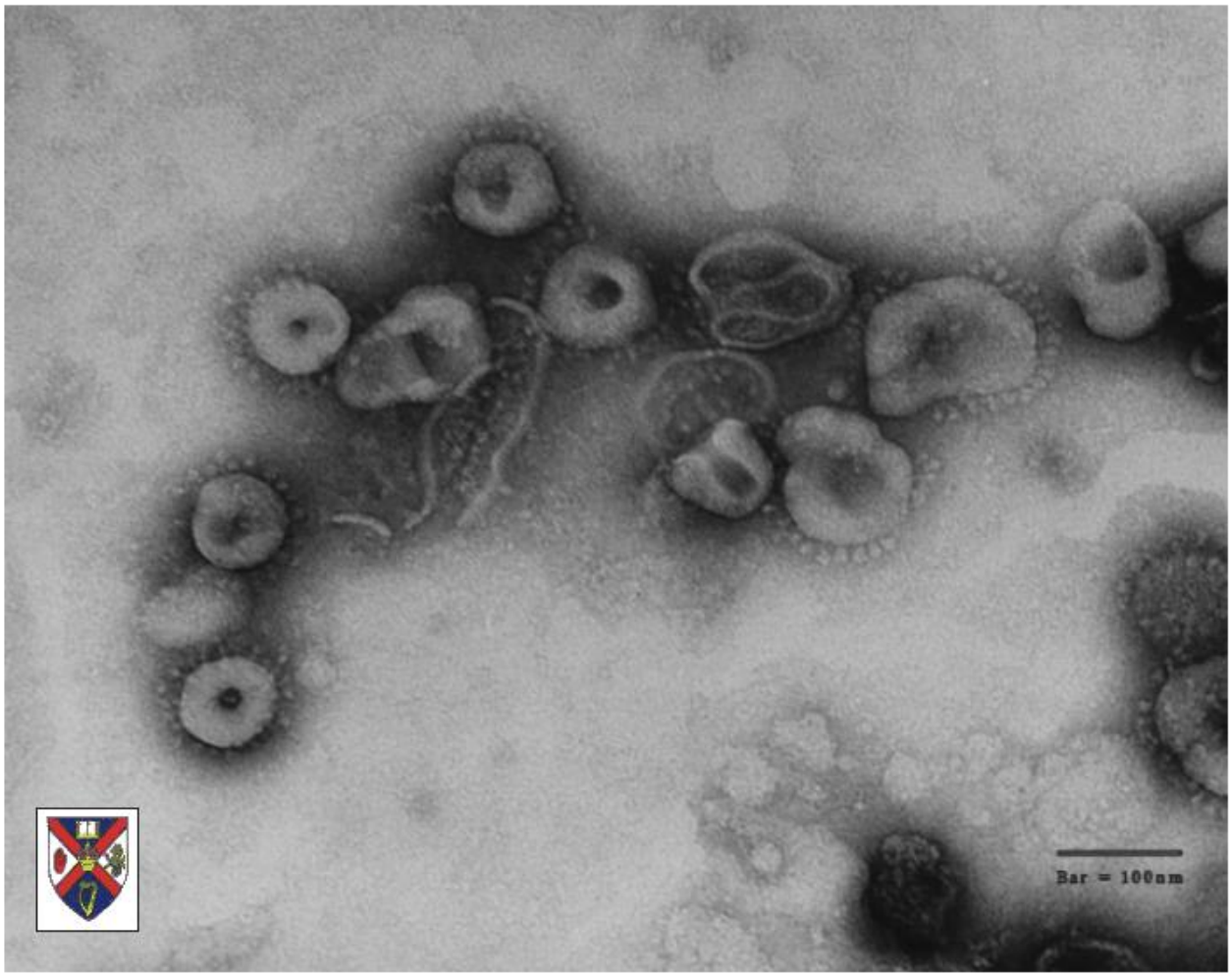
The virus envelope is a lipid bilayer, studded with virus encoded glycoproteins which have properties of haemagglutination and fusion (the F protein).

SARS: ensimmäinen epäilty





By transmission electron microscopy, and negative staining, the helical ribonucleo-protein capsid has a "herring-bone" appearance.



SARS

Edellisen sivun lintuyskävirus ei ollutkaan syyllinen, vaan tämä *Coronavirus*

Severe Acute Respiratory Syndrome (SARS) - multi-country outbreak - Update 23

Status of the main SARS outbreaks in different countries

7 April 2003

Disease Outbreak Reported

China
The Chinese Ministry of Health is now providing daily updates on numbers of cases and deaths, nationwide by province. On 3 April, a total of 17 new cases, including two deaths, were reported. Two previously reported cases were excluded. Eleven new cases and one death occurred in Guangdong Province. One case was reported from Shanghai, four from Beijing, and one case (fatal) from Sichuan Province.

On April 4, 12 new cases, with no deaths, were reported, 11 from Guangdong and 1 from Shanxi. For April 5 and 6, 21 new cases and 2 new deaths were reported. The breakdown by province is awaiting translation from Chinese. This brings the total number of reported cases in China to 1268, with 53 deaths.

Chinese officials have announced that SARS is being made a high priority for the government. A system of alert and response for early detection and reporting of all emerging and epidemic-prone diseases is being put in place. The government has also begun holding daily press conferences. WHO welcomes this move, which is an important way to increase awareness of the population and health care staff of the characteristic symptoms, the need to seek prompt medical attention, and the need to manage patients according to the principles of isolation and strict infection control.

The WHO office in China has reported considerable anxiety among the international community following the death in Beijing on Sunday of a 53-year-old Finnish staff member of the International Labor Organization. The ILO staff members was in Beijing to attend an international conference. At present it is unclear how the staff member contracted SARS. He had travelled to Beijing via Thailand, where no local transmission has been reported.

Hong Kong
Hong Kong SAR continues to report the largest number of new cases, placing some hospitals under considerable strain. Today's report from the Department of Health indicates that the unusual outbreak among residents in the Amoy Gardens estate, which has caused 268 cases, is coming to an end. Investigation of environmental samples continues at a rapid pace with support from several

Miksi ei tiedetä vieläkään varmasti, mikä on taudin aiheuttaja, *coronavirus* vaiko *paramyxovirus*, vai vielä joku muu?

No siksi, että sairastuneista ja kuolleistakin etsitään monenlaisia viruksia. Hyvin monenlaisia löytyykin, niin kuin löytyisi kaikista ihmisistä aina, eikä silloin voi varmasti tietää, mikä monista on syyllinen. Voihan virusten yhteistoimintakin olla dramaattisen taudinkulun syynä, pari harmitonta yhdistää voimansa ... *voilá*!

14.04.2003

WHO is currently exploring ways to strengthen its support to China. Shanghai has requested a visit from a WHO team. Teams to meet this request and follow up on other needs in China are now being assembled by WHO and will soon travel to China.

Status of scientific knowledge
Canadian scientists working around the clock have completed full sequencing of the genome of the SARS virus. This is a major step forward that will boost the development of better diagnostic tests and underpin work on a vaccine.

The rapid sequencing of the SARS virus genome was facilitated by collaboration with numerous other scientists, also working non-stop, at laboratories in a WHO network set up in mid-March.

A PCR test, developed by the US Centers for Disease Control and Prevention, has been shown to be ten times more sensitive than previous PCR tests for SARS. WHO experts hope that the test will be ready for roll out by the end of this week.

Status of clinical knowledge
Data available to WHO indicate that 96% of persons developing SARS recover spontaneously. The focus now is on the roughly 4% who are dying. WHO will hold a clinical teleconference on Wednesday to gather international experiences in the management of SARS patients and pool data on the results of various therapeutic regimens.

Update on cases and countries
As of today, a cumulative total of 3169 cases of SARS, with 144 deaths, have been reported to WHO from 21 countries. This represents an increase of 213 cases and 25 deaths since the last update on Saturday.

Indonesia, the Philippines, and Sweden report their first probable cases (1 in each country) today. Japan, which had previously reported four probable cases, was removed from the list as these cases were determined to have other causes.

China, with 1418 cases and 64 deaths, remains the most seriously affected area. Hong Kong SAR, with 1190 cases and 47 deaths, is the second most seriously affected area. Three of the deaths in Hong Kong over the weekend occurred in persons under the age of 50, marking a departure from a previously pattern in which SARS caused deaths primarily in the elderly or in persons with pre-existing disease.

Ebola


Ebola haemorrhagic fever in the Republic of the Congo - Update 10 - Microsoft Internet Explorer
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WHO Sites
CSR Home
Alert & Response Operations
Diseases
Drug Resistance
Global Outbreak Alert & Response Network
International Health Regulations
Laboratory & Epidemiology Strengthening
Preparedness for Deliberate Epidemics
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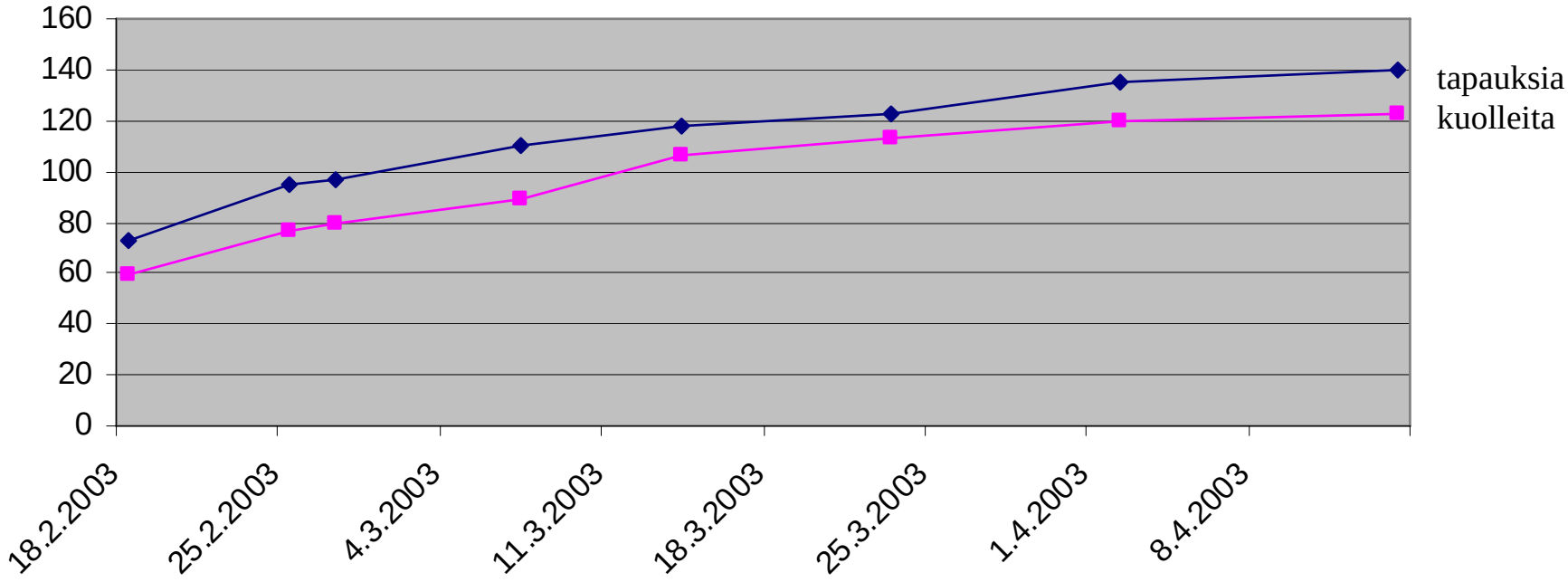
Ebola haemorrhagic fever in the Republic of the Congo - Update 10
2 April 2003
Disease Outbreak Reported
As of 2 April 2003, the Ministry of Health, the Republic of the Congo has reported 135 cases, (13 laboratory-confirmed and 122 epidemiologically linked), including 120 deaths in the districts of Mbomo and Kellé in Cuvette Ouest Département (see previous report). Thirty four contacts are being followed-up.
The Ministry of Health, WHO, the Red Cross and the international team continue to assist with social mobilization, surveillance and case management activities.
Ebola se aina yrittää, mutta on liian kärsimätön: 140 sairastunut, 123 niistä kuollut. Pitäisi malttaa viikko tai kaksi!
Done
Internet



Ebola-parka ei pääse tällä menolla Kongosta mihinkään. Huiman korkea, 88% kuolevuus ilman mitään itämisaikaa ei mahdollista mitään kv-levikkiä. Viimeisimmätkin tapaukset löytyivät etäisestä kylästä.

CONSERVATION BIOLOGY

Ebola, Hunting Push Ape Populations to the Brink

Researchers are warning that a relentless epidemic of Ebola hemorrhagic fever in central Africa, combined with hunting, could push Africa's apes close to extinction within the next decade. A new analysis published online in *Nature* this week by ecologist Peter Walsh of Princeton University in New Jersey

Remains of the day. Veterinary scientist Annelisa Kilbourn (who died last November in a plane crash) holds a femur from a lowland gorilla that died in an Ebola outbreak.

Gabon, they compared a survey of ape nest sites in the early 1980s with survey results from 1998 to 2002.

The team found that the number of nest sites fell drastically, especially close to towns, where demand for bushmeat is high. But apes were also sparser close to sites of human Ebola outbreaks, suggesting that the ape population was infected and was spreading the disease to humans. (People are thought to contract the virus from eating infected animals.) Across Gabon, ape populations have declined by 56% since 1983, says Walsh, who predicts they could fall another 80% within 1 to 3 decades.

Heavy Ebola outbreaks in Congo and civil unrest in the Democratic Republic of Congo suggest major losses of apes there as well (*Science*, 31 March 2000, p. 2386). In Congo and Gabon, international wildlife disease experts have suspected that Ebola caused some die-offs since 1994, although firm data have been

term means of stemming bushmeat h
is "massive investment" in law enfor
in parks. Battling the Ebola epidemic
straightforward, partly because exper
agree about what's driving it. Some
that logging is sparking outbreaks b
turbing the apes' habitat and putting t
closer contact with the as-yet-unk
Ebola reservoir—which could be bats
or birds. If so, there might be little sci
can do except monitor.

Others, including Walsh, suspect t
sporadic human outbreaks in the 199
sulted from a single, spreading epi
transmitted ape to ape, as well as via
species. If so, Walsh thinks an experi
Ebola vaccine that has been shown to
on monkeys could help stem the epide
apes. But Ebola vaccine researcher
Nabel of the National Institutes of He
Bethesda, Maryland, cautions that th
cine could not be used on wild apes w
more evidence that it would work,
could take 1 to 2 years.

