





**The *rII* region consists of two distinct genes that can complement each other during simultaneous infection**

相補性検定  
シストランス検定  
シストロン

Normal phage multiplication. The progeny consist of a large majority of parental T4rIIA and T4rIIB mutants plus a small fraction of wild- and T4rIIA:rIIB genotypes, which arise by crossing over.

**The Genetic Systems Provided by *E. coli***

Molecular Biology of the Gene

**1. Fluctuation analysis of bacterial resistance to phage**

(1943年)

細菌の変異についての適応説 (ラマルク説) は否定

Five separate *E. coli* B cultures are inoculated onto plates covered with phage T1

Incubation 24 hrs

Colonies resistant to T1

28 35 13 38 107

遺伝マーカーの迅速なスクリーン

**2. Replica plating**

Master plate

Replica plate

Replica plate containing amphotycin

Incubation

All colonies grow

Only Smr<sup>+</sup> colonies grow

**3. Isolation of mutant *E. coli* cells with a specific growth factor requirement**

必須代謝物合成能に影響を与える変異体の分離

栄養要求株 (auxotroph)  
原栄養株 (prototroph)

(1944年)

Treatment of *E. coli* cells with a mutagen, such as nitrosoguanidine.

The treated cells are plated on a petri dish filled with a rich nutrient solid agar medium containing the 20 amino acids, the various purines and pyrimidines, all known vitamins, etc. Many of the treated cells fail to multiply because they are killed by the mutagen. The remaining survivors multiply to form distinct colonies on the solid agar surface.

Replica plating and incubation

Rich medium: All survivors grow

Minimal medium (glucose and inorganic salts): Most survivors grow, but mutants requiring growth factors do not.

Minimal medium and arginine: Arginine-requiring mutants can grow.