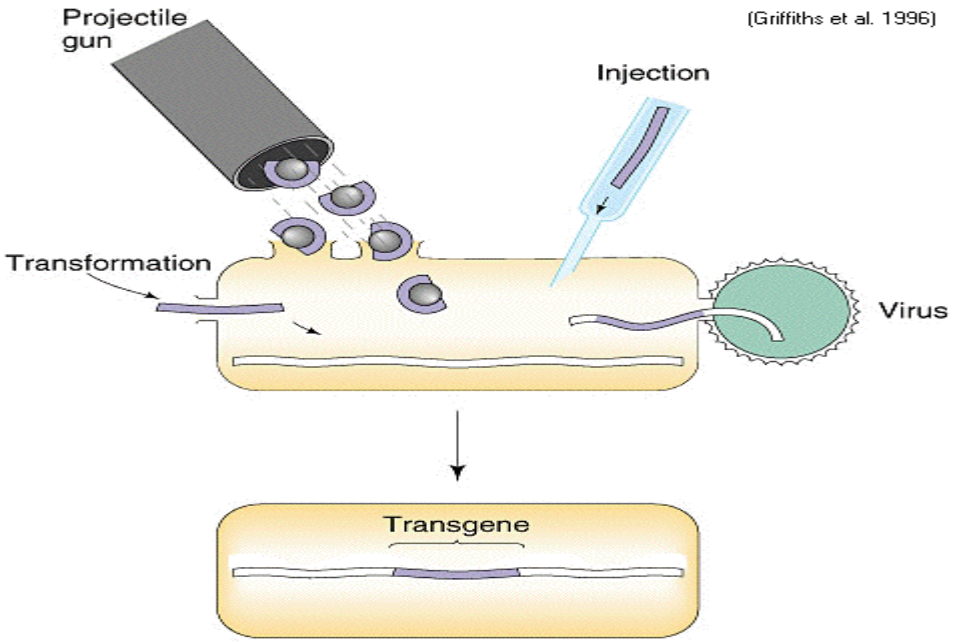
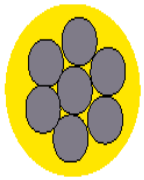
Transformation/Transfection
Getting DNA into your host.

