Korber Memorial Lecture

The Genetic control of protein synthesis

Why are proteins important? enzymes.

Why are genes important? agents of natural selection.

What are proteins made of? polypeptide chains
amino acids – 20
~~folding~~ defined sequence.
folding up. Mys S

What are genes made of? does fully know
nucleic acid.
esp DNA
structure of DNA. 4 bases
2 chains.

Overall relationship – one gene – one enzyme.

many cases, esp in Neurospora. (also Salmonella, etc)

ie. clusters of ~~the~~ mutants which affect one enzymatic step.

~~better~~ ~~only~~ one cistron – one polypeptide chain.

— a.a order, folding, rate

detailed relationship

– abnormal human haemoglobins

– one amino acid altered. Slide

β = sickle. S, C.

– two chain two genes?

foetal haemoglobin α, γ.

~~The sequence hypothesis~~

~~tests for~~

Fine mapping of genes — many sites in one gene.

r_{II} (phage), Pan 2 etc in neurospora, his loci in Salmonella.

etc.

The sequence hypothesis — systems to test on.

Coding problem : diff. due to variation in composition.

Specific mutagenesis — aim to map gene by mutagenesis and genetics.

hot spots. high back mutation rates.

nevertheless, Freese generalisation.

Base Analogues — Acridines.

explanation:

need for a specific mutagen.

Site of protein synthesis — ~~[illegible]~~ ribosomes 2S

- composition
- distribution

flux experiments.

early steps (activating enzymes, soluble RNA)

how does genetic message get to ribosomes : evidence; Haemoglobin.

Old picture fixed ribosomes - new picture: X or messenger RNA.

phage infected cell (special example) : protein synthesis continues.
RNA --- no nett turnover.

Volkin

base composition.

Brenner new RNA goes into old ribosomes. ~~[illegible]~~

two peaks in density centrifugation.

P^{32} goes into one (turnover?)

S^{35} goes into same one. (washes out)

15 seconds work there.

New picture : (for all cells) but size of RNA? stability of RNA?

What does the other RNA do?

Rate of protein synthesis exp. induced enzyme formation.

place of action.

β-galatasidase gene into cell from Hfr

Pardee Jacob Monod (+ Riley)

suggests unstable intermediate

and rate control at gene rather than

at ribosome.