WHAT ARE ANTIBIOTICS?

Antibiotics are medicines that kill bacteria or stop them from multiplying. Common families include:

- β-lactams (penicillin, cephalosporins)
- Macrolides (erythromycin)
- Tetracyclines (doxycycline)
- Quinolones (ciprofloxacin)

They target bacterial cell walls, protein synthesis, and DNA replication.

RESISTANCE AND IMPACT

How Bacteria Outsmart Drugs:

- Mutations change drug targets (e.g., altered ribosomes)
- Enzymes break down antibiotics (β-lactamases destroy penicillin)
- Efflux pumps eject drugs before they act
- Gene swaps via plasmids spread resistance fast

Real-World Impact:

- 700 000 deaths/yr now; could rise to 10 million by 2050
- MRSA causes dangerous skin and blood infections
- Superbugs force longer hospital stays and cost billions

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ANTIBIOTIC RESISTANCE

Imagine a world where scraped knees or strep throat could become life-threatening again. This is the rising challenge of antibiotic resistance—bacteria evolving to survive our best drugs.