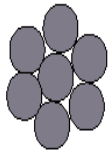


Frederick Griffith
transforming principle
1929

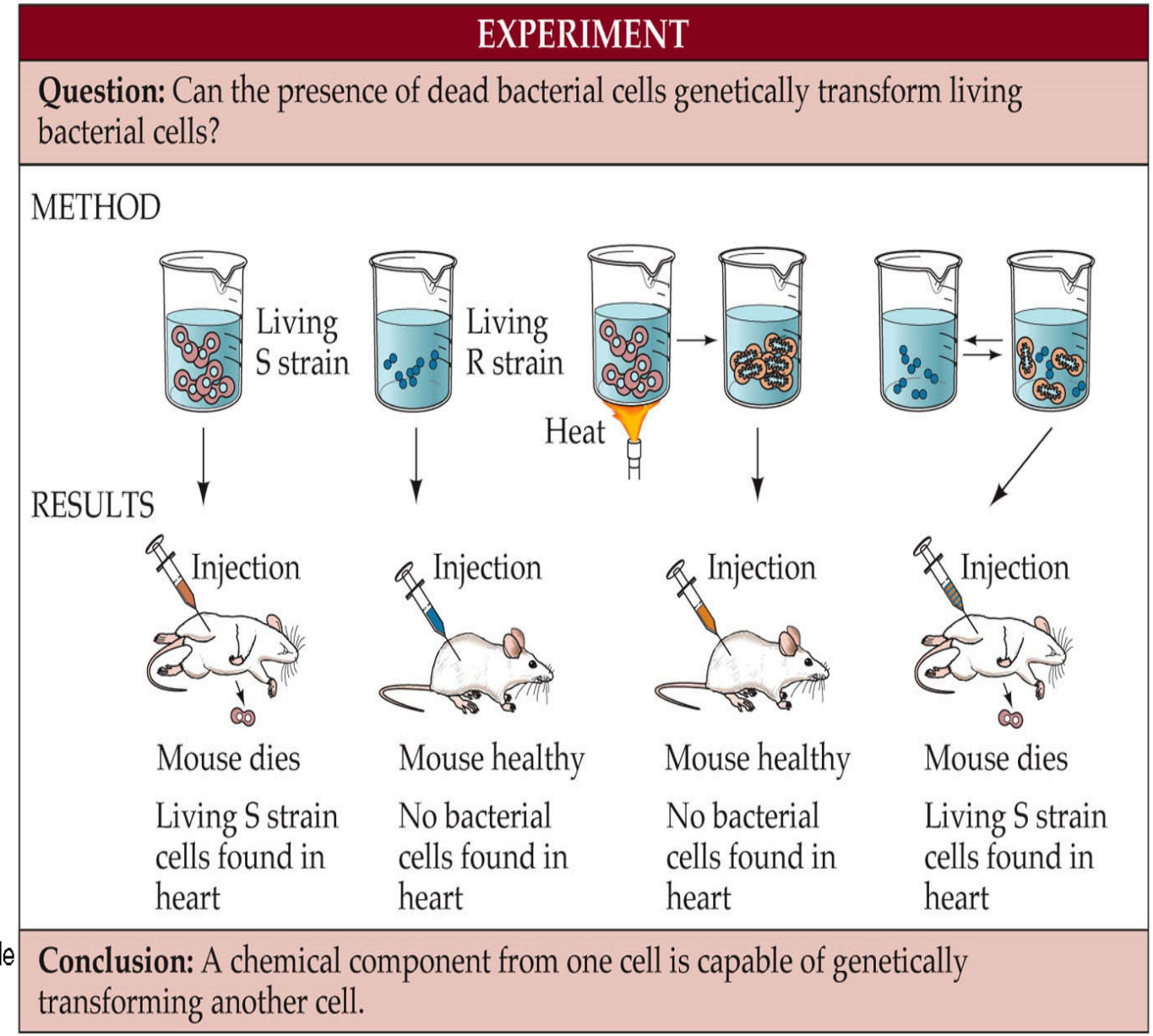
Streptococcus pneumoniae



Smooth colonies secrete a capsule and kill mice.



Rough colonies do not secrete a capsule and do not kill mice



LIFE: THE SCIENCE OF BIOLOGY, Seventh Edition, Figure 11.1 Genetic Transformation of Nonvirulent Pneumococci

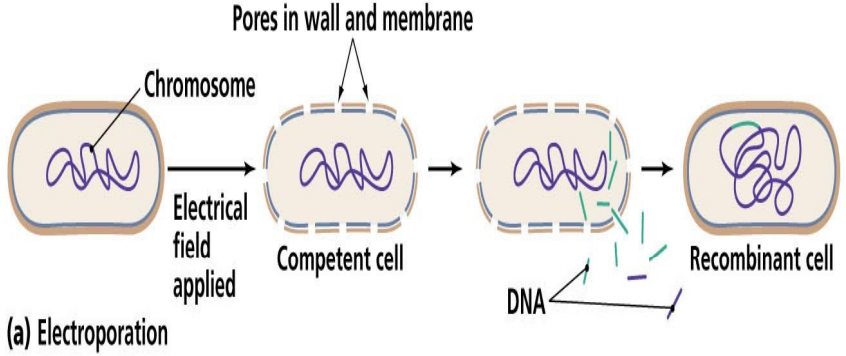
Transformation is getting DNA into a prokaryote
Transduction is the use of infection (i.e. viruses) to get DNA inside
Transfection is DNA into a eukaryote

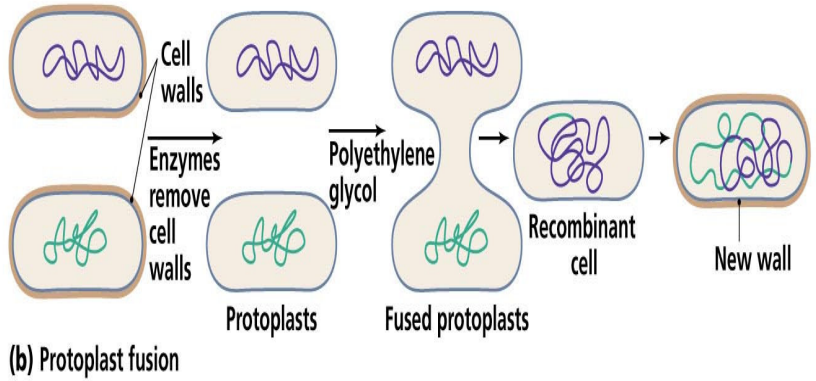
It happens in real live

It happens in the lab
competent (able to transform)

Joshua Lederberg
Nobel Prize 1958
33 years old

Getting DNA into cells--Transformation of bacteria





- Cells are made competent via electroporation or via pre-treatment with $CaCl_2$/cold
- DNA (plasmid) is added and cells that have taken up the plasmid are identified by plating on selective media

