

What is the amino acid sequence coded for by the template strand below?

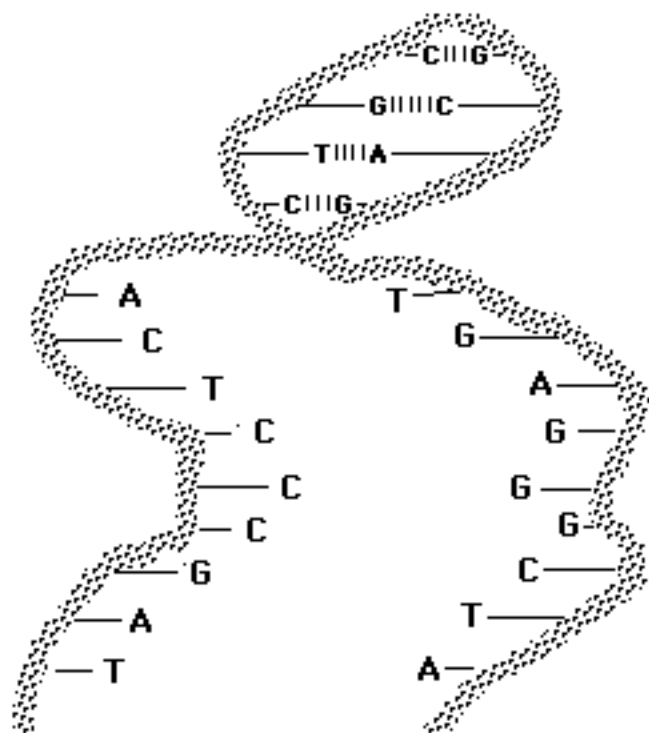
First determine the sequence of the information strand



What is the amino acid sequence coded for by the template strand below?

First determine the sequence of the information strand

INFORMATION
STRAND



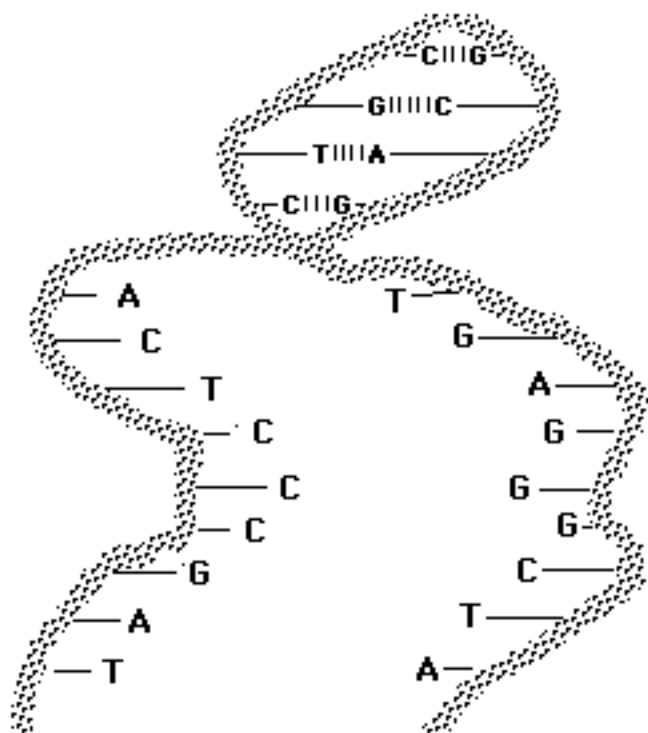
TEMPLATE
STRAND



What is the amino acid sequence coded for by the template strand below?

Next determine the sequence of the m-RNA

**INFORMATION
STRAND**



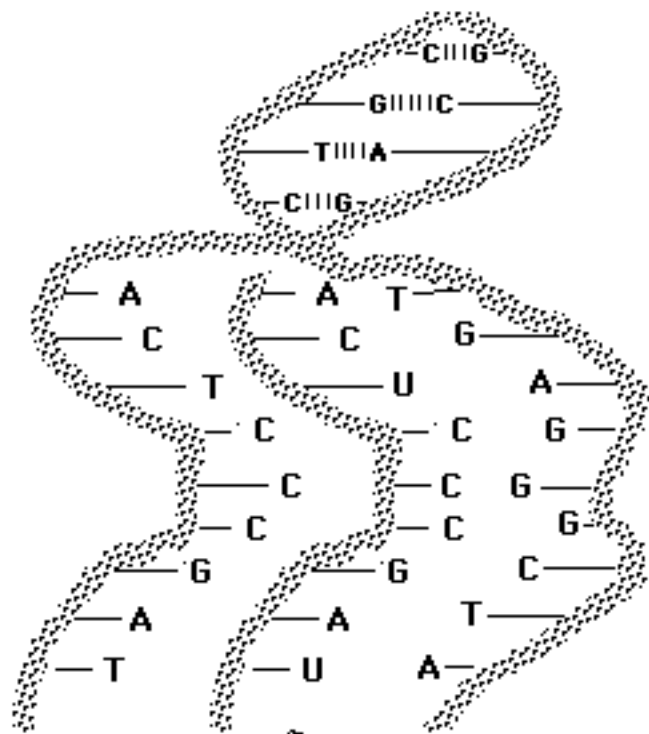
**TEMPLATE
STRAND**



What is the amino acid sequence coded for by the template strand below?

Next determine the sequence of the m-RNA

**INFORMATION
STRAND**

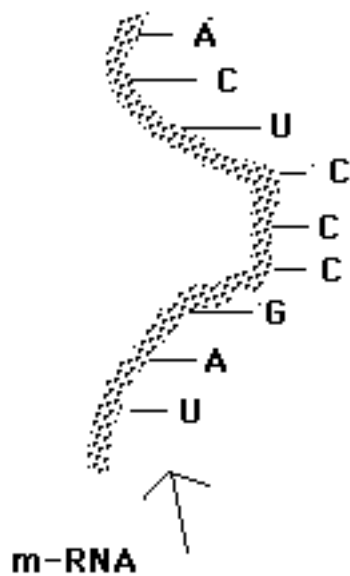


**TEMPLATE
STRAND**

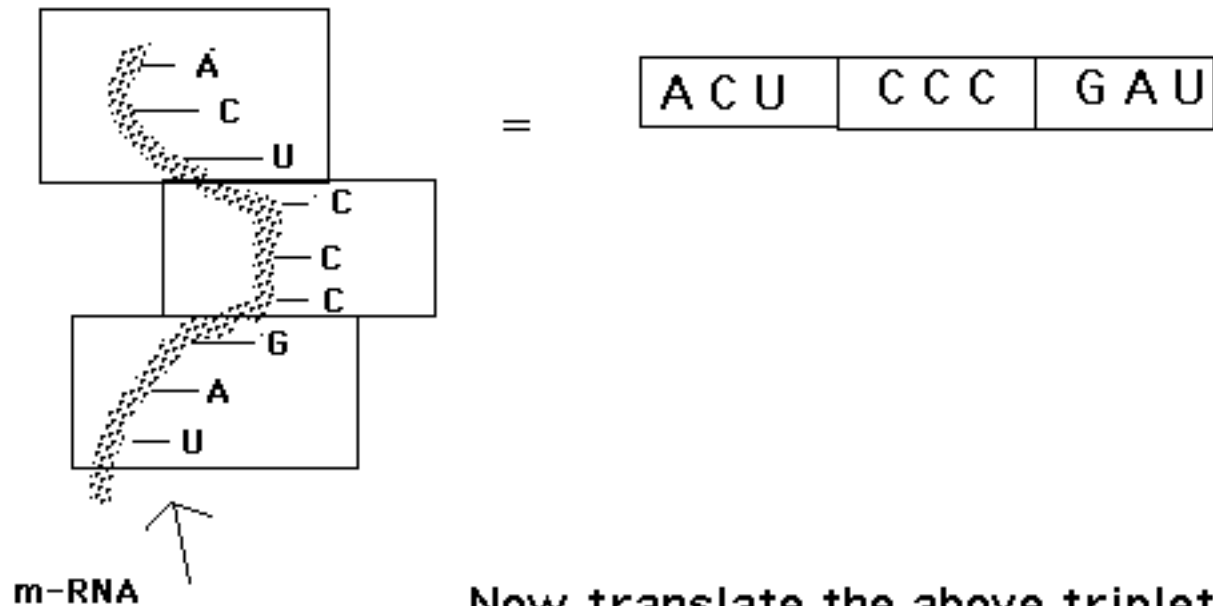
m-RNA



Next divide the m-RNA into triplets



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Now translate the above triplets into amino acid names using the Genetic code Table

