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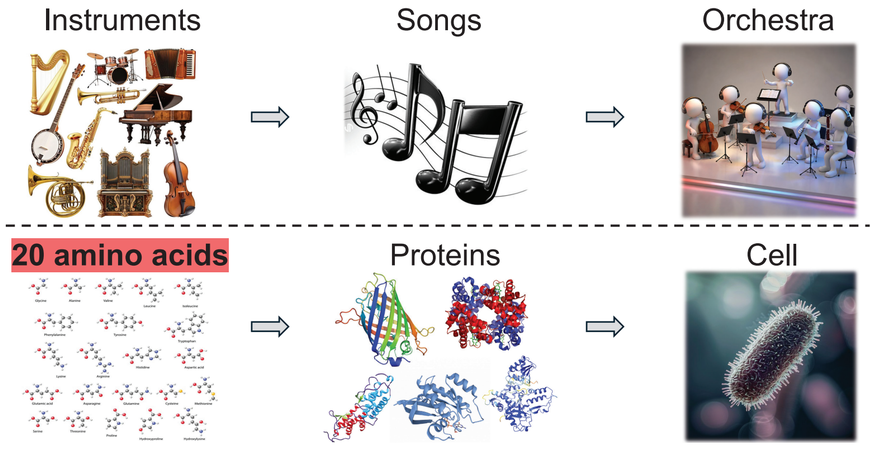
1785

Engineering a cellular selenoprotein factory

I am engineering a synthetic pathway in bacteria to produce different “selenoproteins” that can fight climate change and improve biotherapeutics!

Cells use 20 “molecular instruments” to survive

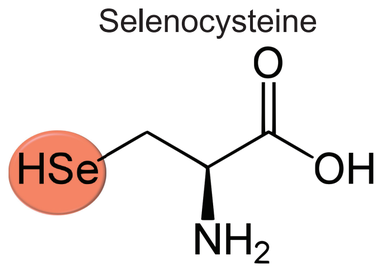
Instruments → Songs → Orchestra



20 amino acids → Proteins → Cell

Some use a special 21st instrument with exceptional properties!

Selenocysteine



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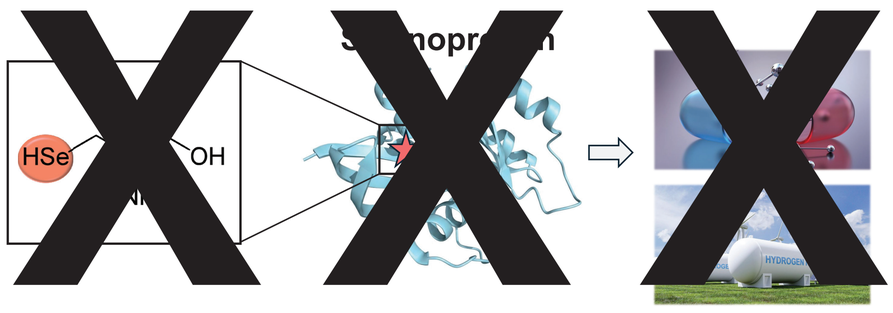
- ✓ *Highly reactive*
- ✓ *Structurally stable*

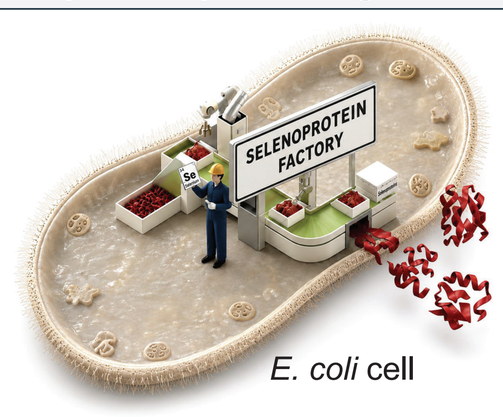
This builds “selenoproteins” with applications in biotherapeutics, clean energy, & more!



Problem: difficulty selenoprotein production limits applications!



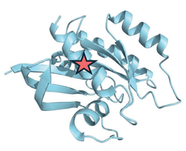
Solution: turn bacteria into a selenoprotein-producing biofactory!



E. coli cell

Engineering biomolecules to promote selenoprotein production

A → **B** → C → D →

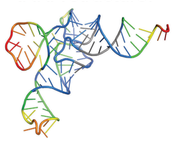


Engineered “tRNA” biomolecule



- ✓Resistant to degradation
- ✓Increased flexibility
- ✓Optimized folding

Simulated tRNA structure!



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