



FACULTY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

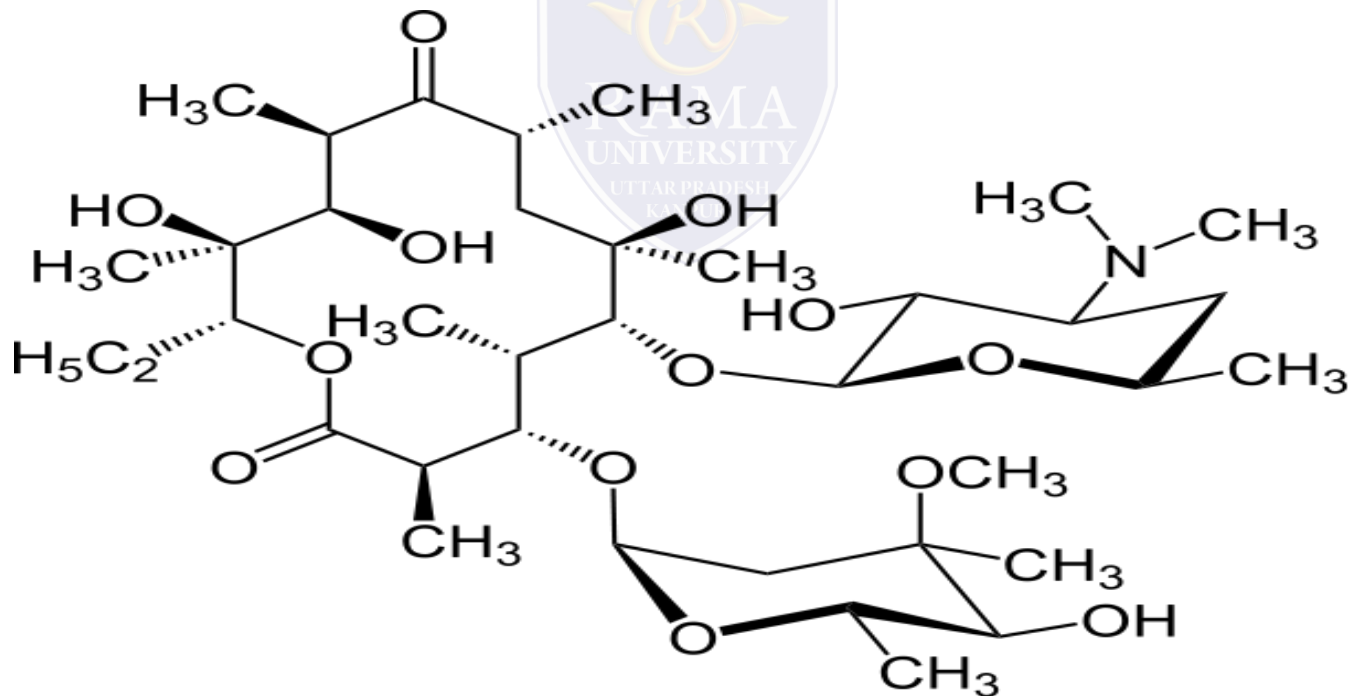
Production of Erythromycin

Introduction

- Erythromycin belongs to the group of Macrolide antibiotics.
- Macrolide antibiotics slow the growth of, or sometimes kill sensitive bacteria by reducing the production of important proteins needed by the bacteria to survive.
- It has an antimicrobial spectrum similar to or slightly wider than that of penicillin and is often used for people who have allergy to penicillin.
- It is used to treat many different types of infections caused by various bacteria.
- It is used to prevent bacterial endocarditis and attacks of rheumatic fever.
- Also used to prevent outbreaks of sexually transmitted diseases like chlamydia, syphilis and gonorrhoea. Prevents respiratory tract infections.
- Erythromycin is produced from the strain of actinomycete *Saccharopolyspora erythraea* formerly known as *Streptomyces erythraeus*.