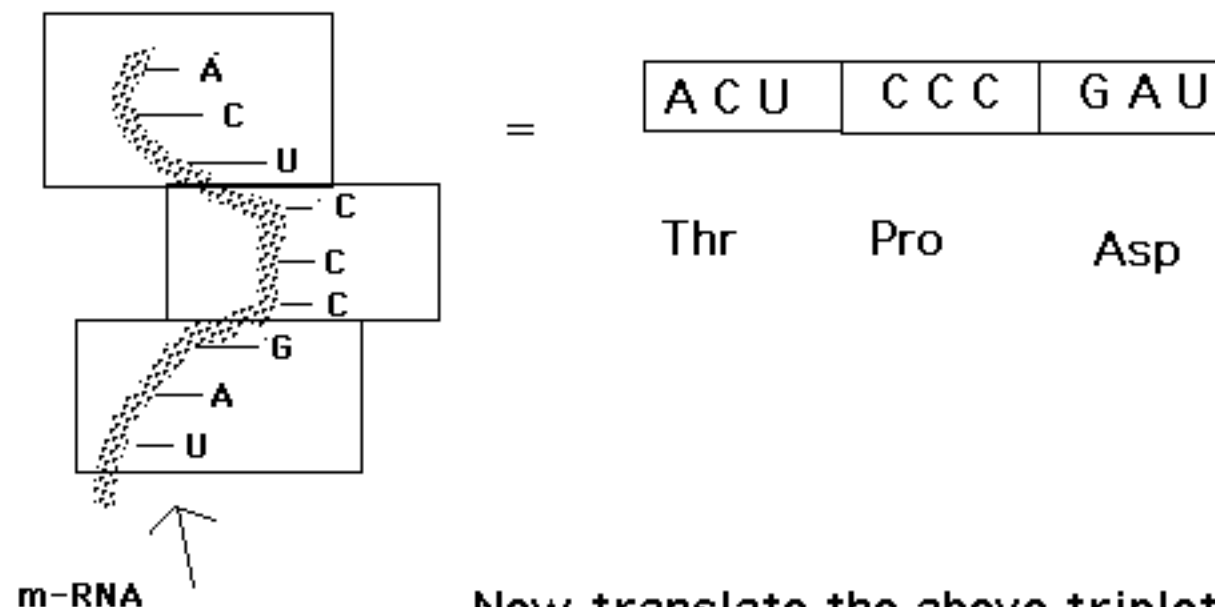
2nd base in codon

		U	C	A	G	
1st base in codon	U	Phe Phe Leu Leu	Ser Ser Ser Ser	Tyr Tyr STOP STOP	Cys Cys STOP Trp	U C A G
	C	Leu Leu Leu Leu	Pro Pro Pro Pro	His His Gln Gln	Arg Arg Arg Arg	U C A G
	A	Ile Ile Ile Met	Thr Thr Thr Thr	Asn Asn Lys Lys	Ser Ser Arg Arg	U C A G
	G	Val Val Val Val	Ala Ala Ala Ala	Asp Asp Glu Glu	Gly Gly Gly Gly	U C A G

3rd base in codon

The Genetic Code

Next divide the m-RNA into triplets



Now translate the above triplets into amino acid names using the Genetic Code Table

Homework Problem: What is the amino acid sequence coded for by the template strand below?

