

VIRUS infections a.  
from an evolutionary  
biological perspective

New and Emerging VIRUSES

The mutual relationships  
of humans and viruses  
as they evolve together  
on this planet.

So why this topic?

① The specialists do  
not deal with it  
Evolutionists with few  
exceptions ignore inf.  
diseases.

Charles Darwin never  
mentions it! though  
he lived in the time that  
Pasteur and Koch were  
making their pathfinding  
discoveries about germs.  
& vice versa.

MOST of you are neither b.  
physicians  
virologists  
nor evolutionary  
biologists

Certainly not well E.  
understood by  
policy makers

How AIDS caught the  
world by surprise?

Even public health  
specialists tend to  
think of viruses and  
other disease agents  
as fixed entities rather  
than dynamically  
evolving living  
systems.  
(-peaked creatures)

② The most important  
ecological issues that  
we face by far!  
center all the public  
anxiety about chemical  
pollution. 1968  
for killed as many  
people as WW2 before  
it

is protection against  
infectious diseases

E.G. Kissinger re  
its importance in  
understanding global  
interconnections of  
people. c.

1. Suggested by a F.  
New virus like  
AIDS

2. Pure insufficient output  
for its continued  
evolution.

Perhaps out of habit  
difficult to understand  
your adversary.

3. Neglecting future  
evolution

Viruses of other infectious  
diseases G

malware) still  
probably  
w/d.

But we have tools to  
cope with those.

and have done in  
advanced countries.

∴ Cancerous LC =  
obviously not the  
cause of AIDS?  
How different?

SPECIFIC AGENTS J.

Go back to what a H.  
virus is

compared to a bacterium  
or protozoan parasite  
like malaria (a  
tiny animal.)

life cycle of viruses \*  
I.

of free-living  
chemotherapy.

Consequences K.  
OF LIFE cycle

Immune prophylaxis  
see best ways.

lot more ease after  
infection.

Viral chemotherapy are  
greatest challenge  
a foolhardy steps.

when immaturity L.  
doesn't work.

- (a) target has a  
structure  
TB, leprosy, AIDS
- (b) other tricks.  
immune modulation.  
+ autoimmune evasion  
i.e. acetaminophen
- (c) most of all  
collapse of AIDS  
immune system.
- (d) rapid reduction of  
R.E.S.  
flee ← recomb. (FLU)

(e) neglect +  $\lambda$ .  
 Erythrocyte.  
 always some side effect.  
 tradeoff of immunity  
 rest is common.  
 benefit.

Evolution - some more  
 depth.  $\lambda$ .

1. Co-evolution of hosts, parasites + vectors.
2. Ultimate origin of viruses unknown.  
 Probably many paths and cycles.
3. Hosts tend to become more resistant.  
 species specificity.  
 e.g. flu  $\rightarrow$  human pigs  
 $\rightarrow$  birds  
 $\rightarrow$  rodents.  
 can be cross adapted

species specificity  $\odot$ .  
 vitally important.  
 why measles can be eradicated. polio?  
 (As far as we know)  
 vs.  
 yellow fever.  
 not eradicated.

flu in between.

Almost no immunity  
 but need methods

COST OF EVOLUTION  
 $P$ .

myxo

sickle

placental distrophy.

VIRAL evolution.  $\odot$ .

Contrary to new  
 judgement

tends to lower lethality  
 virus spread.  
 (HTLV-1.)

HIV: SIV  
 in primates

Not reliable  
 answer.

Deeper relations of R.  
 $\odot$  VIRUSES to  
 host cells

Lysogeny - hide!

transduction

host DNA  $\rightarrow$  virus.  
 (oncogenes)

95% selfish DNA

use host enzymes  
 and metabolism

VIRAL VARIATION S.

- ② METASTASIS
- ③ hyper-mutation  
RAA viruses
- ④ recombination
- ⑤ illegitimate "

Modern fragmentation,  
(splitting & rejoining)  
have probably caused  
far more trouble by  
spread of disease than  
by accidents or by  
chemical pollution.

Intercontinental bus  
does what  
air trip < microbe  
does.

POLICY LESSON T.

Why now is different?  
Are we better than  
ever in relationship to  
infectious disease?

We would have thought so  
until AIDS. Even so,  
certainly medical care &  
preventive health far better  
today than in 1900.  
But the variance is  
greater. ~~at~~ well as  
the mean.

Expectations higher!!!  
life exp. of 40  
not desirable.

TECHNOLOGICAL ANS.

mainly in biomedical  
science.

Looking up for rapid  
response to vaccine  
needs.

of course research in  
virus fundamentals

... AIDS  
so difficult

technological support  
necessary for that  
W.

- 1. paradox of sanitations.
- a) We are adapted to many  
viruses as ubiquitous  
disease. Krupps.  
Rebello.
- b) close contact with  
immunity to new antigens  
and less virulent strains
- c) Poor sanitation may  
accelerate "equilibrium"  
<sup>incl.</sup>
- d) natural selection on  
hosts

2. Modern World.  
Rapid Transport  
large populations in CO<sub>2</sub>'s  
systems ecological  
change.

U.

VACCINES the X.  
fundamentals/answers.

but AIDS-like diseases  
will surely emerge  
more often.

LARGE SCALE SCREENING

privacy issues ??

Quarantine facilities

portable laboratories  
in situ

Better to attack the  
viruses at its  
source rather than.

Hi Tech surveillance of  
disease outbreaks.

Y.

POLICY LESSON

1 WORLD.

my view of

Human Rights Feature.

Za.

MAIN motive is your  
interest as a

human being  
self-interest

o your interest seen  
world.

symbolic that Helmholtz  
is DE/W/fo

o Japan - a closed  
country.  
economic stability  
and dependent on  
world commerce

Z.

→ Terry

propaganda

Daily Decisions (Kleinig)

Dict. synonyms

WORK; novel.

OED?