Conservation groups, scientists
African officials met in Brazzaville, Co
March to discuss options and app

Ebola uhkaa harventuvia apinapopulaatioitakin

Science April 11, 2003

Multiple Ebola Virus Transmission Events and Rapid Decline of Central African Wildlife

Eric M. Leroy,[1]* Pierre Rouquet,[2]† Pierre Formenty,[3]† Sandrine Souquière,[2] Annelisa Kilbourne,[4] Jean-Marc Froment,[5] Magdalena Bermejo,[5] Sheilag Smit,[6] William Karesh,[4] Robert Swanepoel,[6] Sherif R. Zaki,[7] Pierre E. Rollin[7]

Several human and animal Ebola outbreaks have occurred over the past 4 years in Gabon and the Republic of Congo. The human outbreaks consisted of multiple simultaneous epidemics caused by different viral strains, and each epidemic resulted from the handling of a distinct gorilla, chimpanzee, or duiker carcass. These animal populations declined markedly during human Ebola outbreaks, apparently as a result of Ebola infection. Recovered carcasses were infected by a variety of Ebola strains, suggesting that Ebola outbreaks in great apes result from multiple virus introductions from the natural host. Surveillance of animal mortality may help to predict and prevent human Ebola outbreaks.

Human Ebola virus (EBOV) infection causes hemorrhagic fever and death within a few days (*1*). The most lethal strains, causing up to 88% mortality, occur in Gabon, the Republic of Congo (RC), and the Democratic Republic of Congo (DRC) in central Africa, and belong to the Zaire subtype, which is one of four known EBOV subtypes. Together with Marburg virus, EBOV forms the *Filoviridae* family, a group of enveloped, nonsegmented, negative-strand RNA viruses (*2*). The genome is ~19,000 nucleotides long and bears linearly arranged genes that encode seven structural proteins and one nonstructural protein (*3*). Human Ebola outbreaks usually occur abruptly from an unidentified source, with subsequent spread from person to person (*4*). The first three known outbreaks of Ebola occurred between 1976 and 1979 in Zaire (now DRC) and Sudan, with 318 (*5*), 284 (*6*) and 34 (*7*) cases, respectively. No further cases were recognized in Africa until late 1994. Since then, EBOV has appeared in human beings eight times, in several sub-

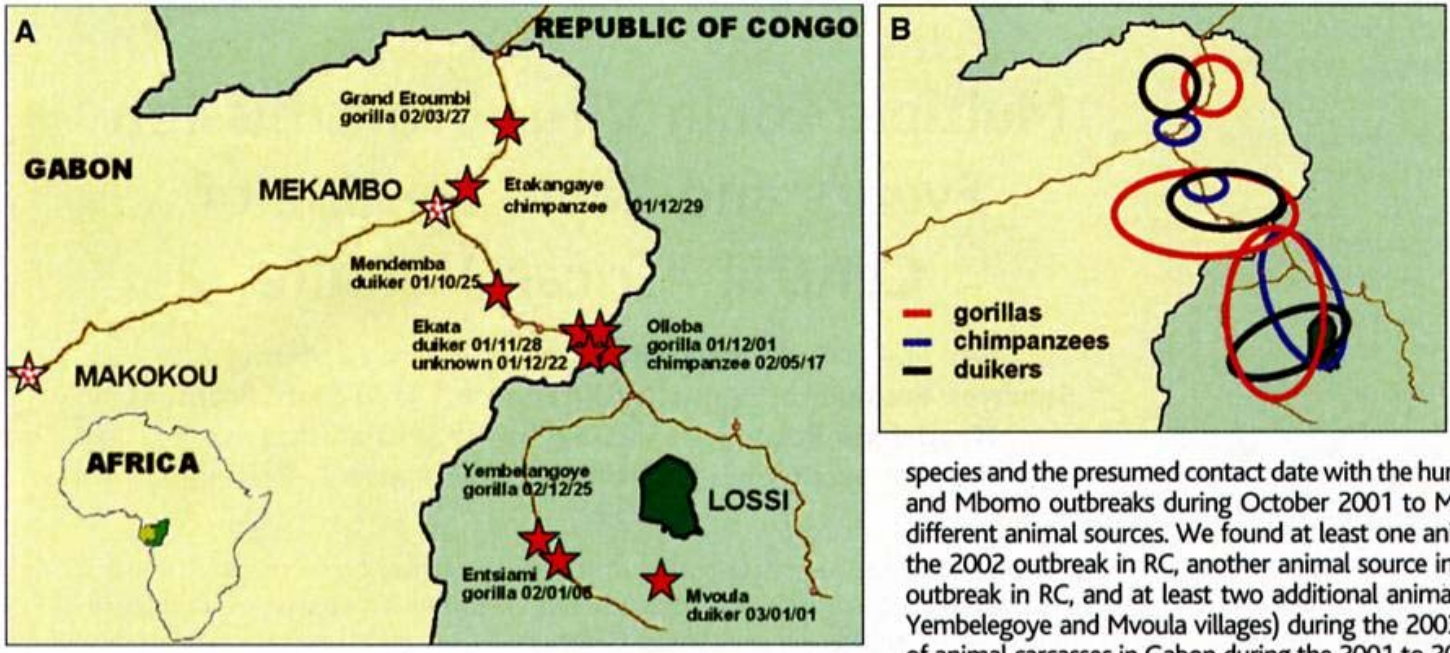


Fig. 1. (**A**) Location of sources of Ebola outbreaks in Gabon and the Republic of Congo between October 2001 and May 2003. Stars indicate the location of the first human case, each infected by an animal source. Red stars indicate identified or suspected animal sources. Red and white stars indicate unknown sources. The figure also indicates the incriminated animal species and the presumed contact date with the human index case. The Mekambo and Mbomo outbreaks during October 2001 to May 2002 involved at least six different animal sources. We found at least one animal source in Entsiami during the 2002 outbreak in RC, another animal source in Olloba during the May 2002 outbreak in RC, and at least two additional animal sources in the Kelle area (in Yembelegoye and Mvoula villages) during the 2003 outbreak in RC. (**B**) Location of animal carcasses in Gabon during the 2001 to 2002 outbreak and in RC during the 2002 to 2003 outbreak. Animal carcasses were precisely located by us or local villagers by using global positioning satellite technology.

Table 1. Nucleotide differences between sequences of the EBOV GP gene identified during Ebola outbreaks in Gabon and the Republic of Congo between October 2001 and May 2003. The table gives the names of identified epidemic chains and reports the number of viral sequences obtained in each chain. See (*12*).

Epidemic chain	Nucleotide position															
	247	543	795	1147	1201	1239	1240	1271	1476	1500	1540	1578	1584	1610	1684	2135
Mendemba A (Oct 01) 7 available sequences	G	C	A	A	A	C	T	T	G	T	T	T	G	A	A	T
Mendemba B (Oct 01) 10 available sequences	G	C	A	A	A	C	T	T	G	T	T	T	G	G	A	T
Ekata (Nov 01)																
Olloba (Dec 01) 1 available sequence	G	C	A	A	A	C	T	T	G	T	T	T	A	A	A	C
Ekata (Dec 01)																
Etakangaye (Dec 01) 1 available sequence	G	T	G	G	A	C	T	T	G	T	T	T	G	G	A	T
Makokou (Dec 01) 2 available sequences	G	C	A	A	A	C	C	T	G	T	T	T	G	G	A	T
Entsiami (Jan 02) 1 available sequence	G	C	A	A	G	C	T	T	A	T	T	T	A	A	A	T
Olloba (May 02)																
Yembelengoye (Dec 02) 8 available sequences								C	G	C	C	C	A	A	A	
Mvoula (Jan 03) 1 available sequence	A	C	A	G	A	T	T	C	G	T	T	T	A	A	G	


WHO: Ebola haemorrhagic fever in south Sudan - update - Microsoft Internet Explorer
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International Health Regulations
Laboratory & Epidemiology Strengthening
Preparedness for Deliberate Epidemics
Public Health Mapping
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About CSR | Country Activities | Outbreak News | Resources | Media Centre
Location: WHO > WHO sites > CSR Home > Disease Outbreak News
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Ebola haemorrhagic fever in south Sudan - update
24 May 2004
As of 24 May 2004, the health authorities of Yambio County have reported a total of 19 cases, including 4 deaths, of Ebola haemorrhagic fever (EHF) in Yambio, Western Equatoria, south Sudan. Laboratory testing performed by the Kenya Medical Research Institute (KEMRI) and by the Centers for Diseases Control and Prevention (CDC) United States have confirmed EHF.
WHO South Sudan Early Warning and Response Network (EWARN) along with a team from WHO headquarters have been working closely with the health authorities and partners in Yambio County helping with the creation of a Crisis Committee to control the outbreak.
This committee includes UNICEF, Médecins sans Frontières-France and other nongovernmental organizations and churches working in public health. The committee is working actively in social mobilization, supporting case management in Yambio hospital, and organizing the follow-up of contacts of people who have been ill with the disease.
Currently, the outbreak appears to be restricted to the environs of Yambio; however, neighbouring countries have been notified. At this stage, WHO recommends no special restrictions on travel or trade as a result of this outbreak.
Vain 4/19 = 21%! Joko nyt?

Marburg 2005

http://www.who.int/csr/don/2005_04_22/en/index.html

http://www.who.int/en/

Marburg haemorrhagic fever in Angola - update 15

22 April 2005

As of 20 April, the Ministry of Health in Angola has reported 266 cases of Marburg haemorrhagic fever. Of these cases, 244 were fatal. In Uige Province, which remains the epicentre of the outbreak, 253 cases, of which 233 have been fatal, were reported as of 21 April.

Assessment of the outbreak

The international response to the outbreak in Angola began one month ago, on 22 March. The features of Marburg haemorrhagic fever, and the conditions in Angola, have been an extreme test of international capacity to hold emerging diseases at bay. The outbreak in Angola is the largest and deadliest on record for this rare disease, which is presently showing a case fatality rate higher than 90%. For comparison, outbreaks of the closely related Ebola haemorrhagic fever have shown mortality rates ranging, according to the virus strain involved, from 53% to 88%. The only other large outbreak of Marburg, in the Democratic Republic of Congo from 1998 through 2000, had a case fatality of 83%.

Two factors make the rapid detection of outbreaks of Marburg haemorrhagic fever difficult: the extreme rarity of this disease and its similarity to other diseases seen in countries where deaths from infectious diseases are common. Neither the source nor the date of the initial cases in Angola can be presently identified with any certainty.

The number of cases began increasing in February and then, more dramatically, in March. On 21 March, Marburg virus was detected in patient samples sent to the Centers for Disease Control and Prevention in Atlanta (USA), and WHO assistance was requested by the Ministry of Health in Angola. The operational response began the following day. As known from extensive experience with outbreaks of other viral haemorrhagic fevers, including Ebola, outbreaks of Marburg can be brought to an end using classic public health interventions. In theory, the measures needed to end the Angolan outbreak are few in number and straightforward in nature. Rapid detection and isolation of patients, tracing and management of their close contacts, infection control in hospitals and protective clothing for staff work to interrupt chains of transmission and thus seal off opportunities for further spread.

Such straightforward measures are complicated by the distinct features of this disease. The sudden onset, dramatic symptoms, and rapid deterioration of patients, and the absence of a vaccine and effective treatment, invariably incite great anxiety in affected populations. This anxiety, in turn, can interfere with control operations, especially when communities begin hiding cases and bodies because of suspicions about the safety of hospitals.

In the current outbreak, such suspicions are understandable. Very few patients with laboratory-confirmed Marburg haemorrhagic fever have survived; most hospitalized patients have died within a

Crisis of Confidence Hampers Marburg Control in Angola

Experts have everything they need to stop the deadly Marburg outbreak in northern Angola—except trust from the local population

Vincent Brown has his own way of keeping track of the Marburg virus in Uige, a provincial capital in northern Angola: He counts fresh graves. A daily visit to the town's cemeteries doesn't yield precise numbers, says Brown, an epidemiologist with Epicentre, the Paris-based research arm of Médecins sans Frontières (MSF)—but it does give one a feeling for the trend.

The reason behind the unorthodox method is simple. In the current outbreak of Marburg hemorrhagic fever, which had caused at least 227 deaths by 15 April, most patients never make it to the hospital. Widespread fear and mistrust of public health authorities and the international teams fighting the disease are leading most families to keep their patients at home. As a result, the virus keeps festering, says Brown, who returned to Paris last week from Uige.

Four weeks after Marburg was nailed as the culprit, the fight against the virus has become a battle to win the trust of the local population. "It's clearly a bit more difficult than we anticipated," says Pierre Rollin of the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, which has sent several teams to Angola. But medical anthropologist Barry Hewlett of Washington State University in Vancouver says the difficulties were predictable. "It's often like this," says Hewlett, who has accompanied medical teams during several outbreaks of Marburg's cousin, Ebola.

Marburg, which spreads through direct contact with blood and other bodily fluids, isn't like flu, measles, or other highly contagious viruses. Putting patients in strict isolation and checking their close contacts for symptoms daily for at least 21 days—and isolating them as well if they do get sick—will usually end the transmission chain.

Today, the logistical systems are in place to do just that, says Pedro Pablo Palma of MSF's Spanish branch in Barcelona. MSF has set up a three-compartment isolation unit in the hospital in Uige, for suspected, probable, and confirmed patients. Although hygiene in the rest of the hospital was initially "catastrophic," Pablo says, with highly infectious corpses piling up in the morgue, the situation has gradually improved.

Scientific capacity is generally better than in most previous outbreaks of Marburg and Ebola. Researchers from Canada's National Microbiology Laboratory in Winnipeg have set up a field lab in Uige that can test patient samples within a few hours. CDC, meanwhile, has set up a diagnostic lab in Angola's capital Luanda to test any samples that might come in there and to confirm results by the Canadian team. But while the graveyard kept filling up—there were twice as many new graves daily in early April than in March, Brown says—the labs didn't have nearly as many samples as they could have handled, and the isolation unit was virtually empty early this week.

The lack of trust has several roots. One is that so far, nobody has made it out of the isolation unit alive, says Pablo—not surprising with a fatality rate of close to 100%, at least of those who make it to the hospital. The notion of isolation itself has been hard to accept, adds David Daigle, a CDC communications officer acting as a spokesperson for the World Health Organization (WHO) in Angola. And at the outset, deceased patients were immediately zipped into plastic bags to prevent further infections, Daigle says, even though tradition requires a ritual washing of the body, during which the deceased is embraced or kissed. "People were very upset," he says. "They couldn't grieve."

The result has been not just a lack of cooperation but also outright hostility—not so much in the city but in four or five of its 14 suburbs, says Brown, who was chased away by an angry mob of 40 to 50 people after a visit to a traditional chief, or soba, in one of them. "It felt pretty threatening," he says. "The message was: Don't come back here."

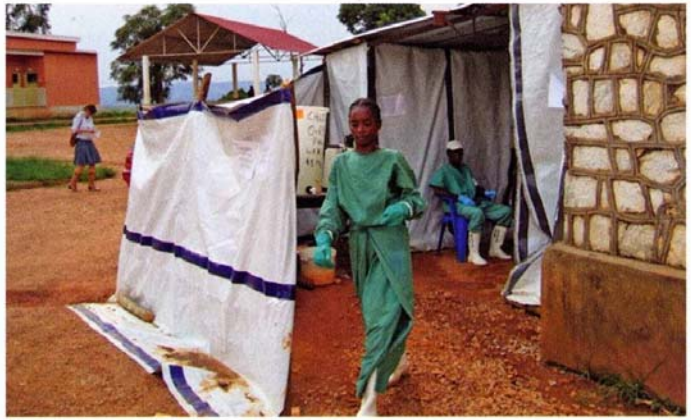
For now, WHO and MSF are heeding that message and shunning certain areas in the hope that a broad "social mobilization" campaign will soon change attitudes. To that end, sobas, church leaders, and traditional healers are being recruited. Two medical anthropologists—one from France, the other from Burundi—are helping with this process, says Daigle.