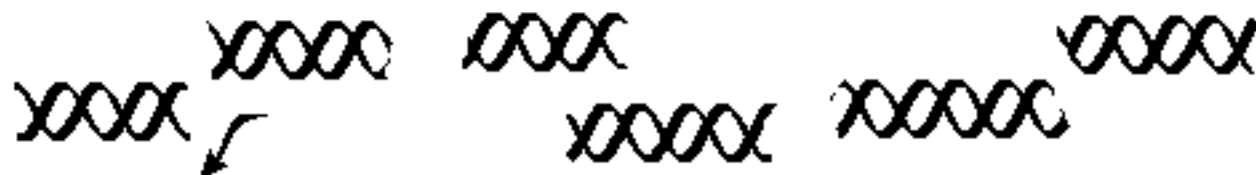
C-C-G-A-C-T-A-C-G-C-T-A

The Steps in DNA Fingerprinting

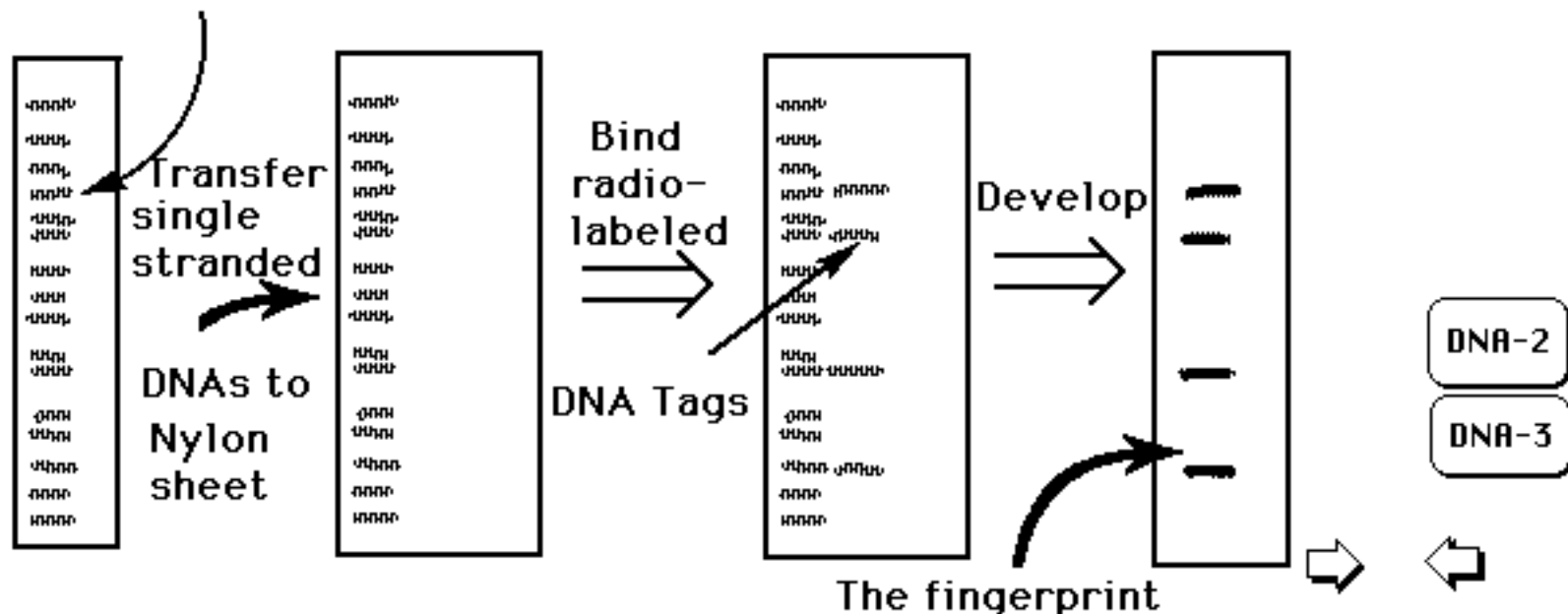


DNA-1

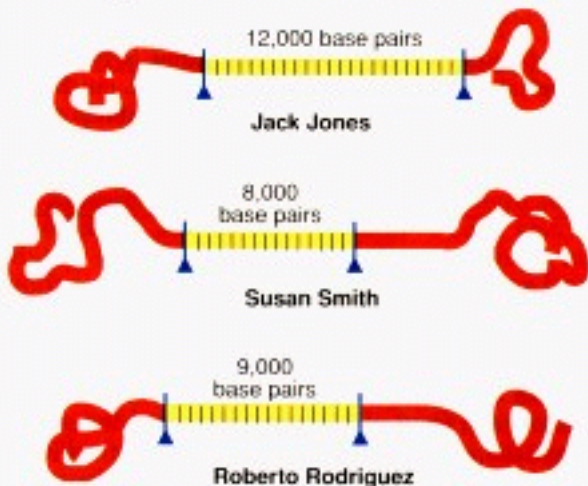
Cut DNA with ↓ restriction enzymes



Separate fragments



Restriction enzymes sever DNA into fragments of various sizes



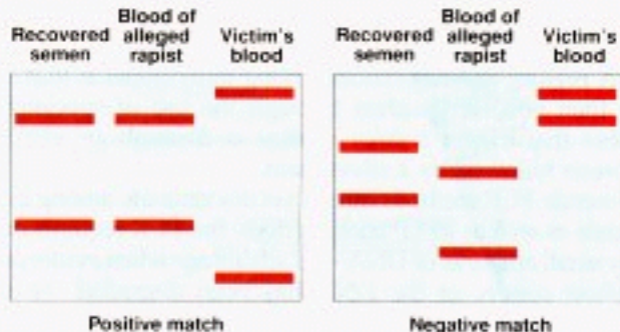
■ = DNA strand

■ = DNA region with variable number of repeating units

▲ = Restriction enzyme cleavage site

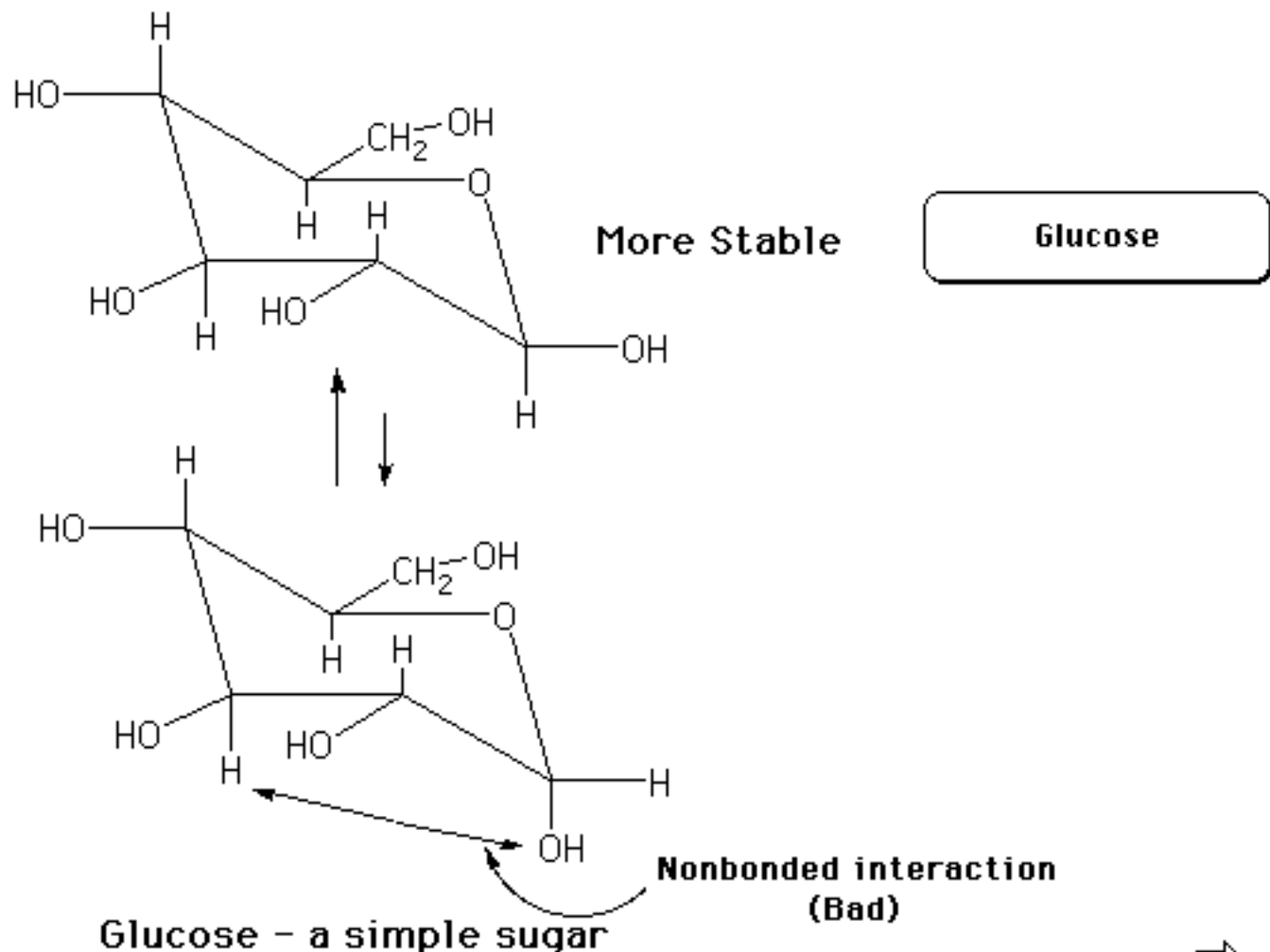
Restriction enzymes cleave DNA at specific locations. The sizes of the resulting fragments differ from individual to individual because of polymorphisms, highly variable DNA regions that contain a variable number of repeating units of certain small DNA sequences.

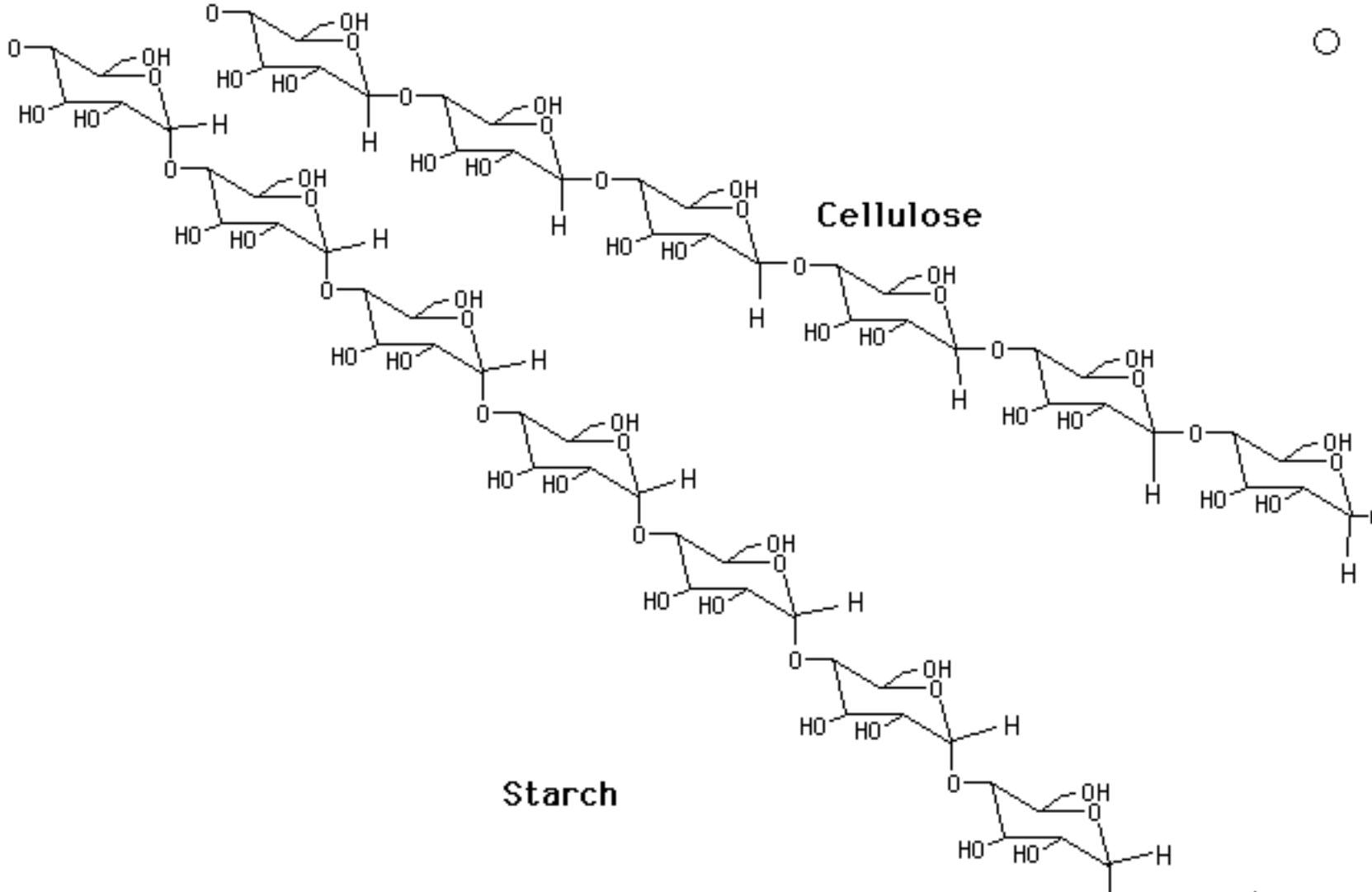
DNA typing is used in criminal cases...