VirginiaTech
Invent the Future

Electroporation vs heat shock

- Plasmid size
- Efficiency

VirginiaTech
Invent the Future

Setting up your transformation reaction

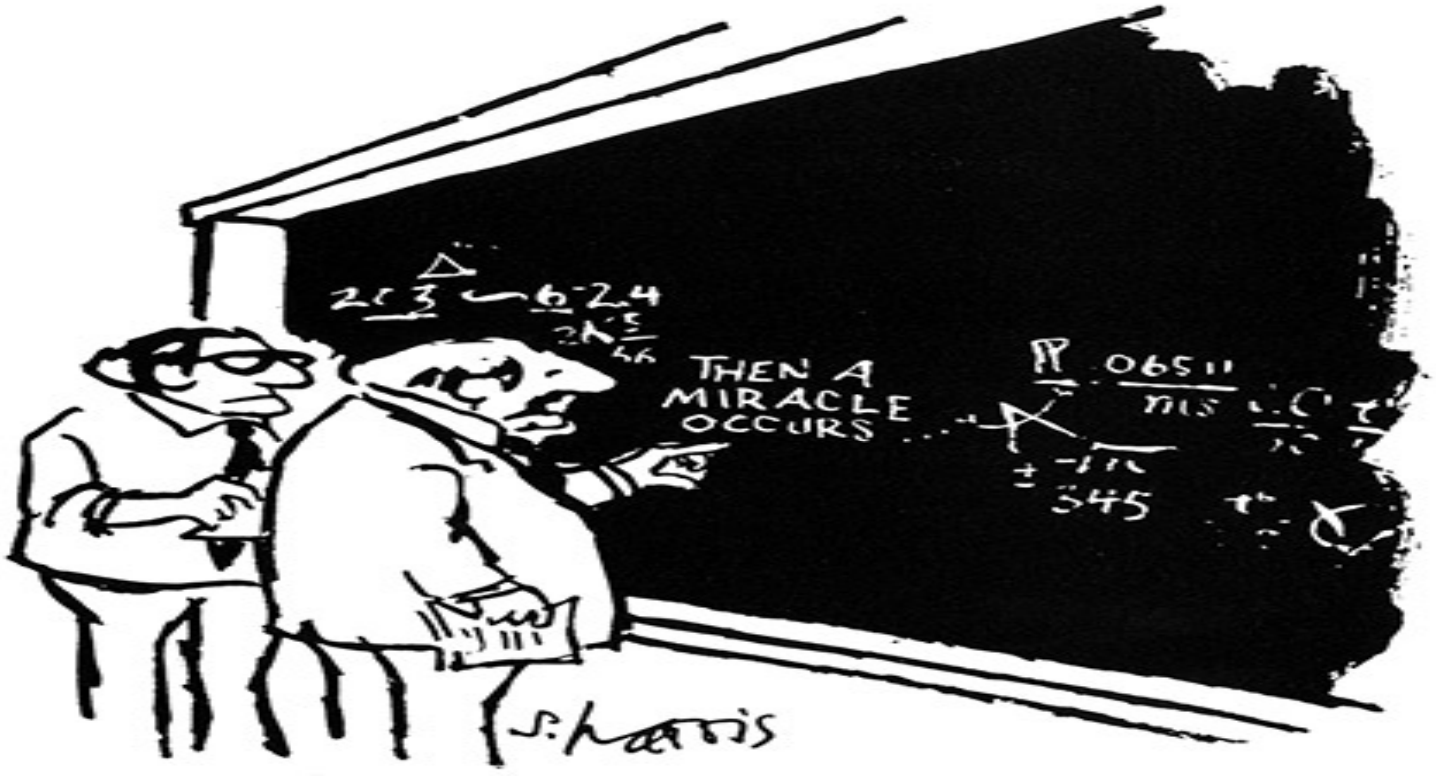
- Ice, Ice, Ice, Ice
- Mix your ligation reaction with competent cells (never exceed 10%)
- No vortex of competent cells
- Incubate on Ice for few minutes
- Heat shock at 42 °C for 30 seconds
- Back on Ice for 2 minutes
- Add SOC Media
- Incubate with shacking 1 h then plate on selective media

VirginiaTech
Invent the Future

Making your own competent cells

- Not all bacteria can be competent
- Easier with electroporation
- Very easy technique for *E. coli* in the lab

Questions



"I think you should be more explicit here in step two."

If we knew what it was we were doing, it would not be called research, would it?" - Albert Einstein