Some creativity is clearly needed. To replace the traditional washing ritual, the anthropologists have introduced an alternative in which family members sprinkle the dead body with bleach, says Daigle. And a popular band whose lead singer died from Marburg has recorded a song to help raise awareness; trucks mounted with loudspeakers should be blaring it out soon.

If past experience is any guide, such measures can usually win over a population, as long as they are culturally sensitive and build on existing beliefs, says Hewlett. In recent Ebola outbreaks in Uganda and the Republic of the Congo, certain changes in burial rituals were generally accepted, such as wearing plastic gloves or introducing bleach. Simply putting bodies in plastic bags was a big mistake, Hewlett says, however well intended.

Still, he's not surprised. Sometimes, the teams sent out to hemorrhagic fever outbreaks are a bit like "medical cowboys," he says. "They feel very strongly about what they have to offer, especially in a crisis"—and fail to realize it may not always be appreciated.

—MARTIN ENSERINK



Staying away. Marburg patients aren't coming to an isolation unit in Uige.

CREDIT: FLORENCE PANOUSSIAN/AFP/GETTY IMAGES

Vitsauksista lisää

Kotitehtävä #11: onko tulossa uusia vitsauksia?

Katso **WHO**:n sivuilta viimeisimmät tiedotteet

- H5N1
- Ebola
- Marburg
- SARS

Printtaa ja lue, näytä vielä luennolla tai tentissä.

HIV

http://www.unaids.org/en/

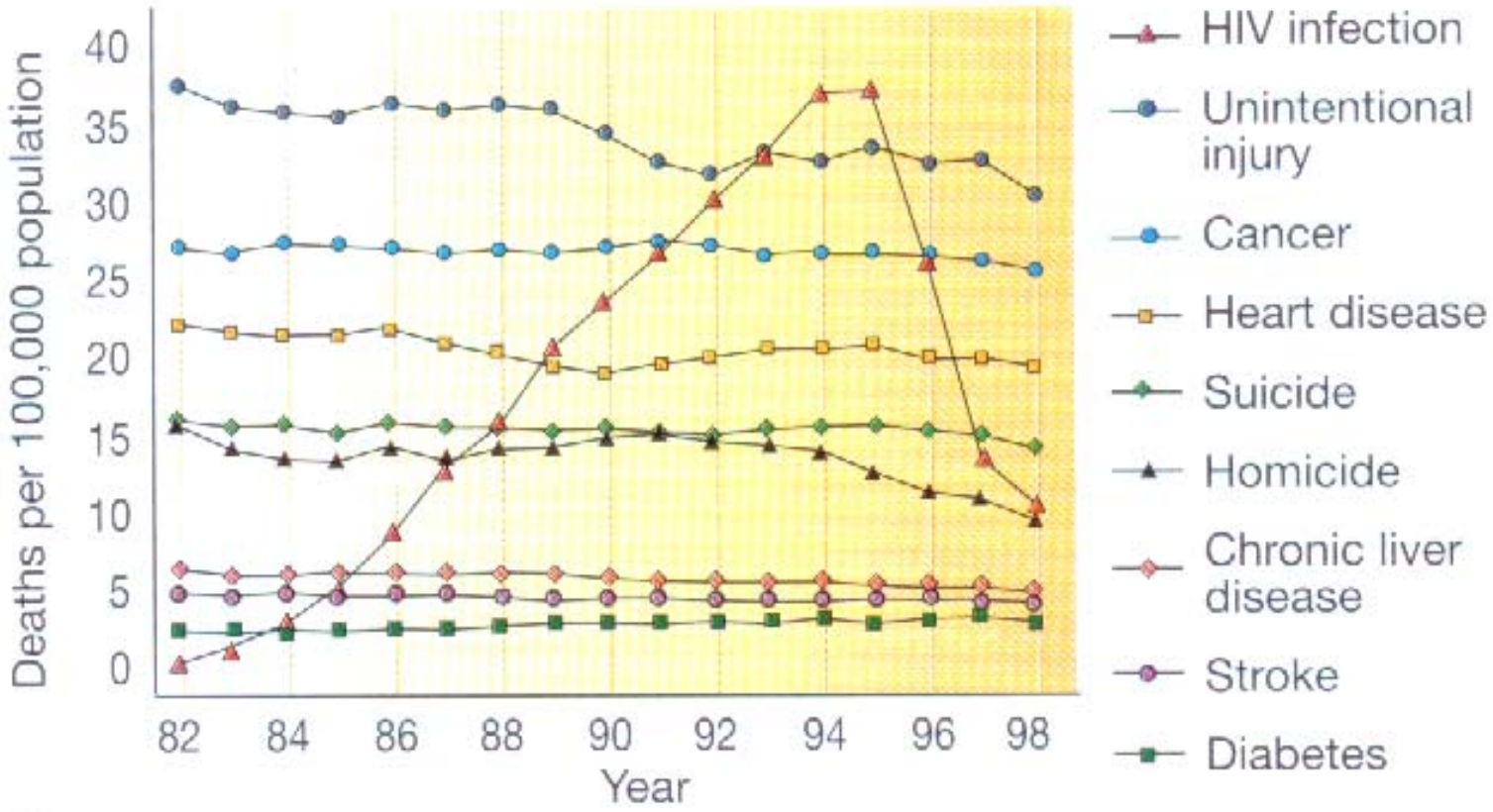
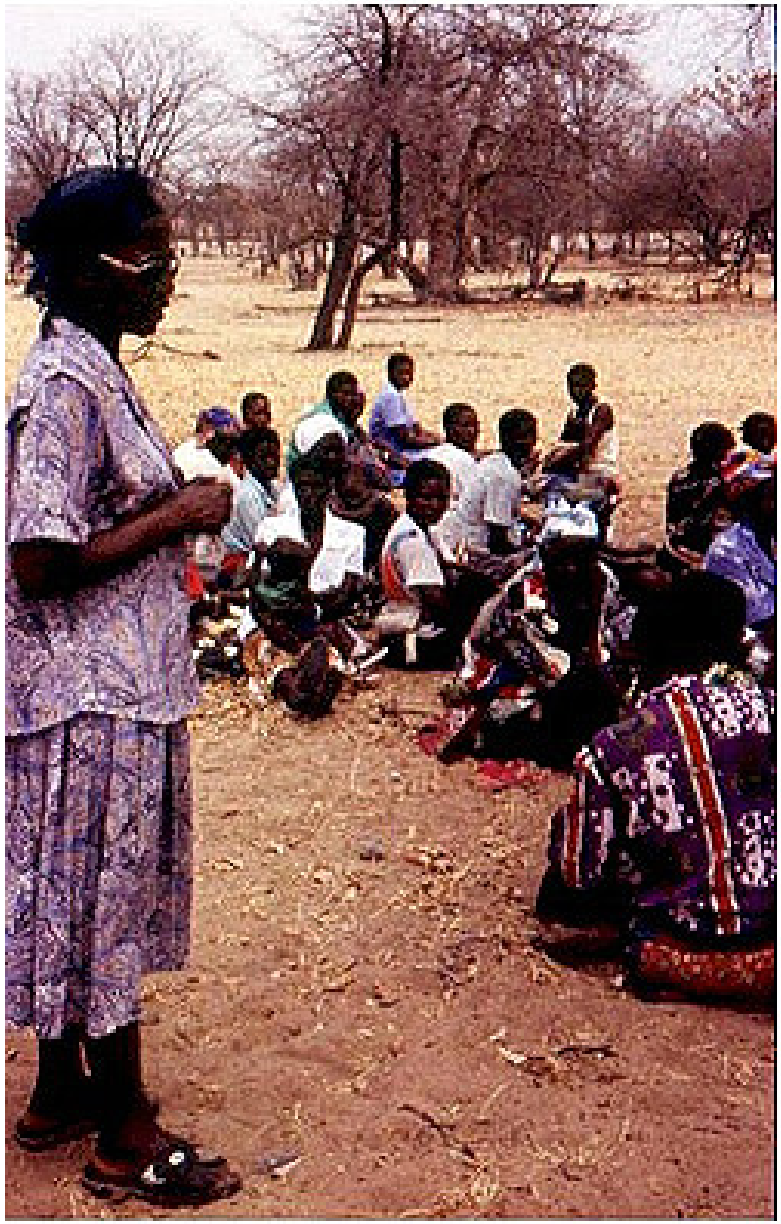


Figure 3 Trends in annual rates of leading causes of death among adults aged 25–44 years in USA over the period 1982–1998. The data from 1998 are preliminary. (Source: Centers for Disease Control and Prevention.)

AIDSin kronologia San Franciscossa

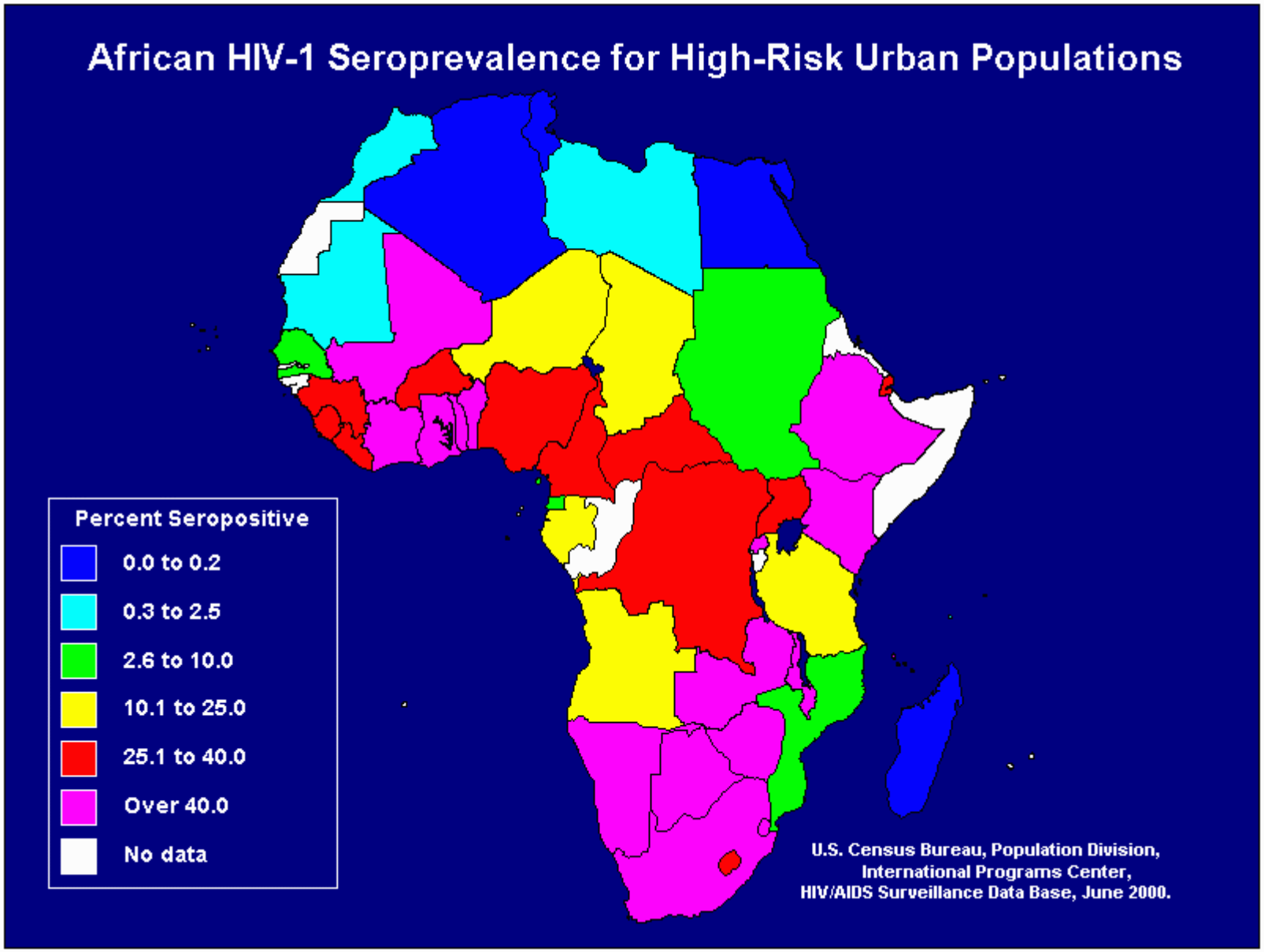
HIV



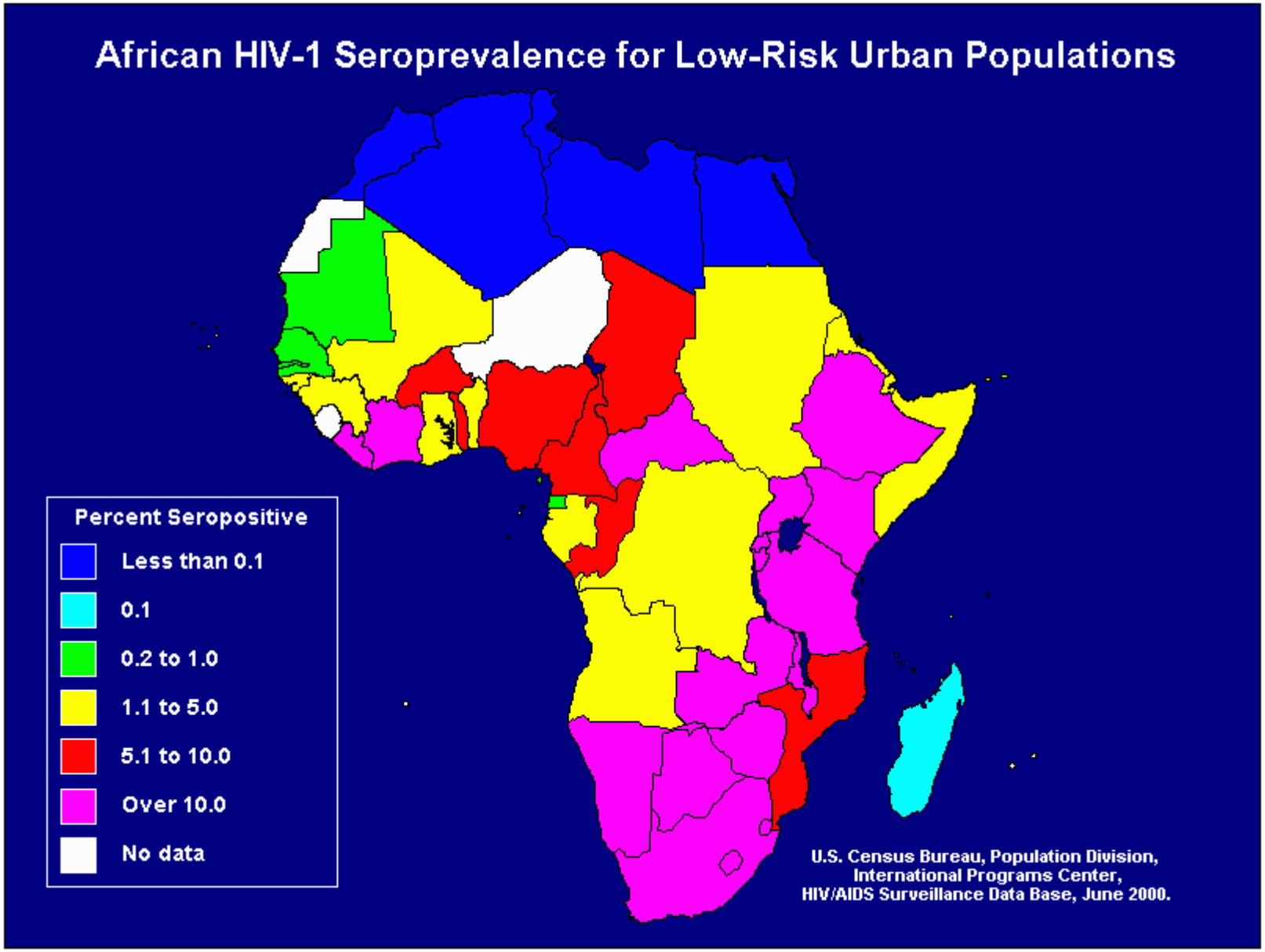
Leviämisen suhteen virukset ovat myös toisenvaraisia, mutta isäntäorganismit huolehtivat siitä usein varsin epäit-sekkäästi ja uhrauksia kaihtamatta!