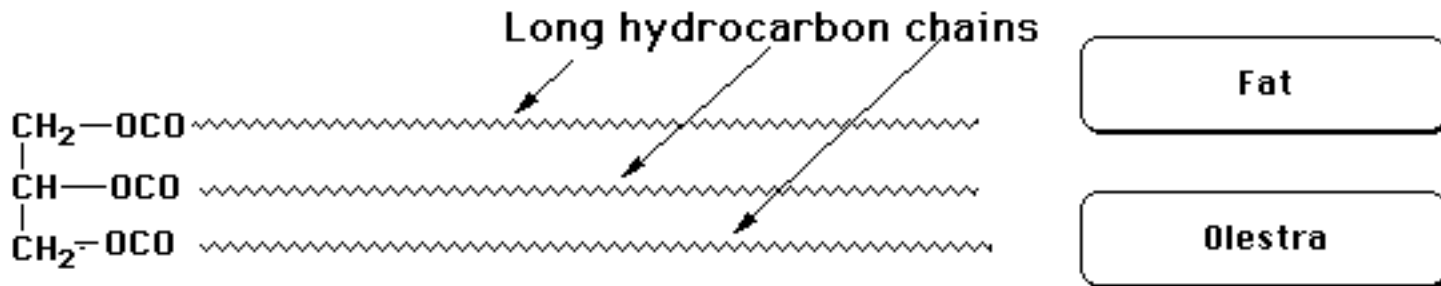
If the DNA pattern from a suspect's blood matches that of evidence from a crime scene, the suspect could be the criminal. In a real case, the profiling procedure then would be repeated several times, probing different locations on the DNA molecule. The likelihood that the match is coincidental then would be calculated.

Carbohydrates

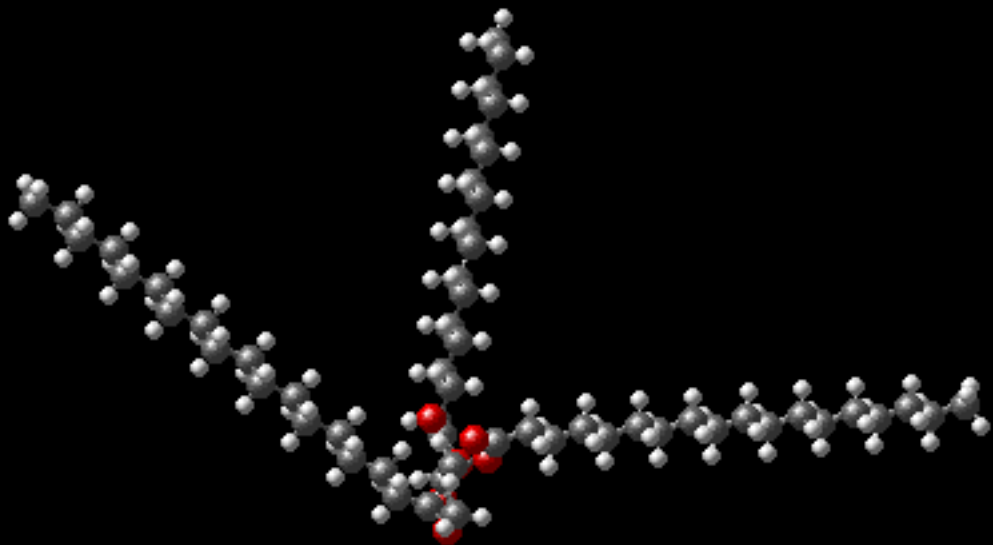


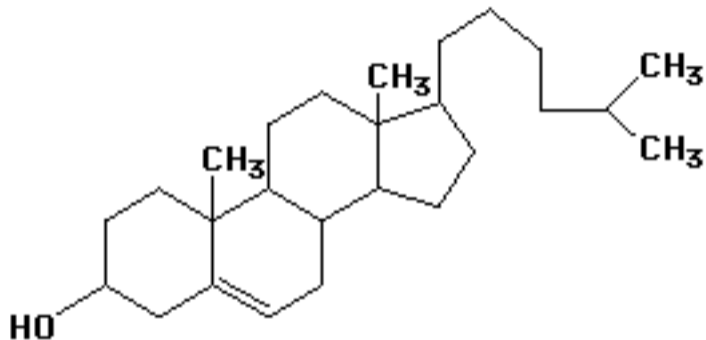


Lipids - molecules with large nonpolar areas soluble in nonpolar solvents:

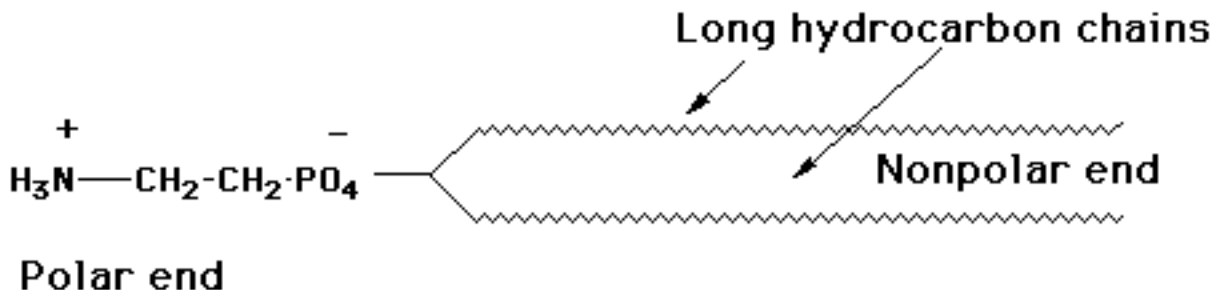


A triglyceride a fat or oil If the chain contains double bonds the fat is unsaturated

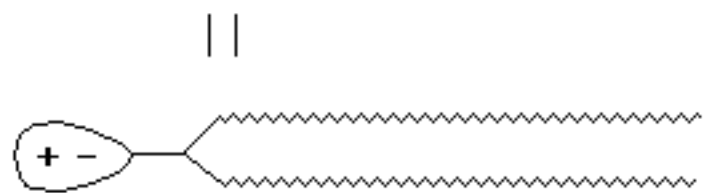


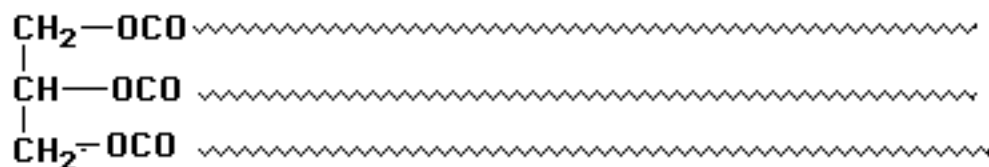


Cholesterol - A steroid

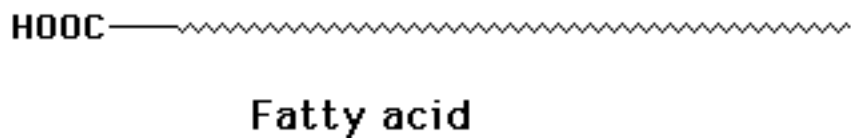
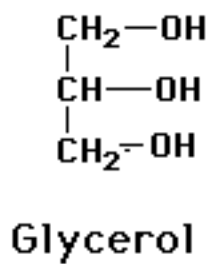