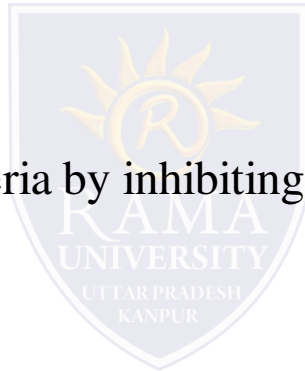
Structure of Erythromycin

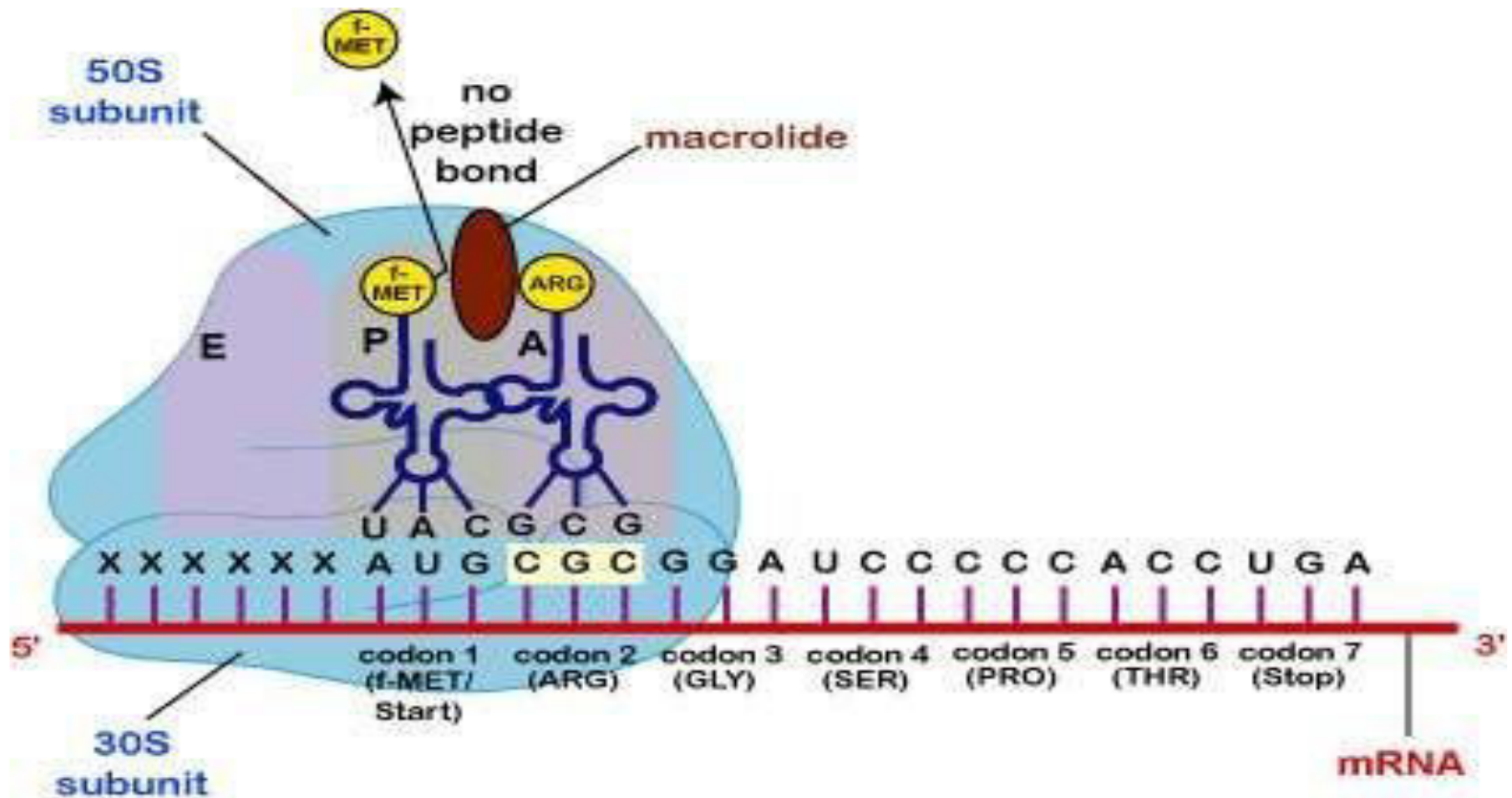
- It is a macrocyclic compound containing 14-membered lactone ring with 10 asymmetric centers and two sugars – L-Cladinose and D-Desoamine.
- Trade name is E-mycin or Erythrocin



Mechanism of Action

- Erythromycin displays a bacteriocidal activity particularly at higher concentrations.
- It prevents the growth of bacteria by inhibiting their protein synthesis.
- Erythromycin binds to the 23s rRNA molecule in the 50S ribosomal subunit.
- This binding blocks the exit of the growing peptide thus inhibiting the translocation of the peptides.





Erythromycin interferes with the aminoacyl translocation preventing the transfer of the tRNA bound at the A site to the P site of the rRNA complex.

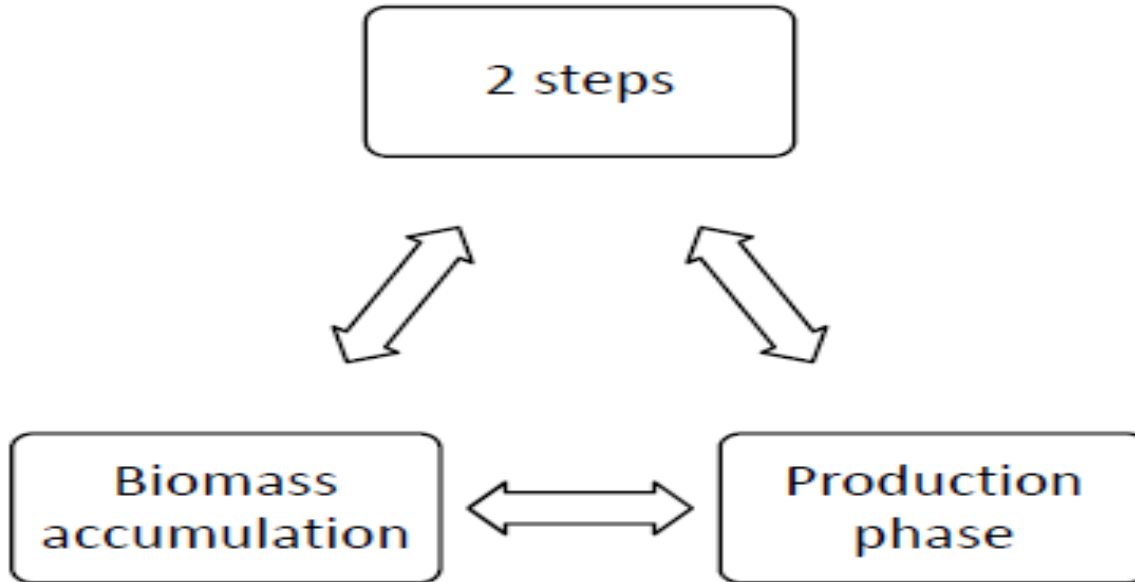
Pharmacokinetics

- Erythromycin is easily inactivated by gastric acids, therefore all orally administered formulations are given as either enteric coated or more stable salts or esters, such as erythromycin ethylsuccinate.
- It is rapidly absorbed and diffused into most tissues and phagocytes.
- Due to high concentration in phagocytes, erythromycin is actively transported to the site of infection, where during active phagocytosis, large concentration of erythromycin is released.

Metabolism

- It is mostly metabolised by demethylation in the liver.
- It's main elimination route is Bile and a small portion in Urine
- It's half-life is 1.5 hours

Production Process

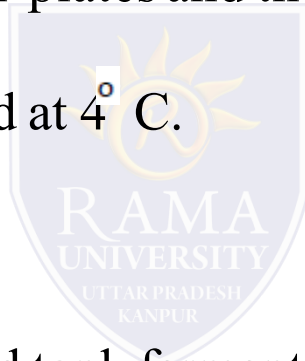


Biomass Accumulation

- The sporulating culture of *Streptomyces erythraeus* is done on Trypton agar slant.
- Cells are harvested from agar plates and the suspension is taken in Sterile water.
- The suspension is then stored at 4° C.

Production Phase

- Media which used in a stirred tank fermenter consists of,
- Sucrose – 5%
- Corn steep liquor – 0.5%
- Soyabean oil meal – 1.5%
- Yeast – 1.0%
- NaCl – 0.5%
- CaCo₃ precipitate – 0.3%
- pH – 7.0 -7.2



- Production of Erythromycin production occurs when froth reaches stationary phase.
- Addition of n-propanol as precursor increases the production of erythromycin..