Kuva on Angolasta, lasten rokotuksen yhteydessä pidetystä **AIDSin** vastaisesta luentotilaisuudesta. Savannin asukkaille HIV saapuu matkatöissä olevien miesten välittämänä: timanttikaivokset, poliisihommat, opiskelu, suurviljelmät, Savimbin rosvojoukoissa kuljailu.

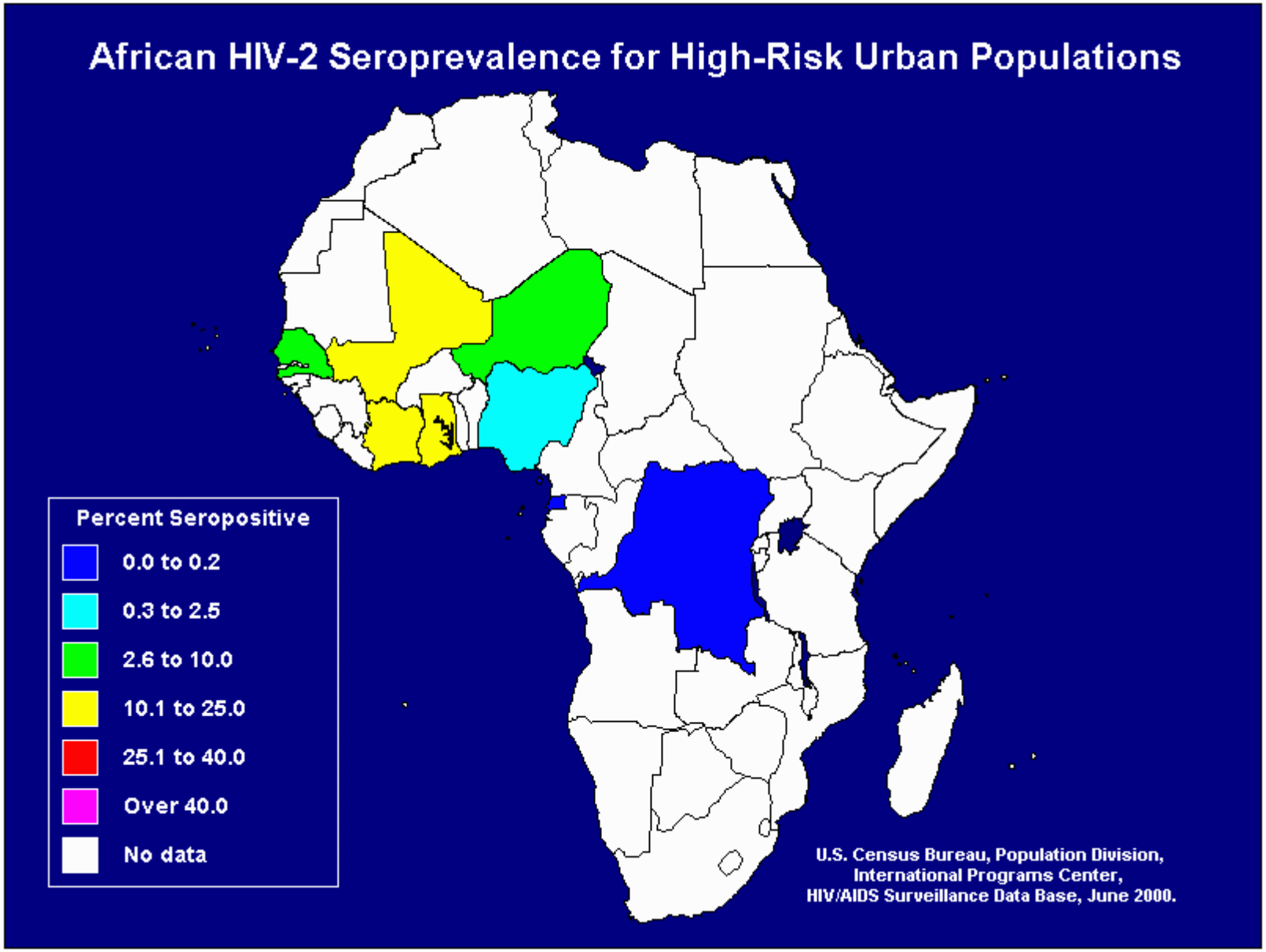
Botswanan AIDS-tilanne on melkein pahin.



http://www.unaids.org/en/HIV_data/Epidemiology/epi_slides.asp


African HIV-1 Seroprevalence for Low-Risk Urban Populations
Percent Seropositive
Less than 0.1
0.1
0.2 to 1.0
1.1 to 5.0
5.1 to 10.0
Over 10.0
No data
U.S. Census Bureau, Population Division,
International Programs Center,
HIV/AIDS Surveillance Data Base, June 2000.

African HIV-2 Seroprevalence for High-Risk Urban Populations



http://www.who.int/hiv/data/en/

Kotitehtävä #12

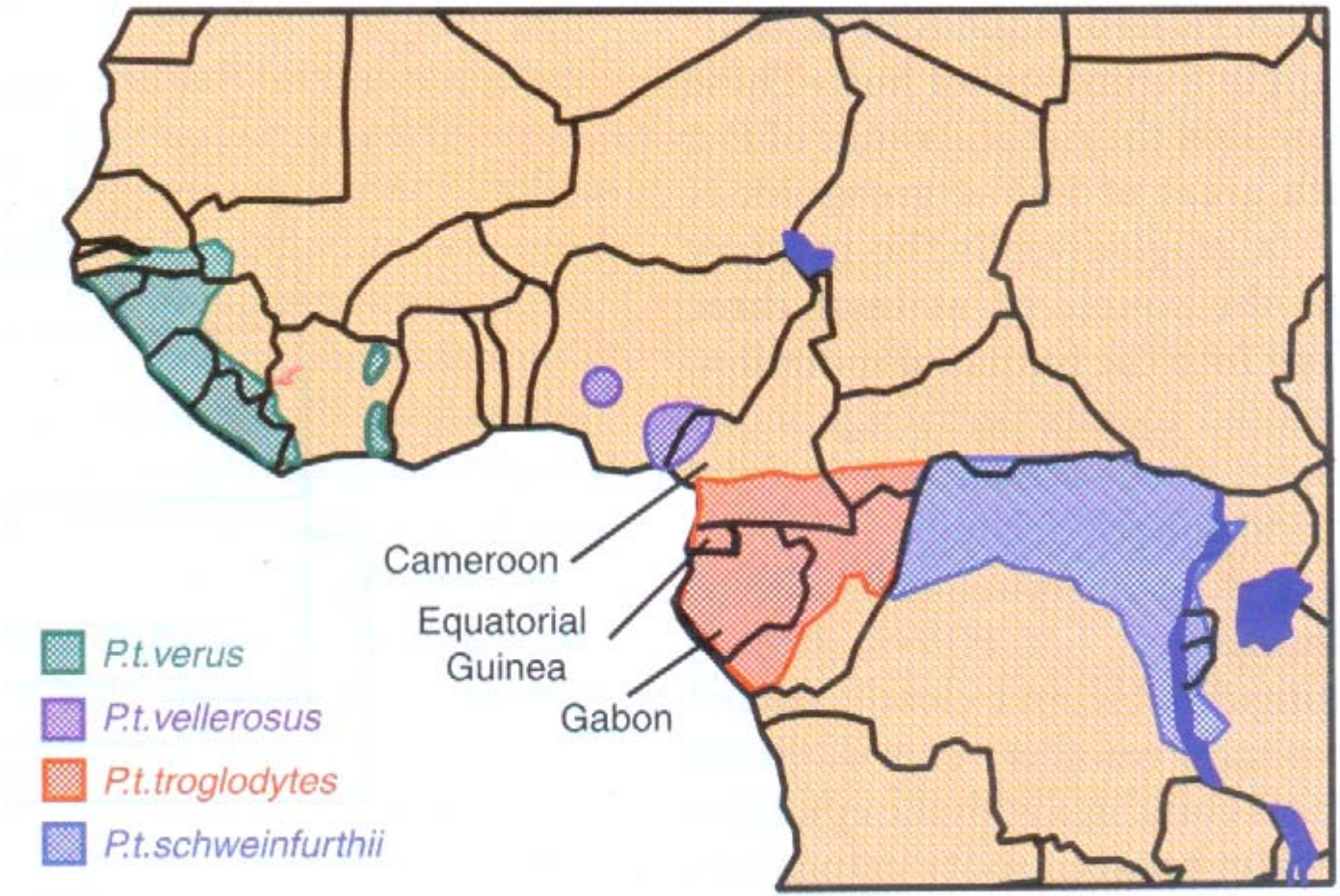
Tutki HIV-tilastoja (powerpoint-esitystä **Global epidemics**) ja muodosta oma kanta siihen, onko HIV nyt sitten jo historiaa.

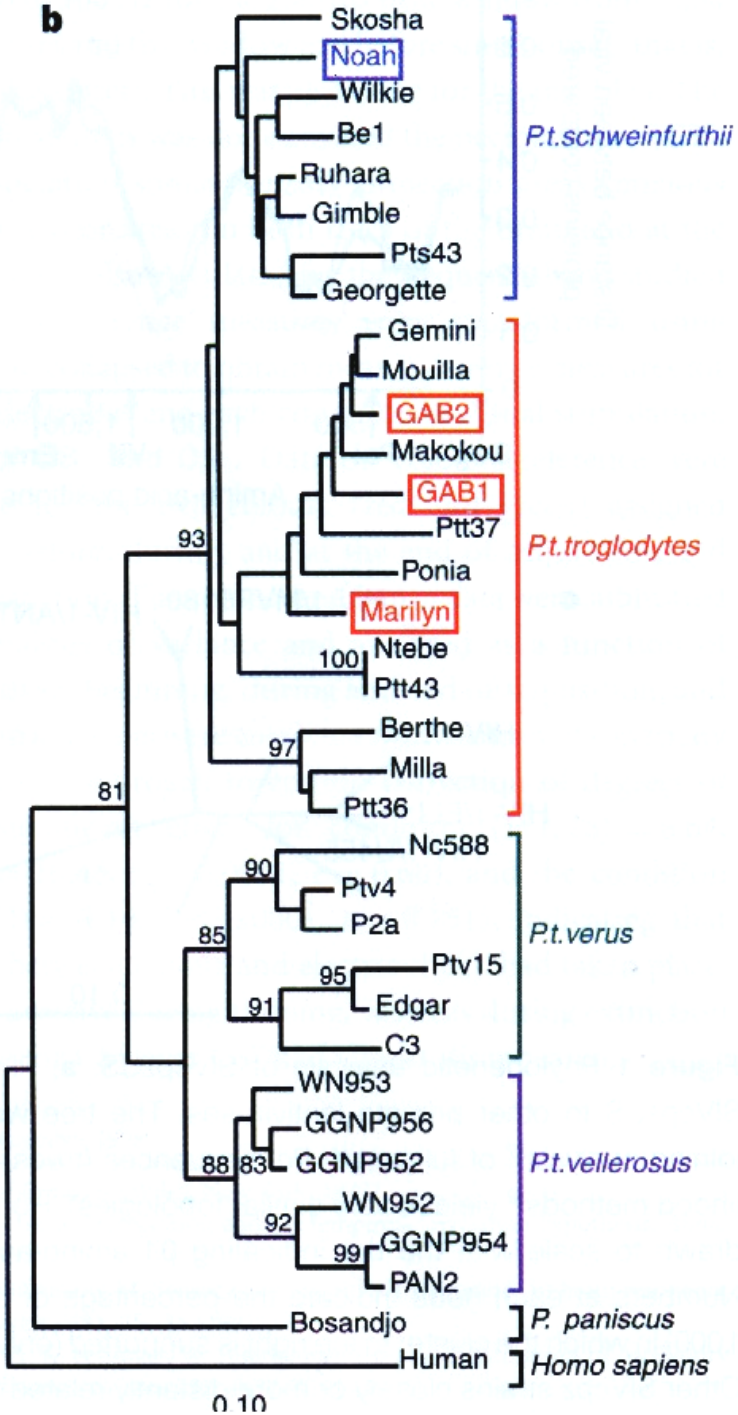
Lähetä mielipiteesi sähköpostilla Jaakko.Lumme@oulu.fi

Tämä on ainoa kerta kun saat käyttää sähköpostia yhteydenottoon tämän opintojakson puitteissa.