A Phospholipid

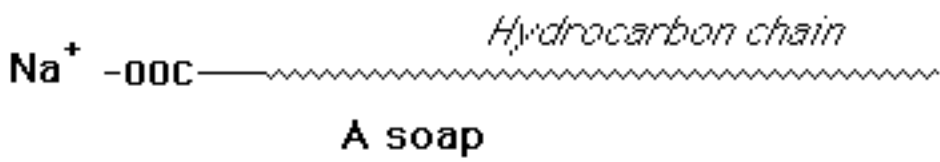




↓
Hydrolysis

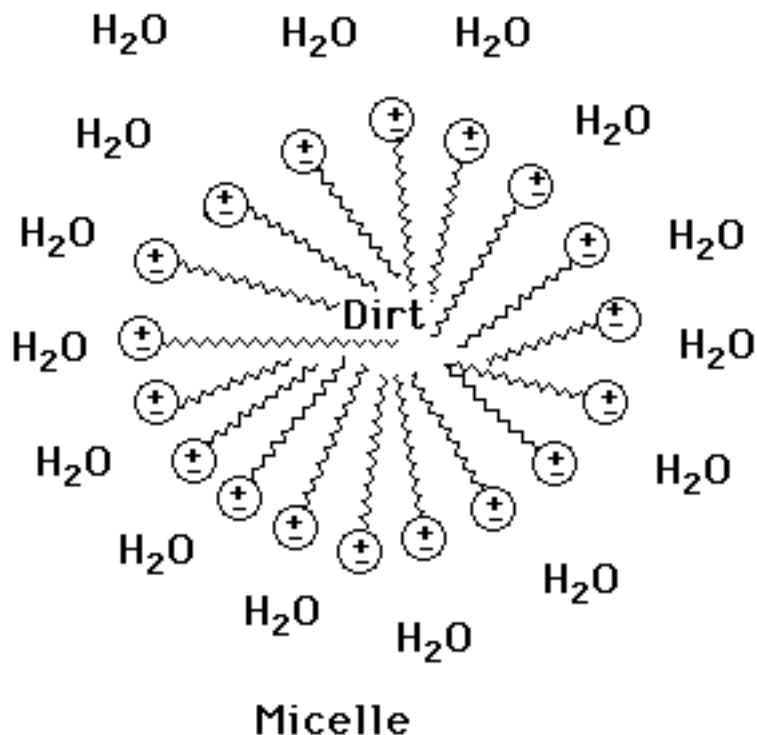


↓
Base $\text{Na}^+ \text{ } ^-\text{OH}$

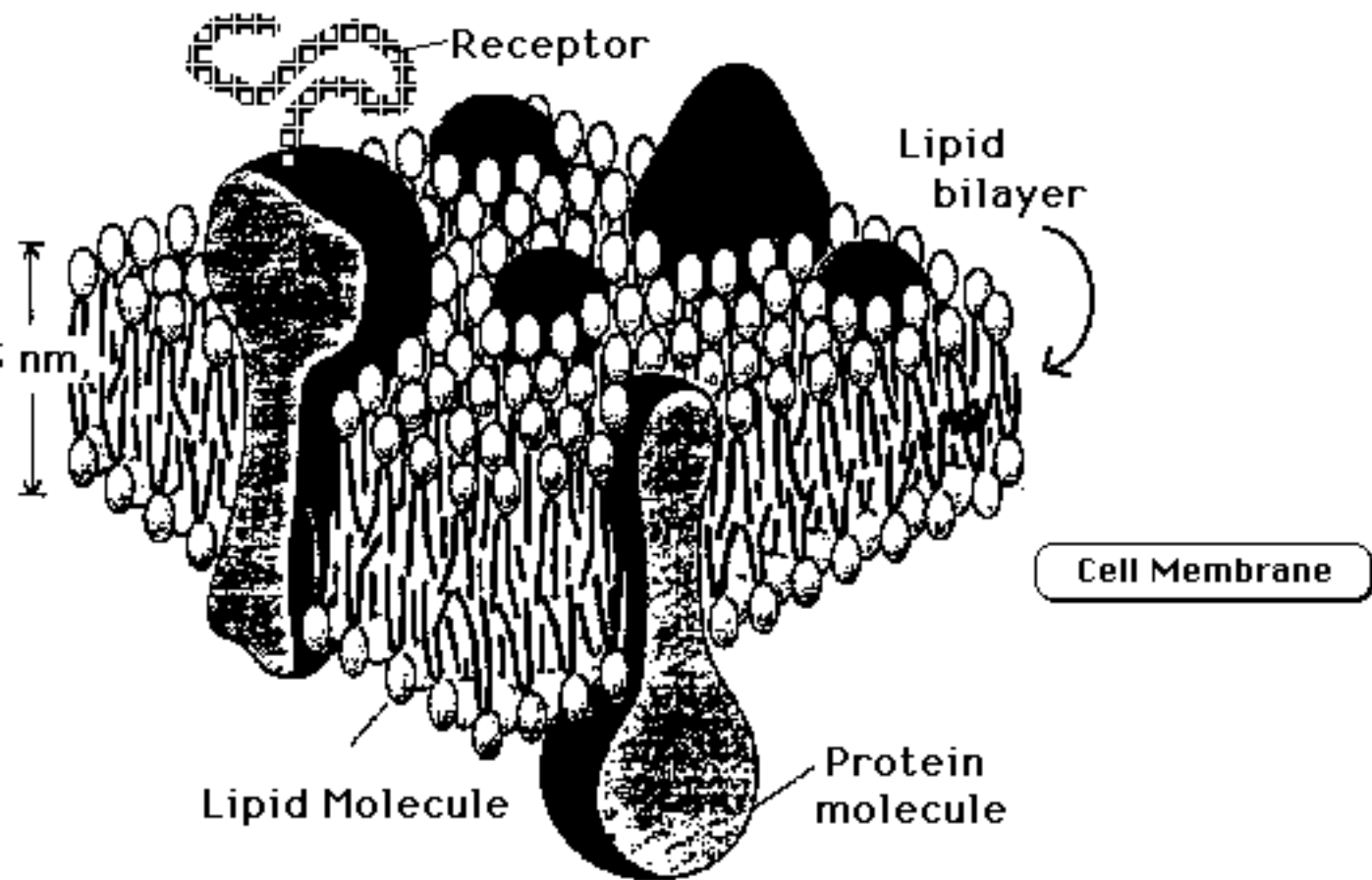


Like dissolves like

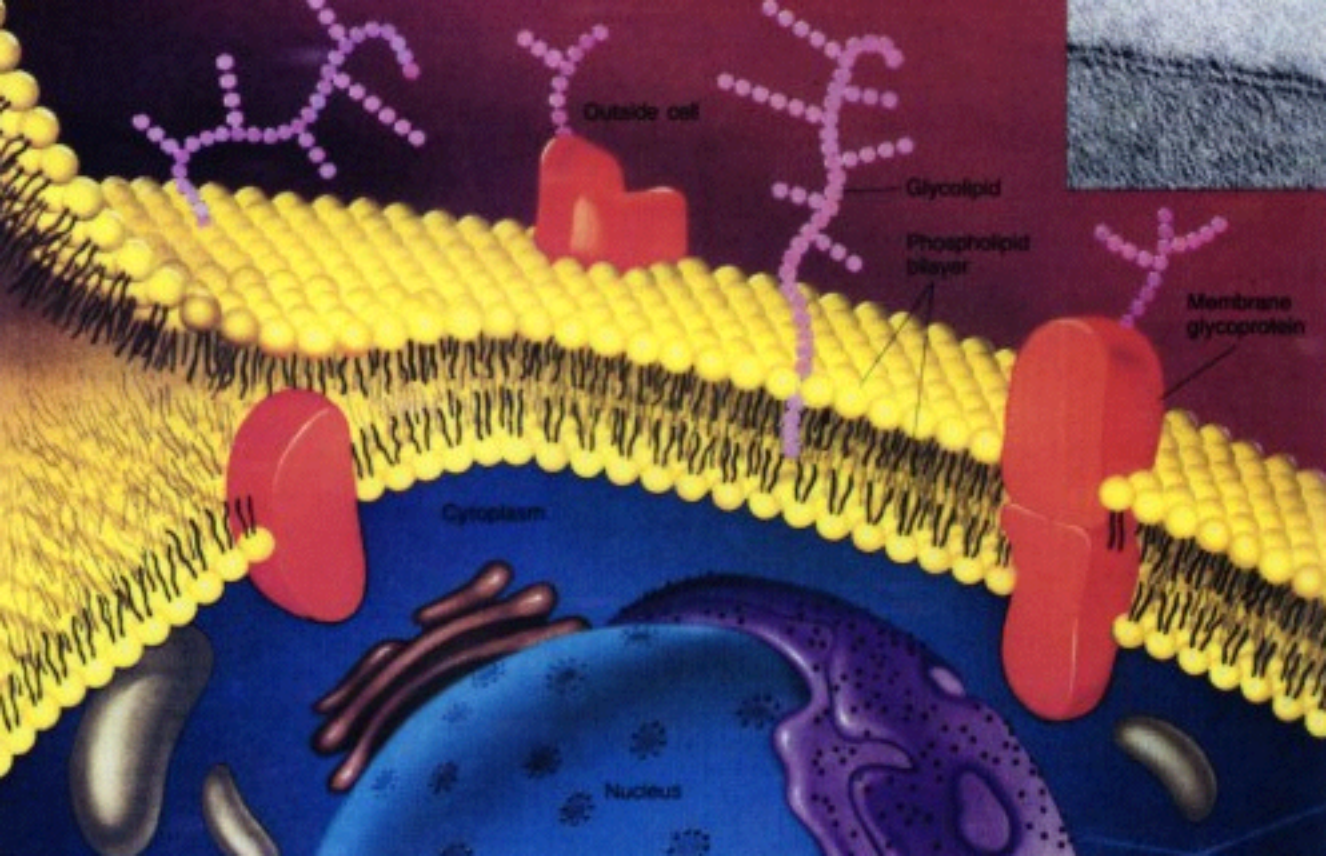
A Typical Soap



Solubilizes nonpolar substances in water



The structure of the cell wall



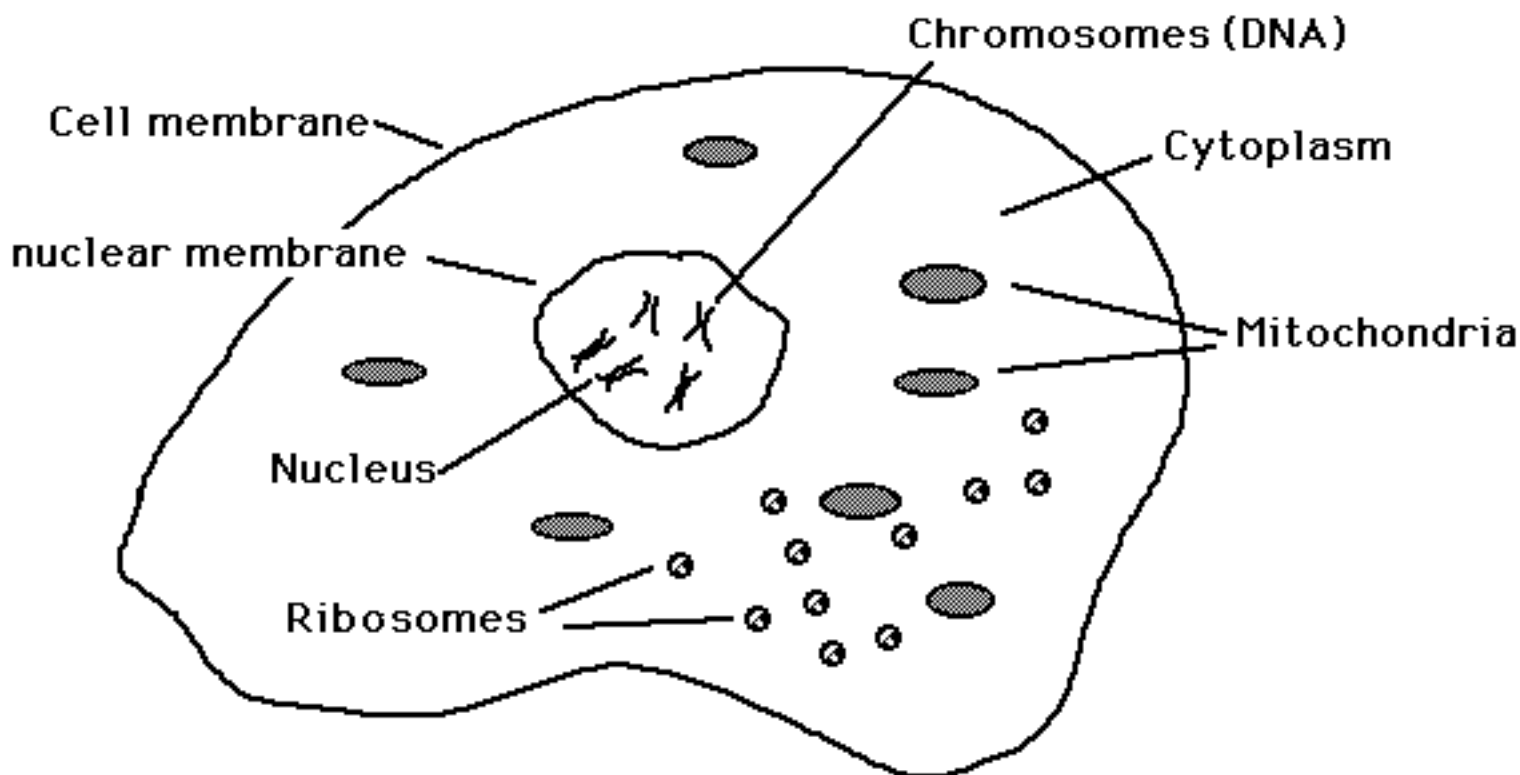
There are two types of cells on Earth: prokaryotic and eukaryotic. The former appeared first, and strong evidence indicates that the latter evolved from the former via endosymbiotic relationships.

Prokaryotic cells include all bacteria and the blue-green algae. Fossil evidence shows that they have lived on earth for at least 3.8 billion years. The DNA in prokaryotic cells is not enclosed within a membrane-bound nucleus as is the DNA in eukaryotic cells.

The Four Molecules of Life:

- 1. Nucleic acids**
- 2. Proteins**
- 3. Carbohydrates**
- 4. Lipids**

Schematic of a Eukaryotic Cell



The information required for producing all of the constituents of a cell is contained in the DNA in the chromosomes in the nucleus