Gao, Bailes, Robertson, Chen, Rodenburg, Michael, Cummins, Arthur, Peeters, Shaw, Shar & Hahn (1999) Origin of HIV-1 in the chimpanzee *Pan troglodytes troglodytes*. -Nature 397: 436-441

Simpanssin alalajien alueet

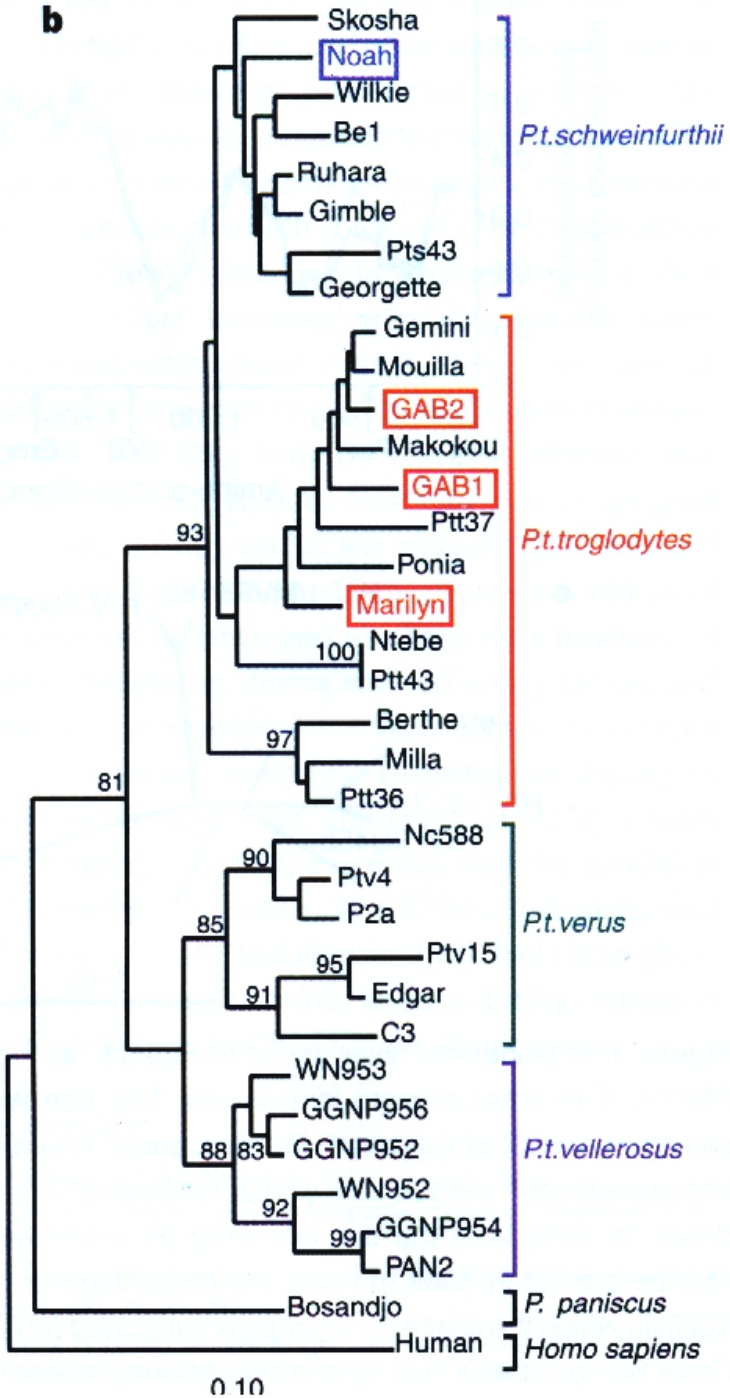


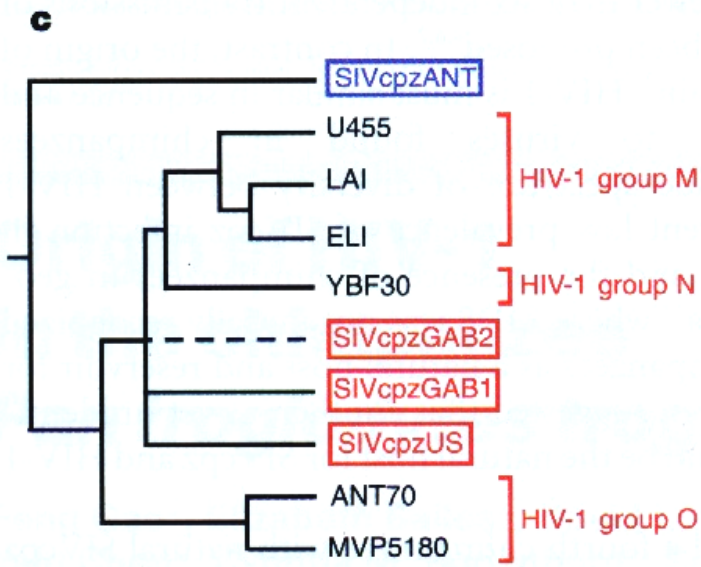


Simpanssien fylogenia
eli “sukupuu”

Simpansseilla on nimet,
koska useat ovat töissä
koe-eläiminä Yhdysvalloissa

Ulkoryhminä bonobo, *Pan paniscus* ja ihminen, *Homo sapiens*





Valikoitujen virusten fylogenia HIV ihmisen, SIV apinan virus.

Päätellään, että *Pan troglodytes troglodytes* on HIVeiksi ryhtyneiden SIVien päävarasto, josta se on rynnännyt ainakin kolme kertaa

Hahn, Shaw, De Cock & Sharp (2000) AIDS as a zoonosis: scientific and public health implications. - Science 287: 607-614

Lihalajitelma afrikkalaiselta torilta

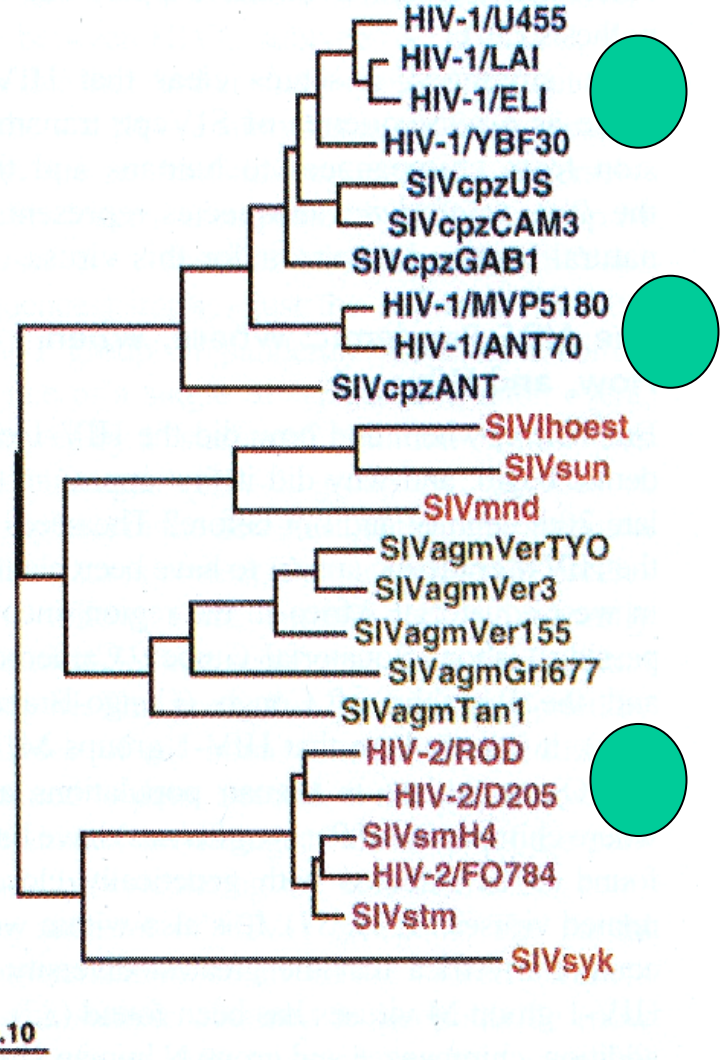
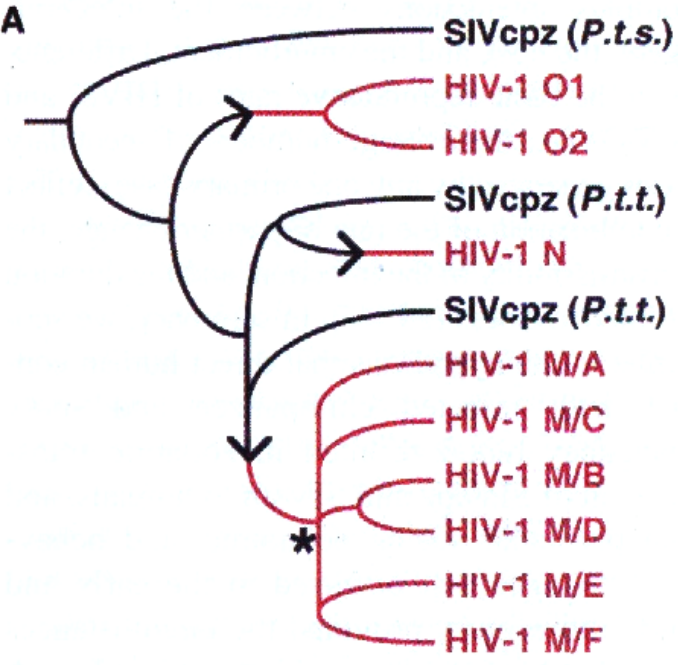


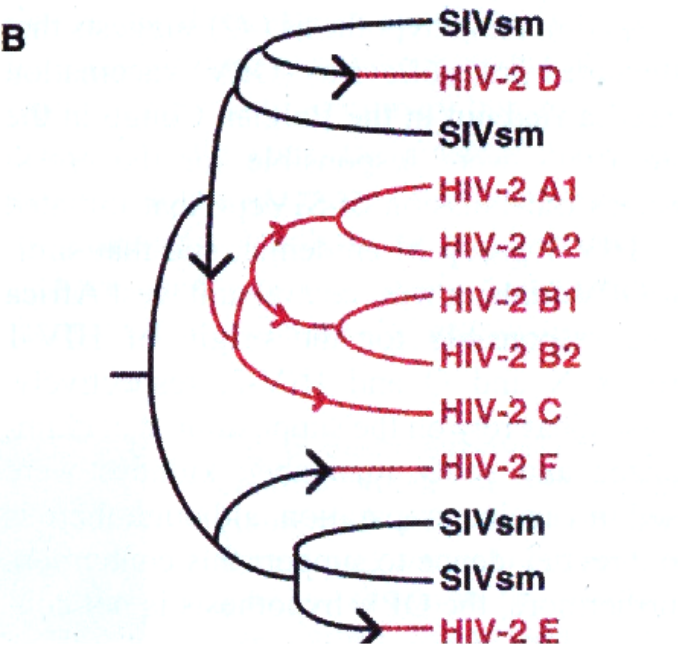
Fig. 1. Evolutionary relationships of primate lentiviruses based on maximum-likelihood phylogenetic analysis of full-length Pol protein sequences (*52*). The five major lineages are color-coded. SIVs have subscripts denoting their species of origin (defined in Table 1). The scale bar indicates 0.1 amino acid replacement per site after correction for multiple hits (*52*).

Kädellisten ***lentiviruksia*** *Pol*-proteiinin sekvenssin perusteella verrattuna

HIV = Human Immunodeficiency V.
SIV = Simian (apinan siis)

cpz simpanssi (*Pan troglodytes*)
sm sooty mangabee (*Cercocebus*)
syk Sykesin apina (*Cercopithecus*)
agm African Green Monkey
ynnä muita, 26 lajia + ihminen!





AIDS on zoonoosi

HIV-1 ja **HIV-2** kantojen suhde **SIV**-sukulaisiin.

HIV-1 on tullut simpanssista, kolme eri kertaa, ja tyyppi **HIV-1 M** on se varsinainen maailmanvalloittaja.

HIV-2 on siitä nokimangabeestä, neljä kertaa tullut ihmisille, ja yksi näistä tyypeistä on taas muihin verrattuna vanha ja muunteleva

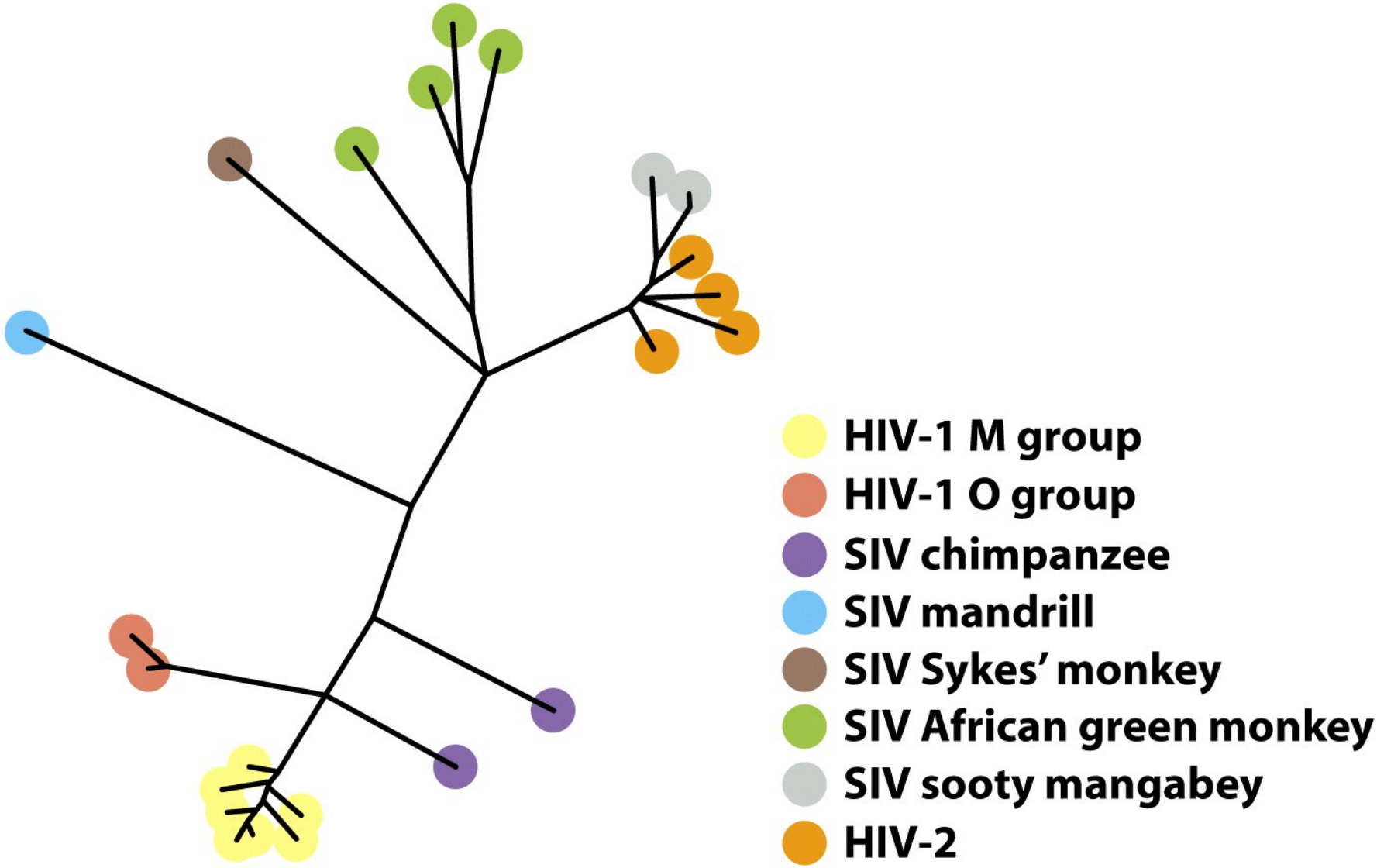
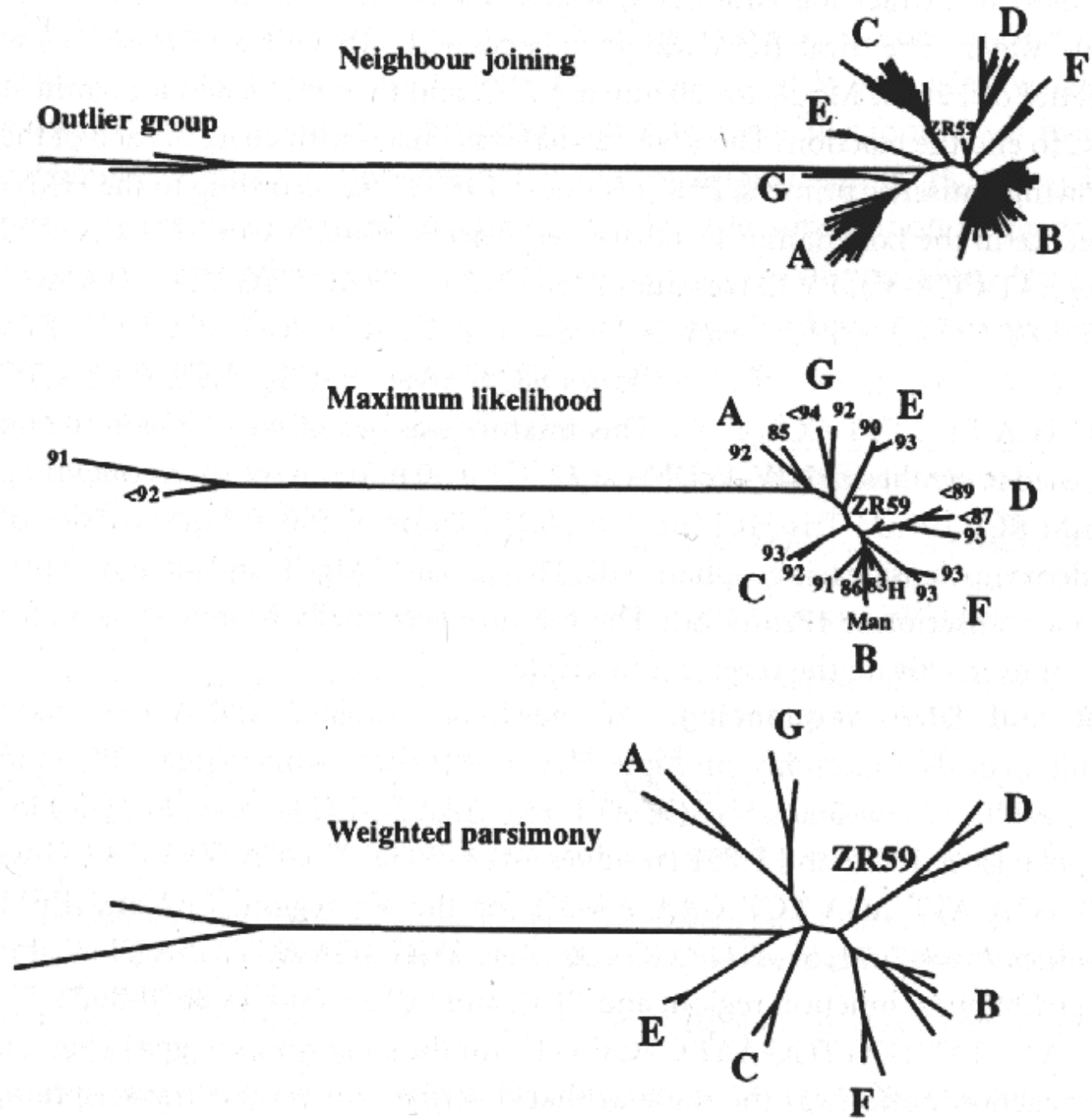


Figure 24-42 Molecular Biology of the Cell 5/e (© Garland Science 2008)

Zhu, Korber, Nahmias, Hooper, Sharp, Ho (1998)
An African HIV-1 sequence from 1959 and implications for the origin of the epidemic. - Nature 391: 594-597

Tutkijat etsivät 1213 plasmanäytettä jotka oli otettu Afrikassa eri syistä vuosina 1959-1982. Näytteistä 21 oli seropositiivisia, mutta vain yhdestä saatiin virus eristettyä. Mies oli Leopoldvillestä Belgian Kongosta, kaupunki on nykyisin Kinshasa ja maa välillä Zaire, nyt Kongon more-or-less Demokraattinen Tasavalta.

Viruksen RNA pitää muuttaa DNA:ksi käänteistranskriptaasientsyymillä. Ryhmä onnistui, onhan Ho Time Magazinen vuoden mies!



ZR59 eli zairelainen sijoittuu kaikissa fylogeneettisissa puissa puskan tyvelle ja ymmärrämme siitä, että se on sukua näiden M-alaryhmän virusten kantaäidille

Kuvan Man oli manchesterilainen sailori joka kuoli AIDSiin 1959

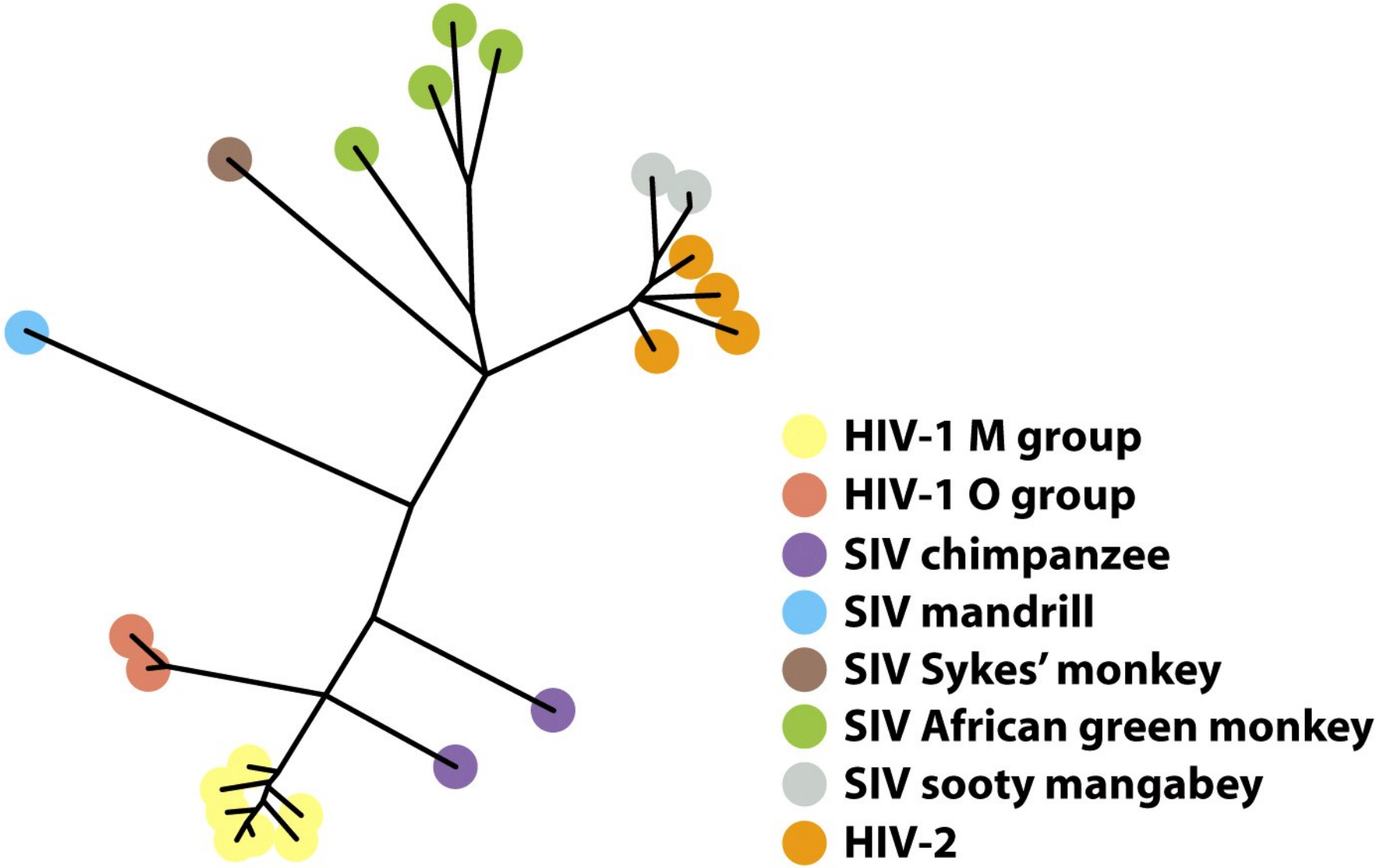


Figure 24-42 Molecular Biology of the Cell 5/e (© Garland Science 2008)

Polio

Hämmästyttävä kertomus ihmiskunnan kurjasta historiasta

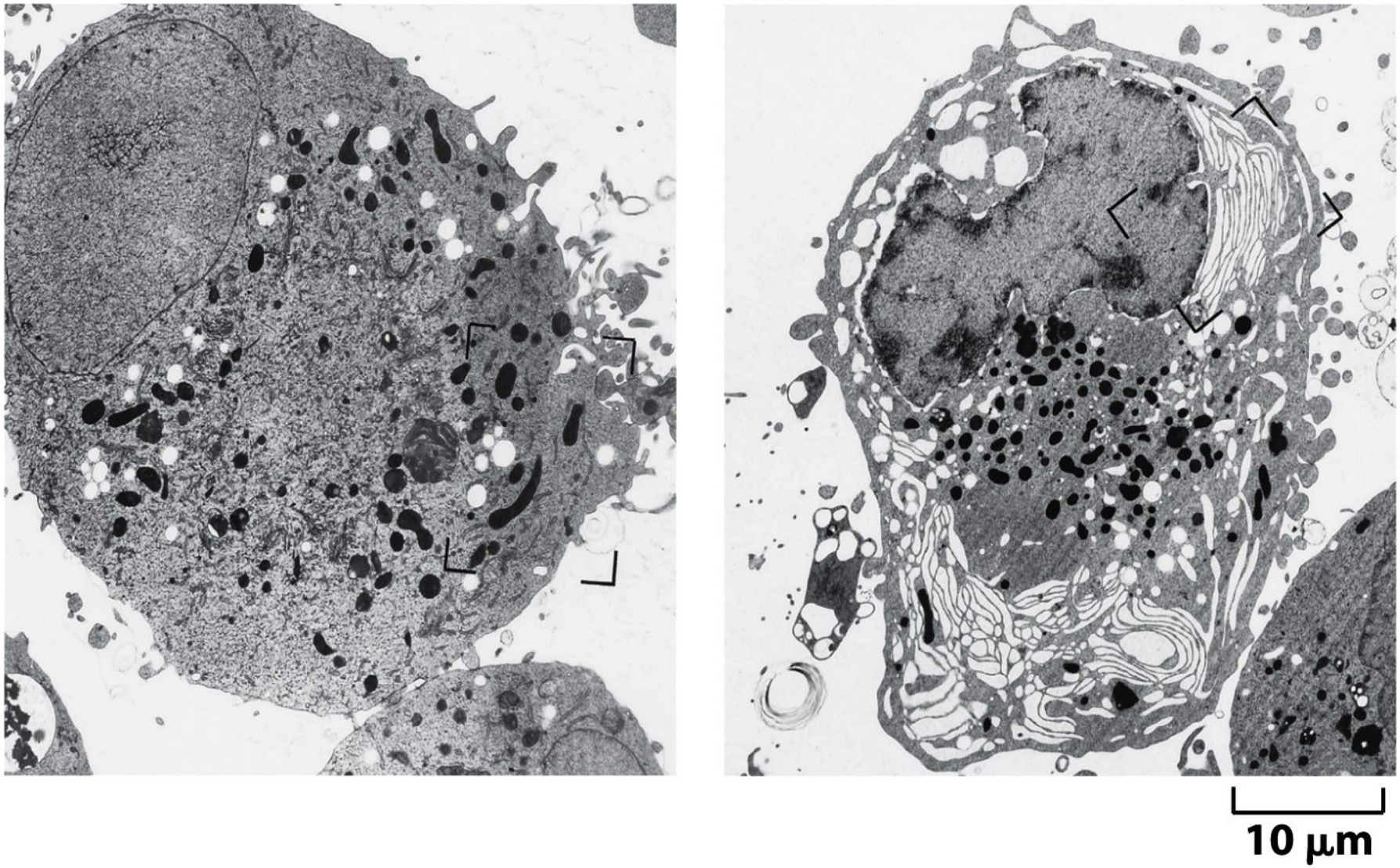


Figure 24-36 Molecular Biology of the Cell 5/e (© Garland Science 2008)

Poliovirus aiheuttaa tuhoa hermosoluissa

CELL 1515

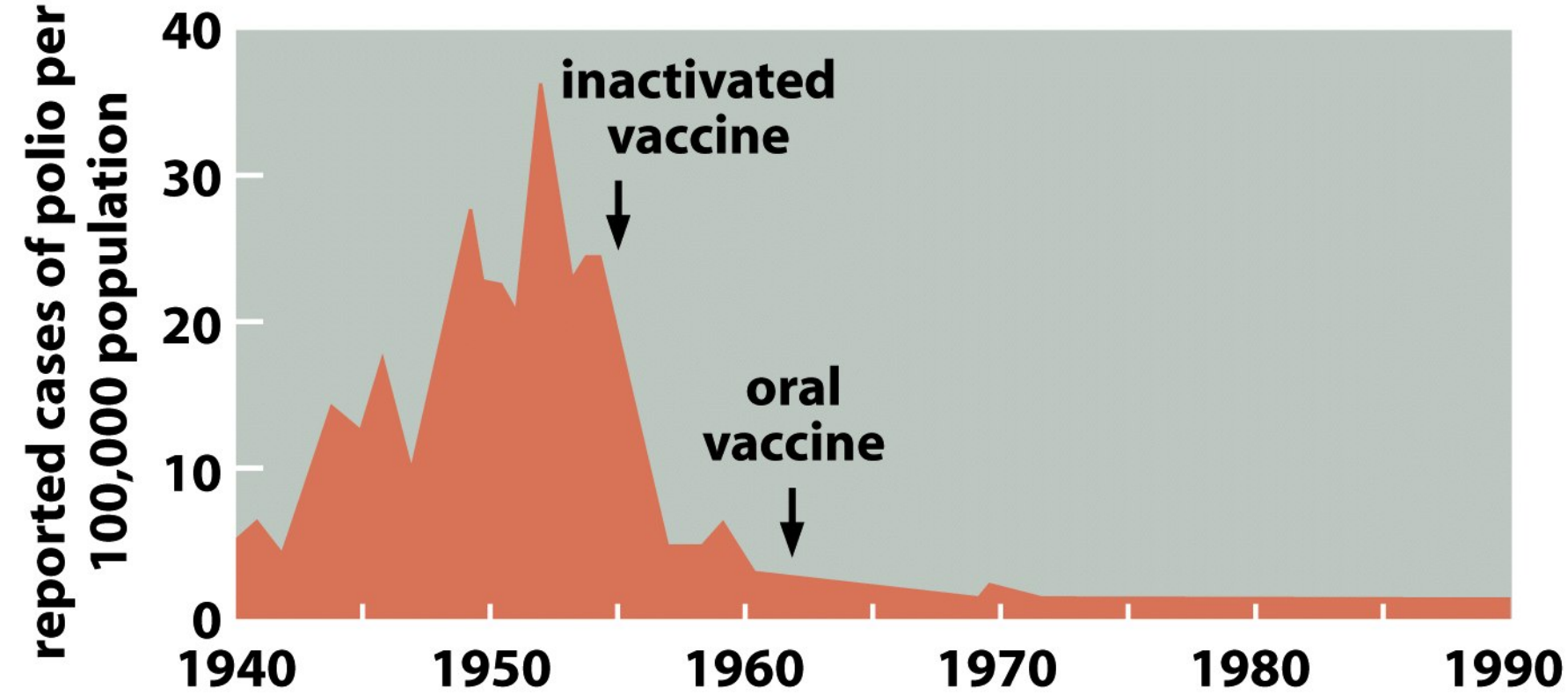


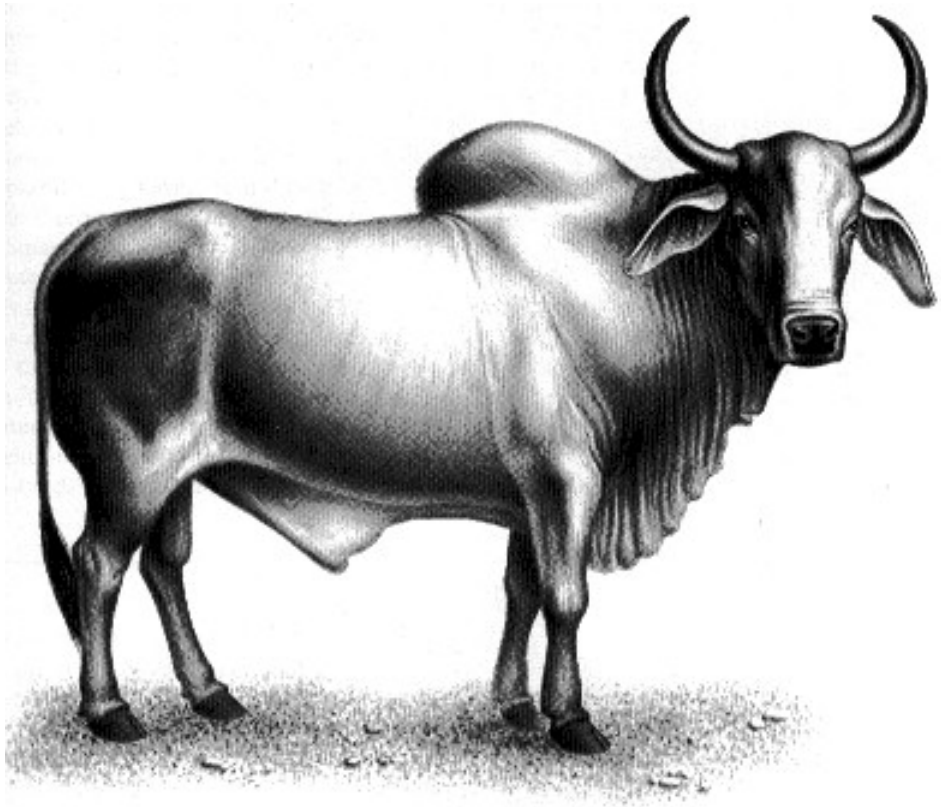
Figure 24-17 Molecular Biology of the Cell 5/e (© Garland Science 2008)

Poliolla oli tapana levitä pandemioina, kunnes Jonas Salk keksi ensimmäisen rokotteen, Suullisesti annettava laajensi rokotettavien piiriä maailmassa rutkasti.

Origins of HIV: Polio vaccine cleared

New evidence from three separate laboratories pours cold water on claims that contaminated polio vaccines may have introduced the AIDS virus into humans. It was suggested that chimpanzee kidney cultures allegedly used in the preparation of oral polio vaccine stocks used in Africa during the late 1950s could have introduced a precursor of HIV-1 into humans. But now PCR amplification of frozen samples of the suspect vaccine has failed to reveal any HIV-1-related nucleic acids or chimpanzee mitochondrial DNA. In addition the evidence points to the use of macaque monkey cells, rather than chimpanzee in the vaccines in question. And finally, a phylogenetic study of modern HIV-1 strains identifies the last common ancestor of HIV-1 group M as a virus present in a human host, rather than as a single transfer from another primate.

Polio vaccine samples not linked to AIDS
PHILIPPE BLANCOU, JEAN-PIERRE VARTANIAN, CINDY CHRISTOPHERSON, NICOLE CHENCINER, CLAUDIO BASILICO, SHIRLEY KWOK & SIMON WAIN-HOBSON
A search through the archives clears early vaccines of starting the AIDS pandemic.
Nature **410,** 1045-1046 (26 April 2001)



Bos indicus, Zebu

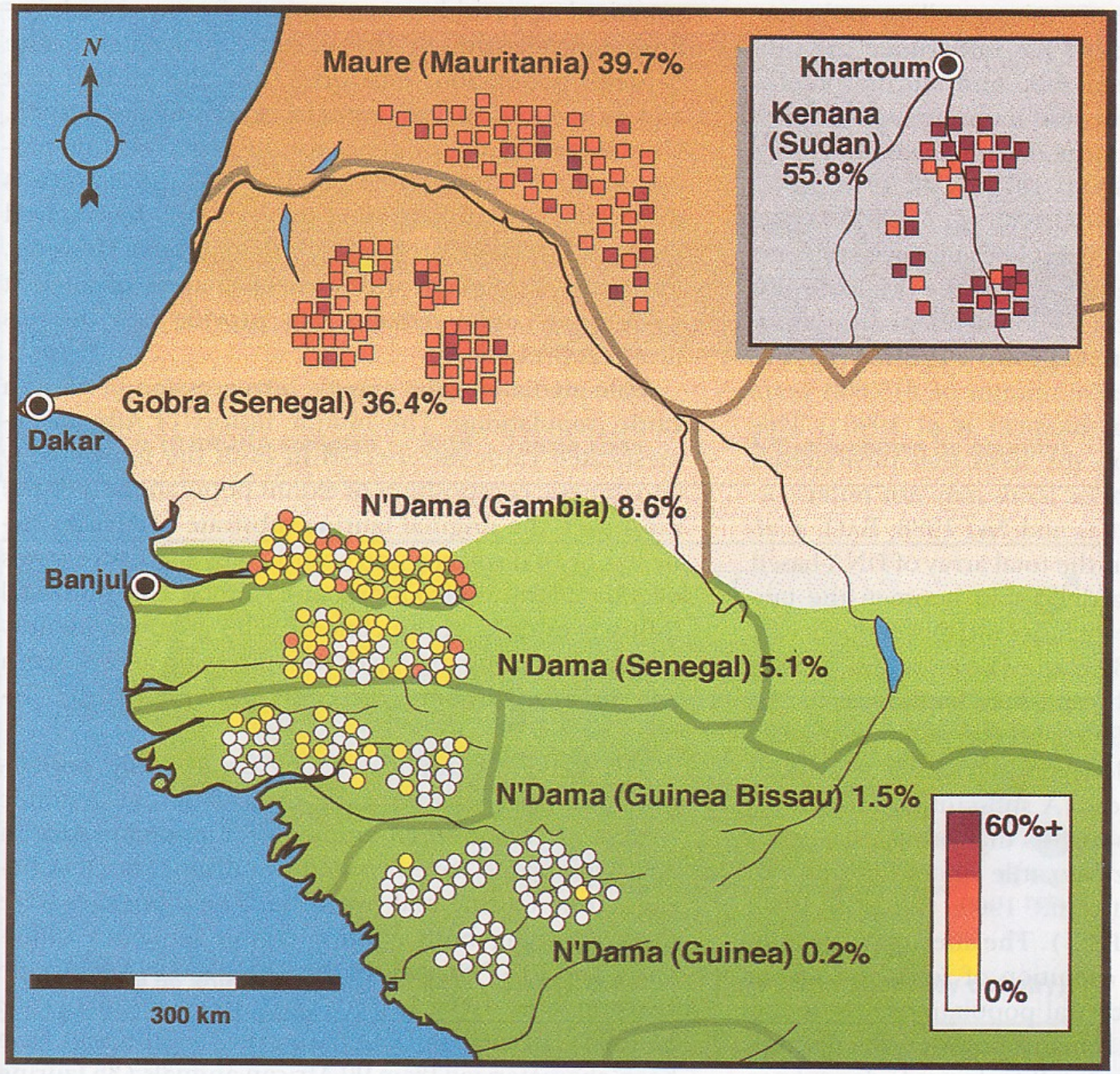


FIGURE 5.—Genetic introgression of zebu-specific alleles in West African cattle. Individual cattle are represented by circles (taurine animals) or squares (zebu animals). The color-coded scale represents the proportion of zebu-specific alleles in percentage terms from an original scale of zero to 20. The percentage beside each population is the proportion of zebu-specific alleles in the population as a whole (Table 4). With the exception of the Maure, the position of each animal corresponds approximately to the location where they were sampled. Although the Maure breed was actually sampled in Senegal, they are recent migrants to this country and were relocated to Mauritania for the purposes of this diagram. For comparative purposes, the gray window shows the East African zebu Kenana breed that was sampled in Sudan. The green shaded area denotes the arboreal tsetse-infested zone.

mitokondrio

nukleaariset
mikrosatelliitit

Y-kromosomi

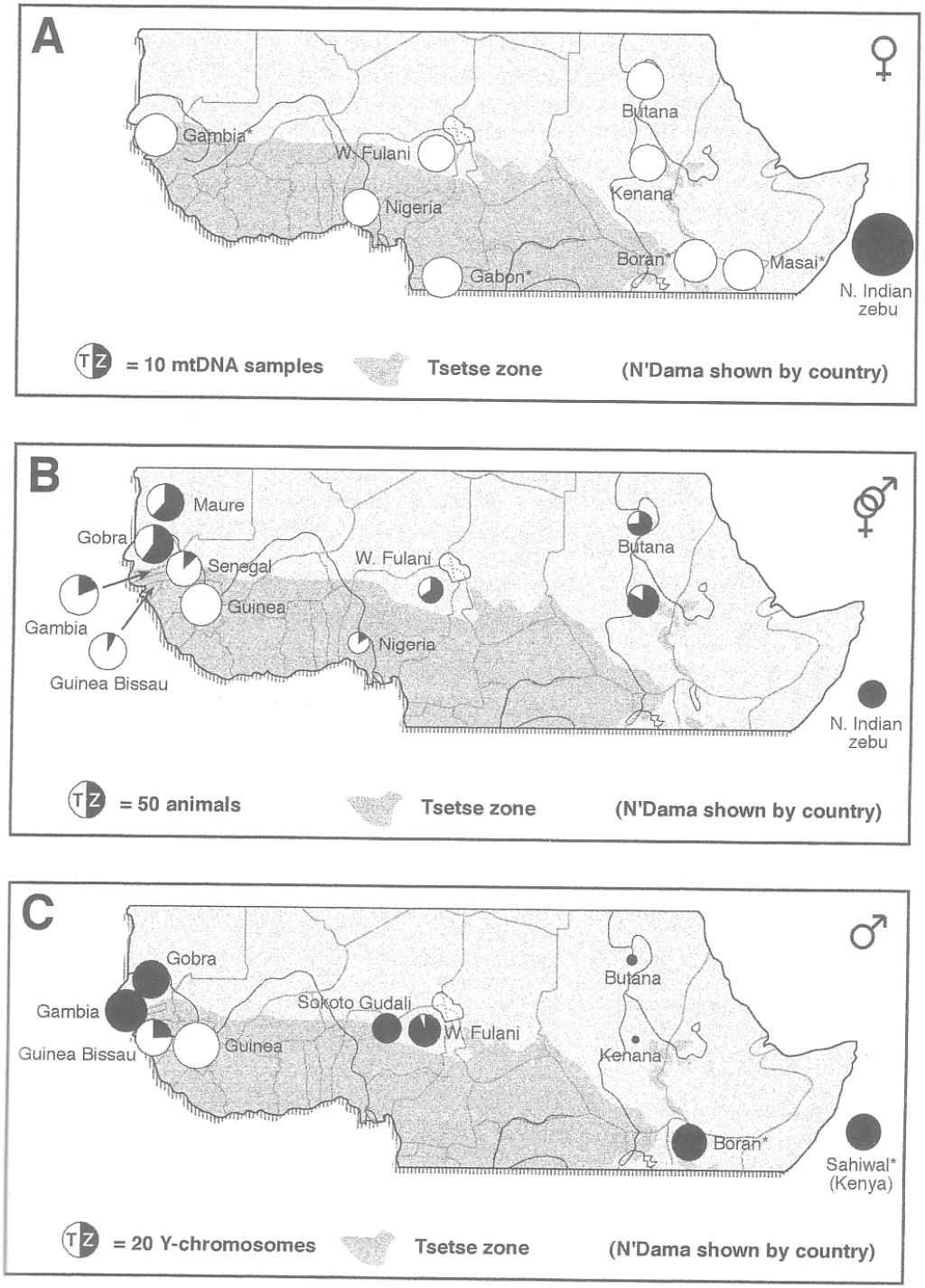
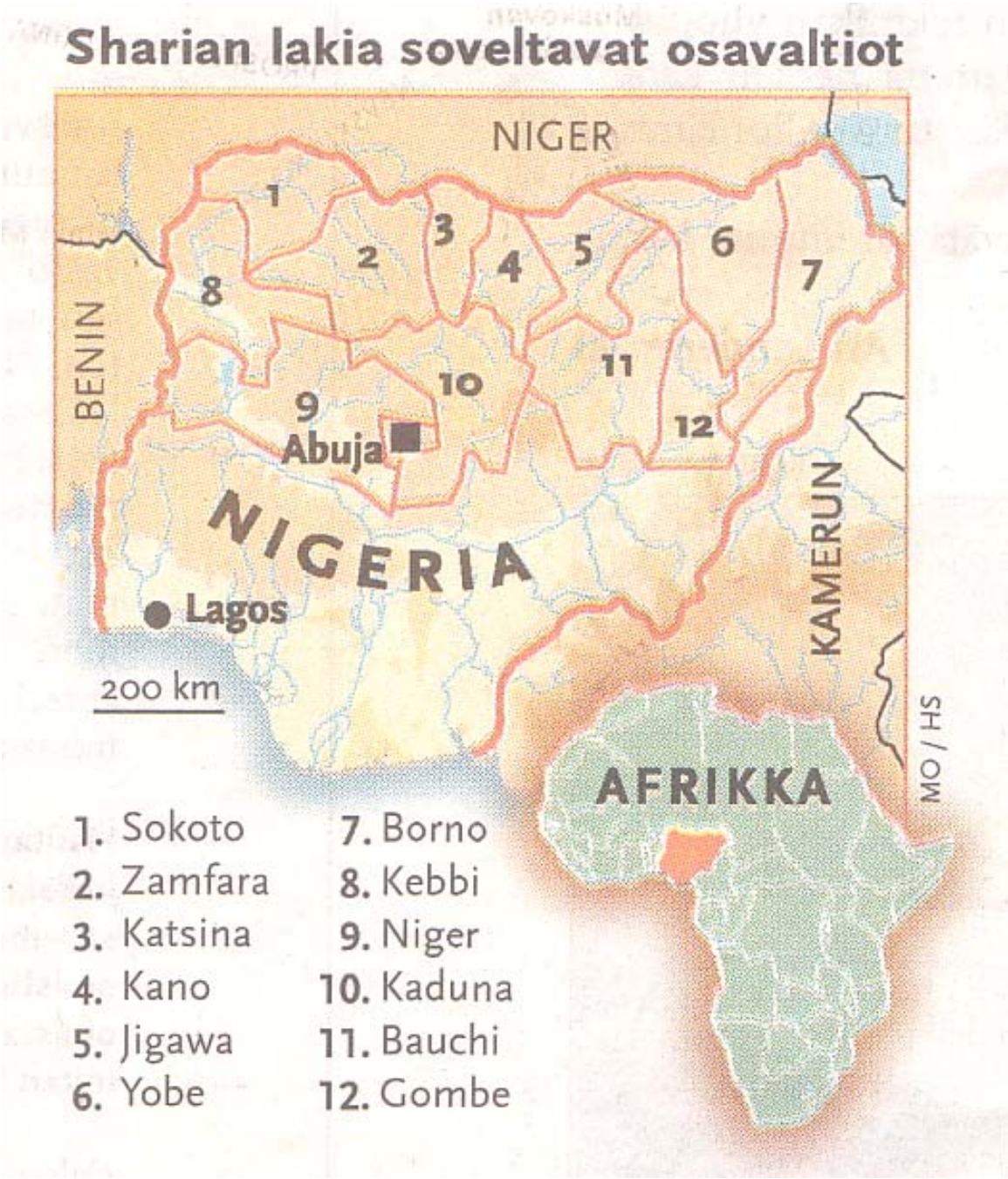


FIGURE 6.—The introgression of three different zebu genomic components into African cattle. Sample size is proportional to the area of each pie-circle as indicated on each of the three diagrams. The distribution of taurine and zebu mitotypes are shown in A. Zebu admixture proportions are shown in B. The black portion of each circle represents zebu admixture proportions from Table 4 and the area of each circle is proportional to sample size. The introgression of the zebu *Y* chromosome is shown in C. Again, the black portion of the circles corresponds to the proportion of zebu *Y* chromosomes in the population. Data for A and C were taken from SUZUKI *et al.* (1993), BRADLEY *et al.* (1994), LOFTUS *et al.* (1994b) and TEALE *et al.* (1995). Populations marked with an asterisk (*) were not analyzed in our laboratory. Sample sizes are not given in TEALE *et al.* (1995) and for the purposes of C an arbitrary size of 20 is assumed for the Boran and Kenyan Sahiwal populations.

1000 years ago Tsetse halted muslim migration south. Last century it plagued European colonial governments and today it impedes development of large areas . Some species affect humans, but many other species affect cattle and in a bad year can kill 100% of a herd. With Africa's spiralling population African govts, eg Kenya and Zimbabwe, are keen to control the fly so that land tsetse previously rendered unable to be cultivated can be developed. Scientists how sucessfully developed very environmentally benign ways of controlling the fly and have started projects with groups such as the Masai. Conservationists warn this ironically may harm the environment, by reducing the percentage of land set aside to preserve bio-diversity.

http://en.wikipedia.org/wiki/Trypanosomiasis

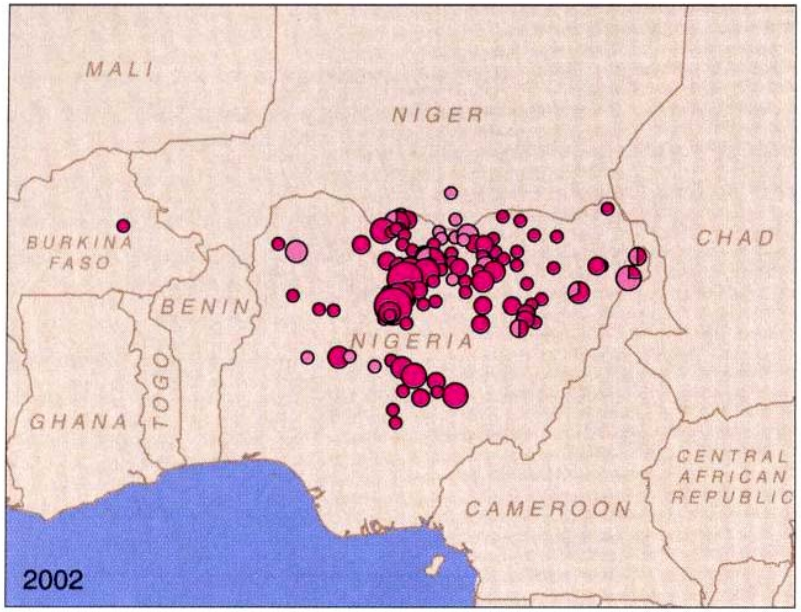
Standford

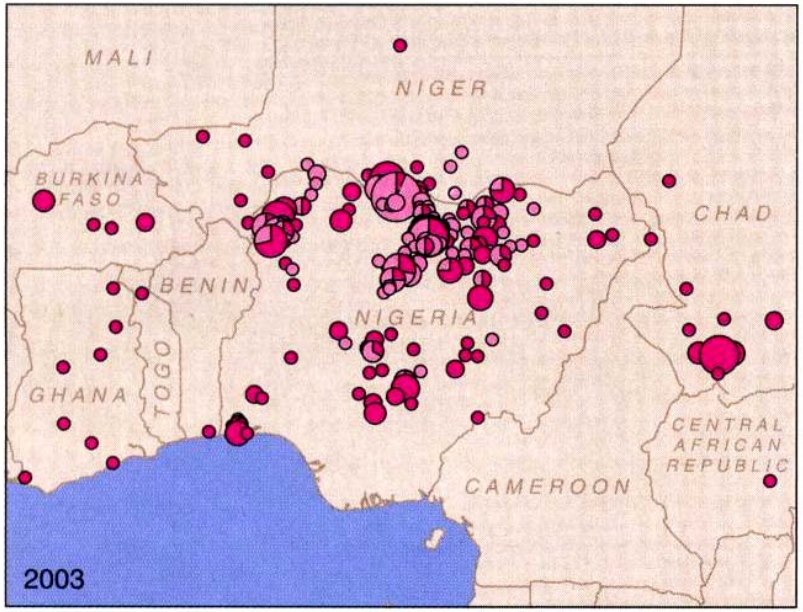


Asiat johtavat toisiin.

Tämä kartta oli Hesarissa kuvituksena sille jutulle, että Nigeriassa pidettiin missikilpailut (?) ja kivitettiin hengiltä "avionrikkojanaiset" (Sharian laki: nainen on noin ½ ihmistä)

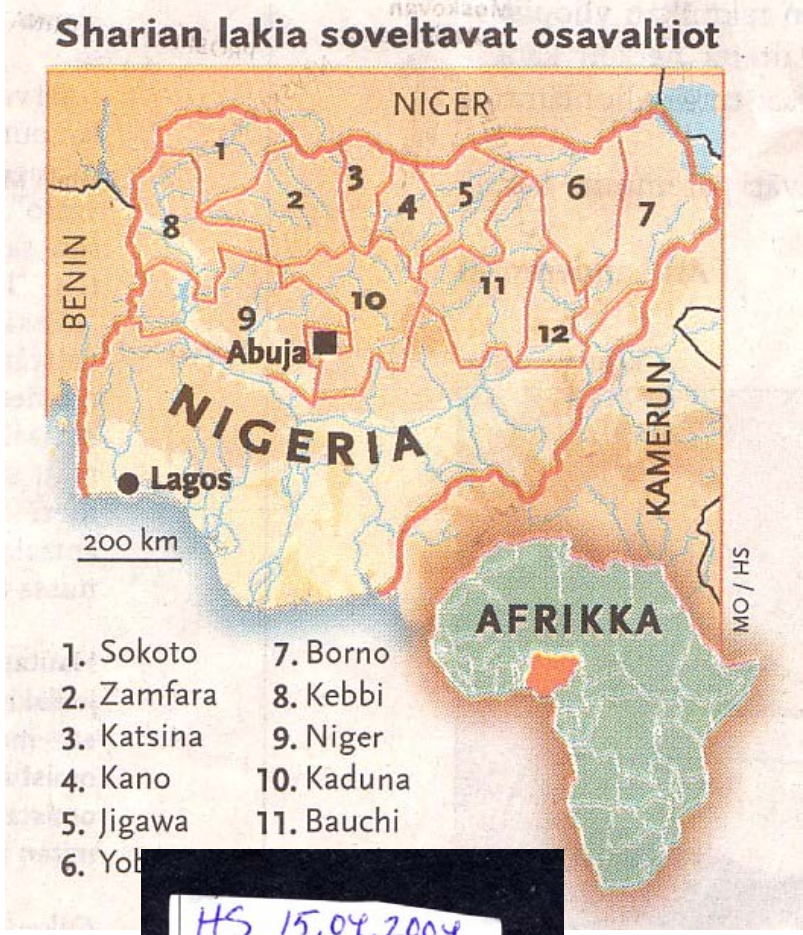
HS 20.10.2002





Type 1 Type 3

Breakout. Rumors about vaccine safety derailed vaccination activities in Nigeria in 2003, and the disease exploded, reinfecting eight polio-free countries and endangering the global eradication effort.



HS 15.09.2004

Botswanassa poliotapaus

GENEVE. Eteläisessä Afrikassa sijaitsevassa Botswanassa on todettu ensimmäinen poliotapaus 13 vuoteen, Maailman terveysjärjestö WHO ilmoitti keskiviikkona.

Seitsenvuotiaan pojan uskotaan saaneen taudin Nigerian pohjoisista osavaltioista, missä muslimijohtajat ovat vastustaneet lasten polio-rokotuksia.

Rokotuskampanjoiden ansioista poliota on koko maailmassa yleisesti vain viidessä Afrikan maassa.

Reuters

doing that in
about vaccine
ates in northern
ination for up to
04, p. 24). As a
infected 20 pre-
, as far away as

ntamination are

gure heavily. As
ast, vaccinators
ed 40 Nigerian
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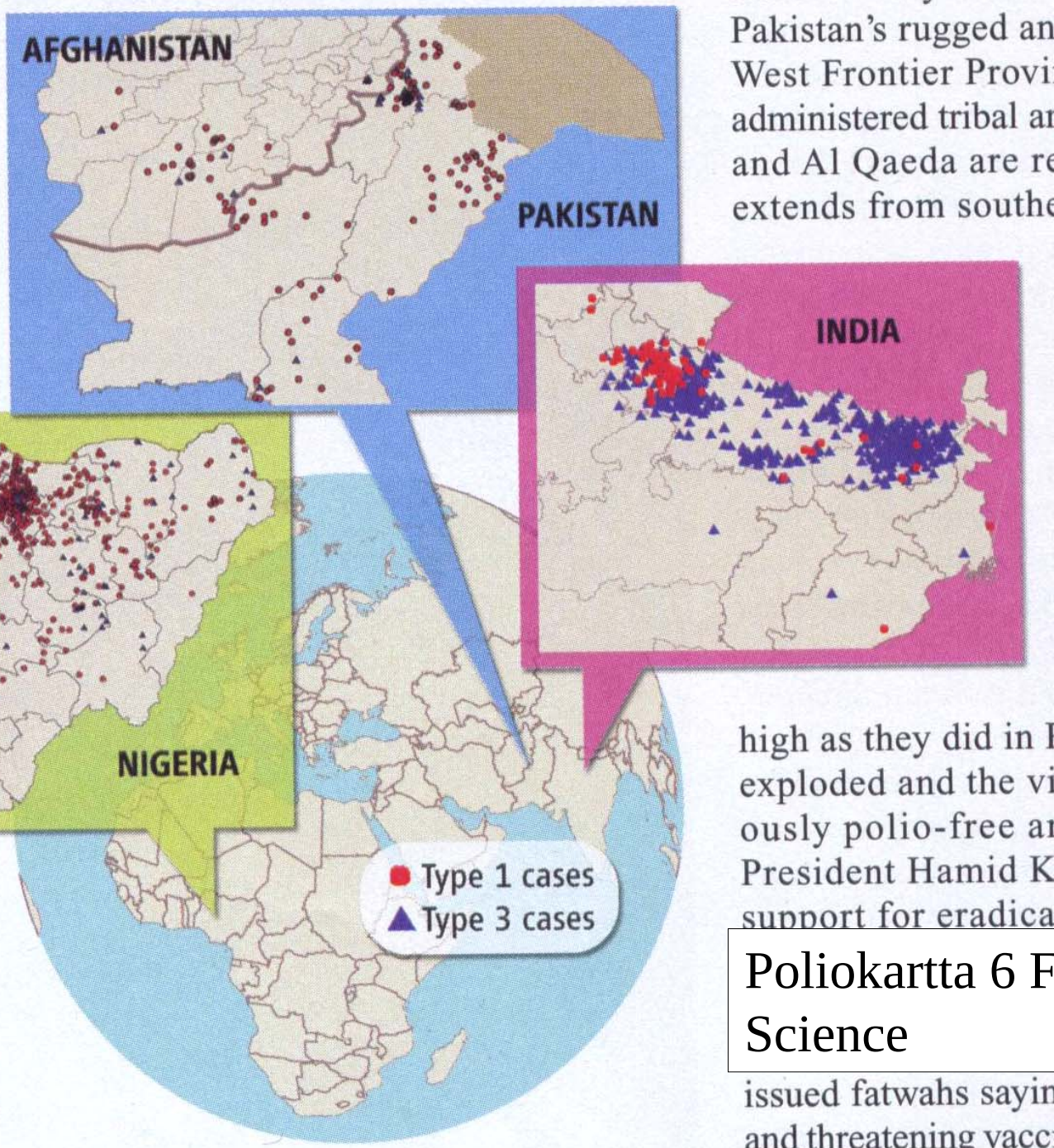

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Poliokartta 6 Feb 2009
Science

Sowing sorrow. Farming helped increase the human population and create the right environment, with pooled water for breeding mosquitoes, for malaria to take off.

Science 20 July 2001

Taudit

Maanviljelys johti populaation kasvuun ja tiukkaan kanssakäymiseen eläinten kanssa

Malaria	kastellut viljelmät (riisi) + kana, ankat
Tuhkarokko (measles)	nauta (rinderpest)
Tuberkuloosi	nauta
Isorokko (smallpox)	nauta (cowpox)
Influenssa	sika, ankka, kana
Hinkuyskä (pertussis)	sika, koira