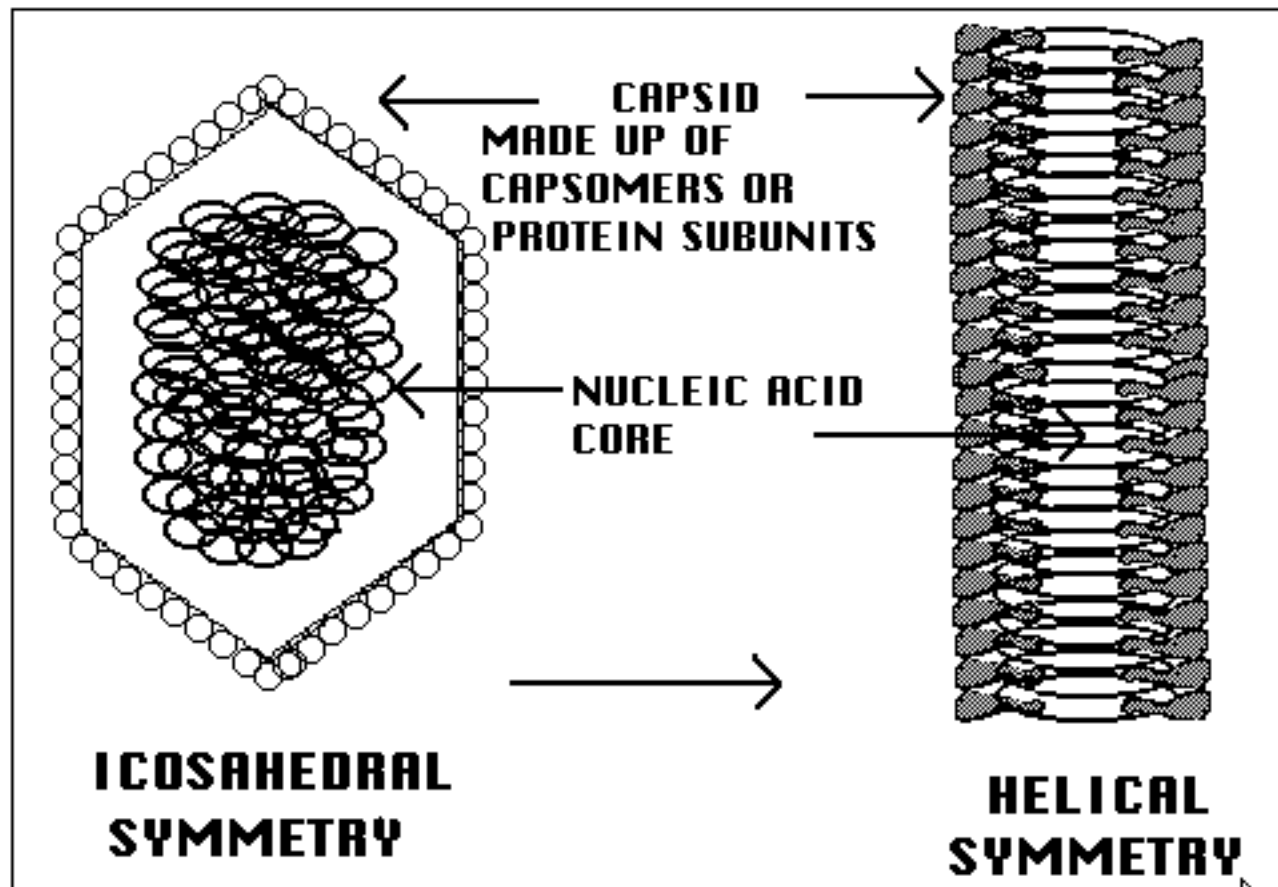


VIRUSES

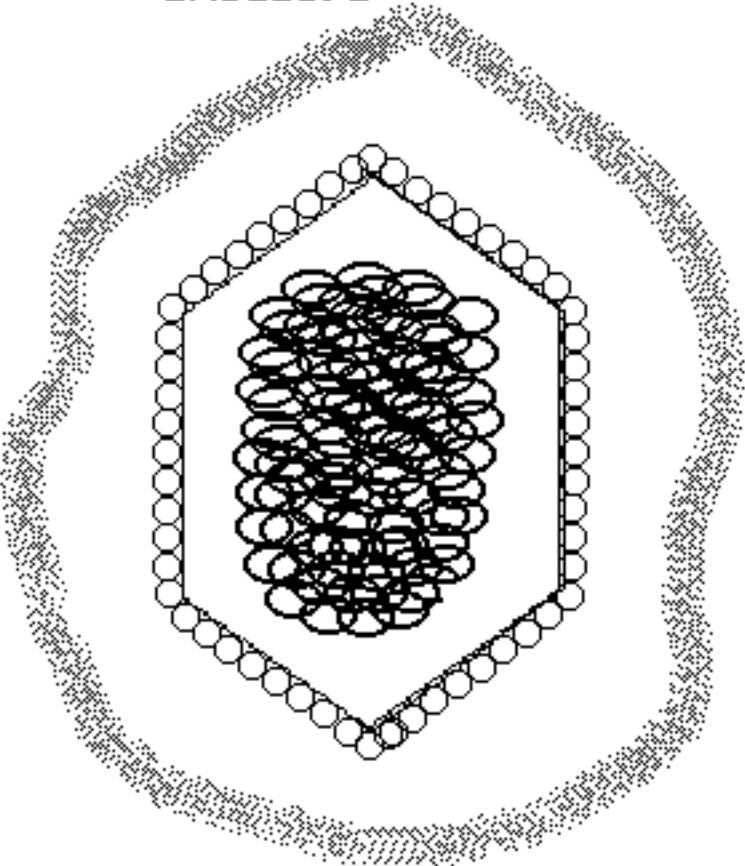
Viruses occupy a twilight zone between the worlds of living and nonliving things. Criteria commonly applied for living things include (1) independent motility, (2) irritability (the ability to respond to certain environmental stimuli), (3) the ability to reproduce, and (4) the ability to specify the genetic composition of progeny

STRUCTURE OF VIRUSES

TWO MAJOR TYPES OF SYMMETRY:



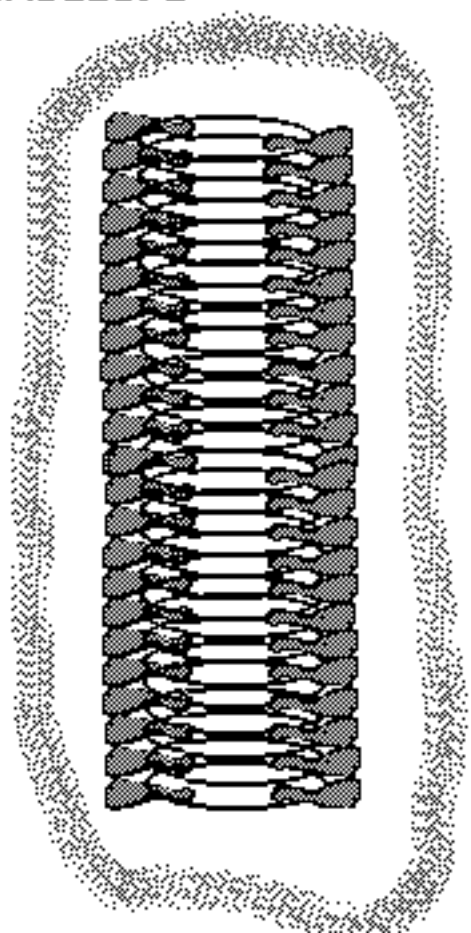
**ICOSAHEDRAL VIRUS WITH
ENVELOPE**



EXAMPLE: HERPES VIRUSES

Ebola

**HELICAL VIRUS WITH
ENVELOPE**



EXAMPLE: RABIES VIRUS →

ADSORPTION



RELEASE



ASSEMBLY

**REPLICATION CYCLE
OF ANIMAL VIRUS**



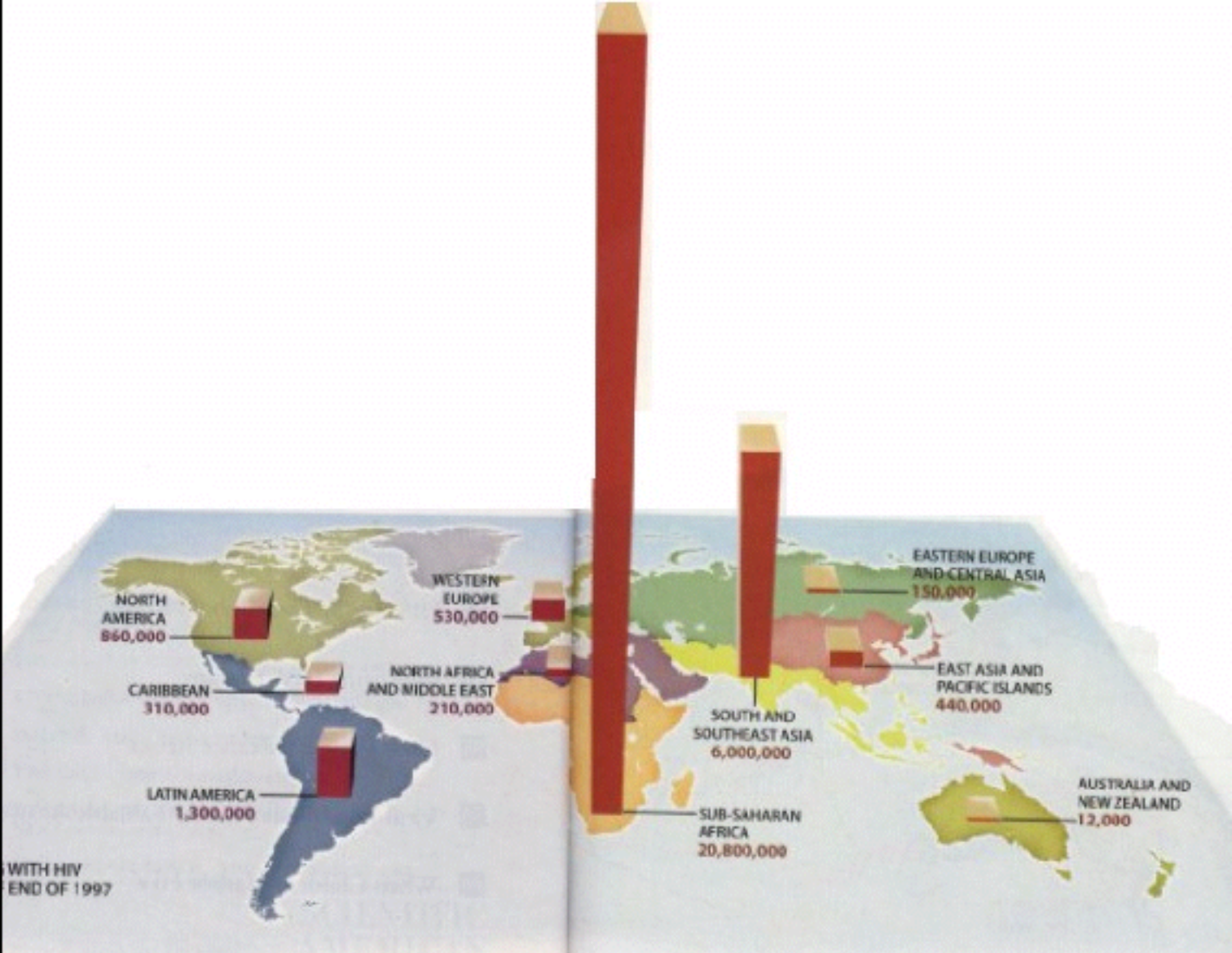
PENETRATION



REPLICATION

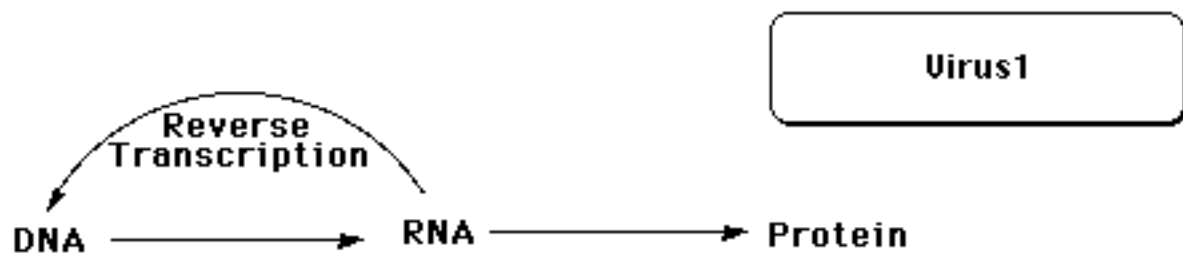


THE AIDS VIRUS. Human immunodeficiency virus (HIV) was shown in 1984 to be the cause of the dreaded condition called acquired immune deficiency syndrome (AIDS). Since the early 1980s, 40 million people have contracted HIV and 12 million have died. There are now 30.6 million HIV infected people in the world. In the US there are 630,000 to 900,000 HIV infected people. In 1997, 6 million people acquired HIV (16,000)/day.

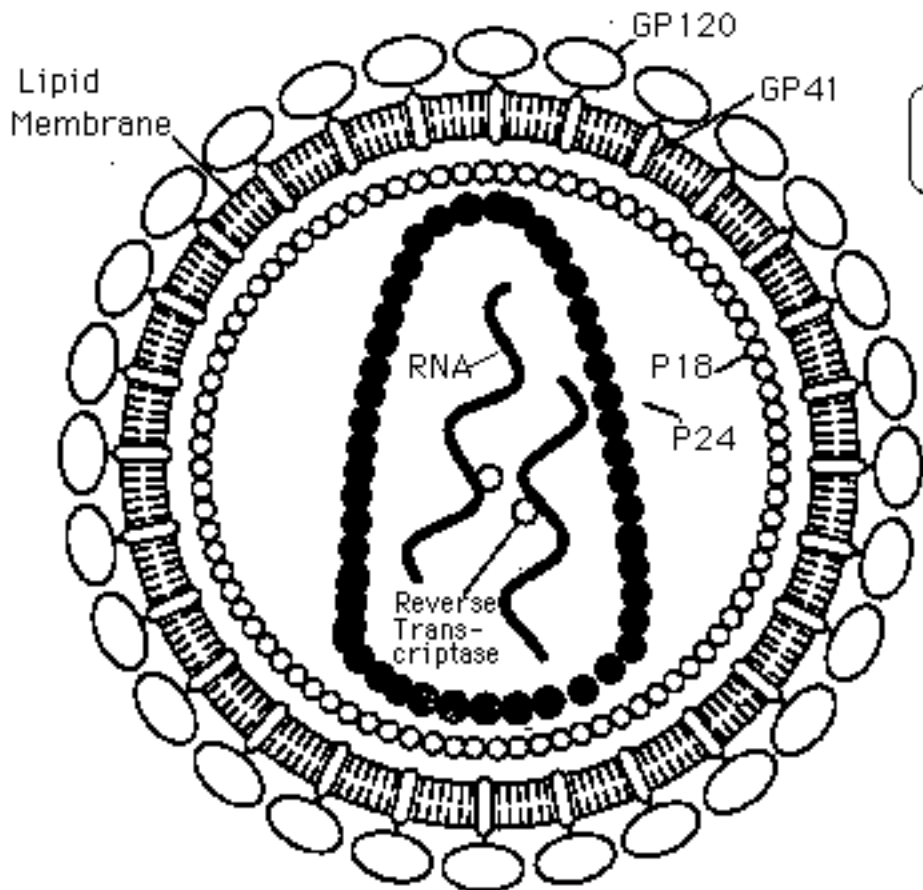


World Wide Distribution of HIV

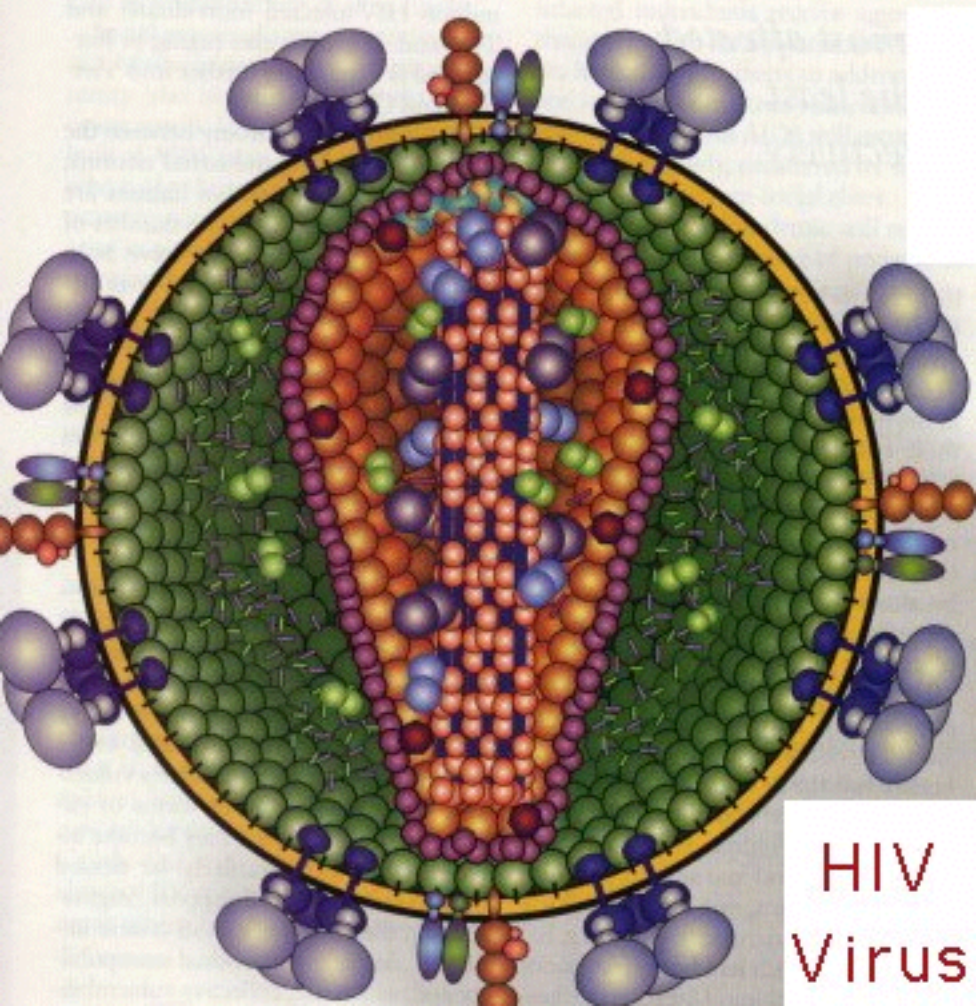
THE AIDS VIRUS. Human immunodeficiency virus (HIV) was shown in 1984 to be the cause of the dreaded condition called acquired immune deficiency syndrome (AIDS). HIV is a human retrovirus, the third such virus to be identified. Retroviruses (retro—from Latin means “turning back”) are named after a crucial step in their growth cycle that involves the reversal of transcription, the first half of the “central dogma of biology”



The AIDS Virus



The Aids Virus



HIV
Virus

Life Cycle of a Retrovirus:

