

**SNS COLLEGE OF ALLIED HEALTH SCIENCE**  
Affiliated to The Tamil Nadu Dr M.G.R Medical University, Chennai



**DEPARTMENT OF PHYSICIAN ASSISTANT**

**COURSE NAME: MICROBIOLOGY**

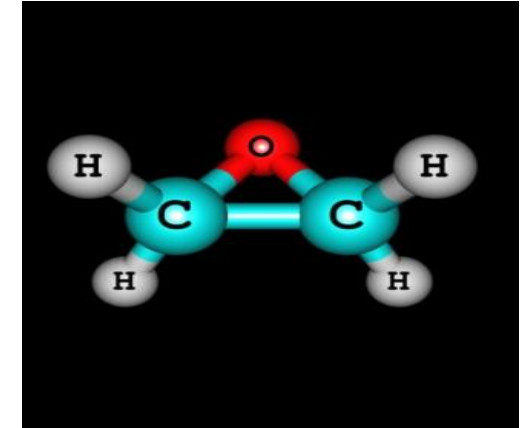
**UNIT : 1**

**TOPIC : GASEOUS METHOD OF STERILIZATION - ETO**

**FACULTY NAME: MITHRA V**

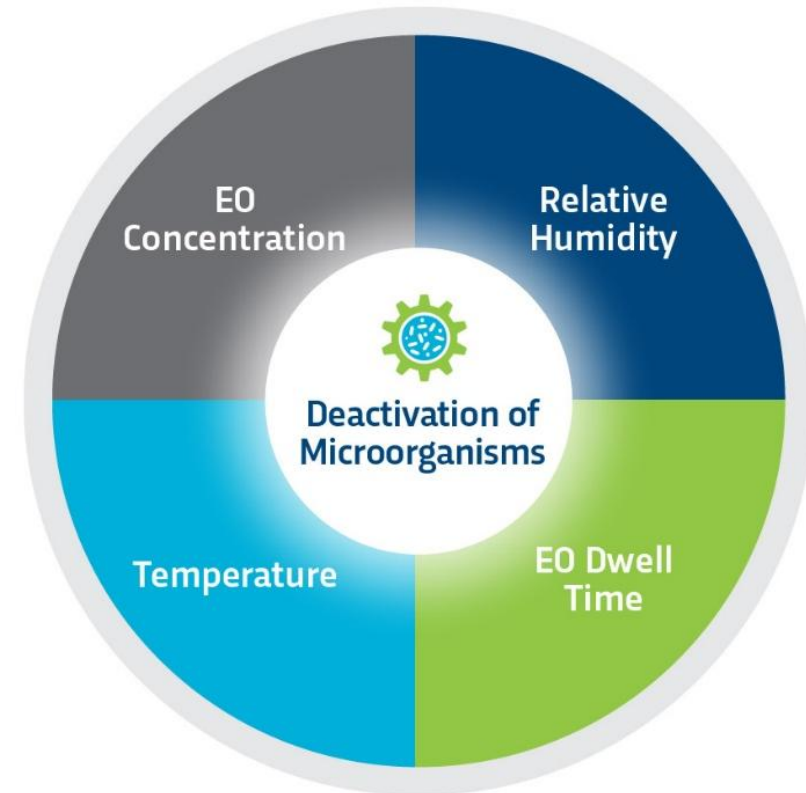
# ETO or ETHYLENE OXIDE

- Colorless, faintly sweet odor & flammable gas at room temperature
- Becomes a liquid **below 10.7°C** (51.3°F).
- Characterized by a three-membered ring structure consisting of **2C, 4H and 1 O** atom.
- Used to sterilize **heat or moisture sensitive** items.



# OVERVIEW

- The **four essential parameters** (operational ranges) are:
- Gas concentration (450 to 1200 mg/l);
- Temperature (37 to 63°C);
- Relative humidity (40 to 80%)
- Water molecules carry ETO to reactive sites
- Exposure time (1 to 6 hours).



# ETO STERILIZATION

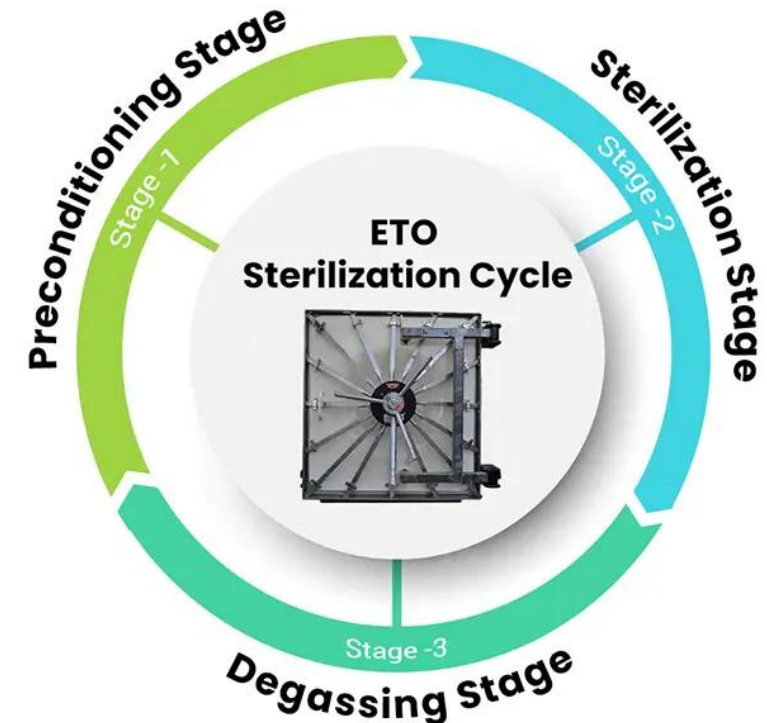
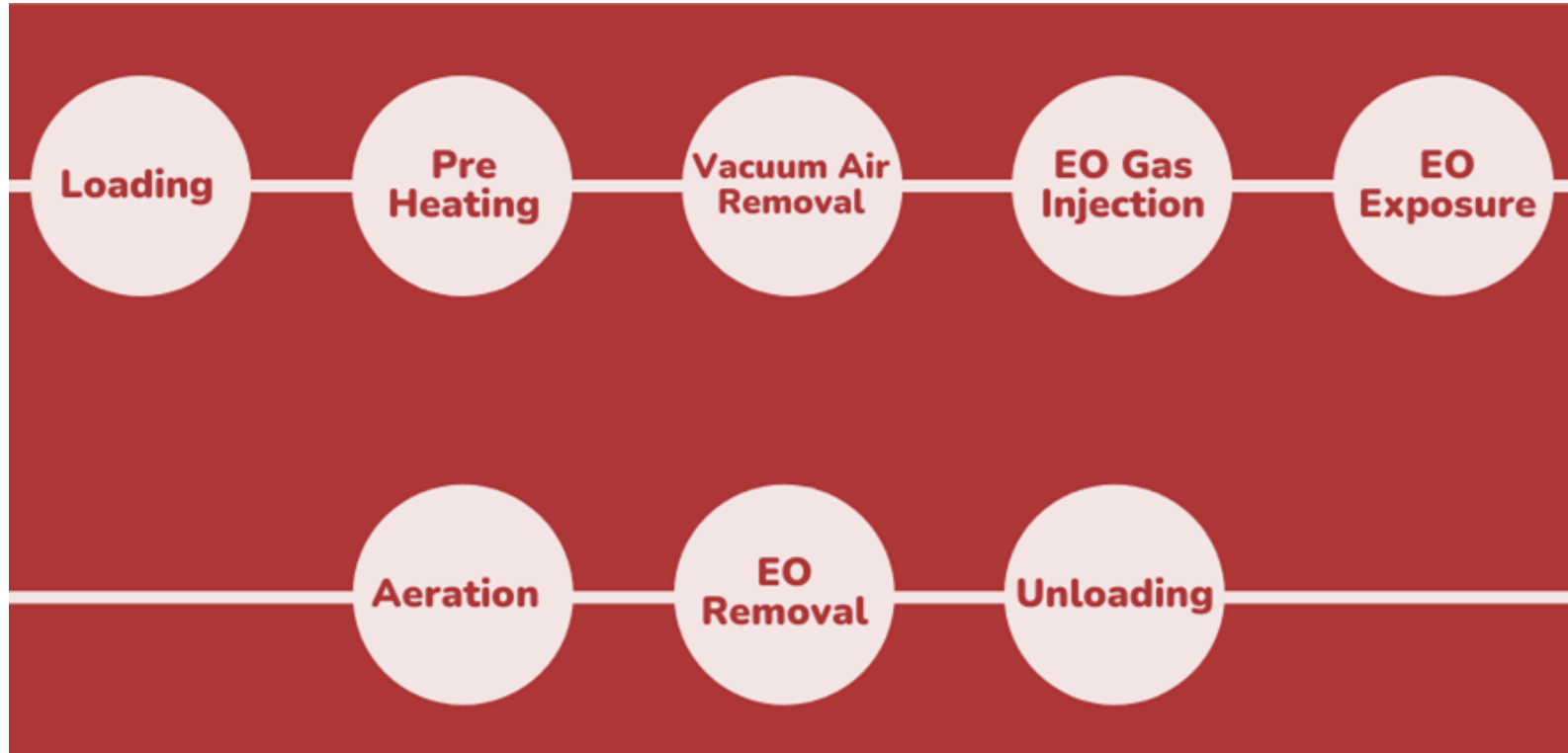
- Device used- [ETO Sterilizer](#).
- Low-temperature sterilant.
- Result of alkylation of protein, DNA and RNA.
- Prevents cellular metabolism & replication in microbial life
- Effective results by penetrating through plastics.
- Applications in Pharmaceuticals, plastics and Electronics.



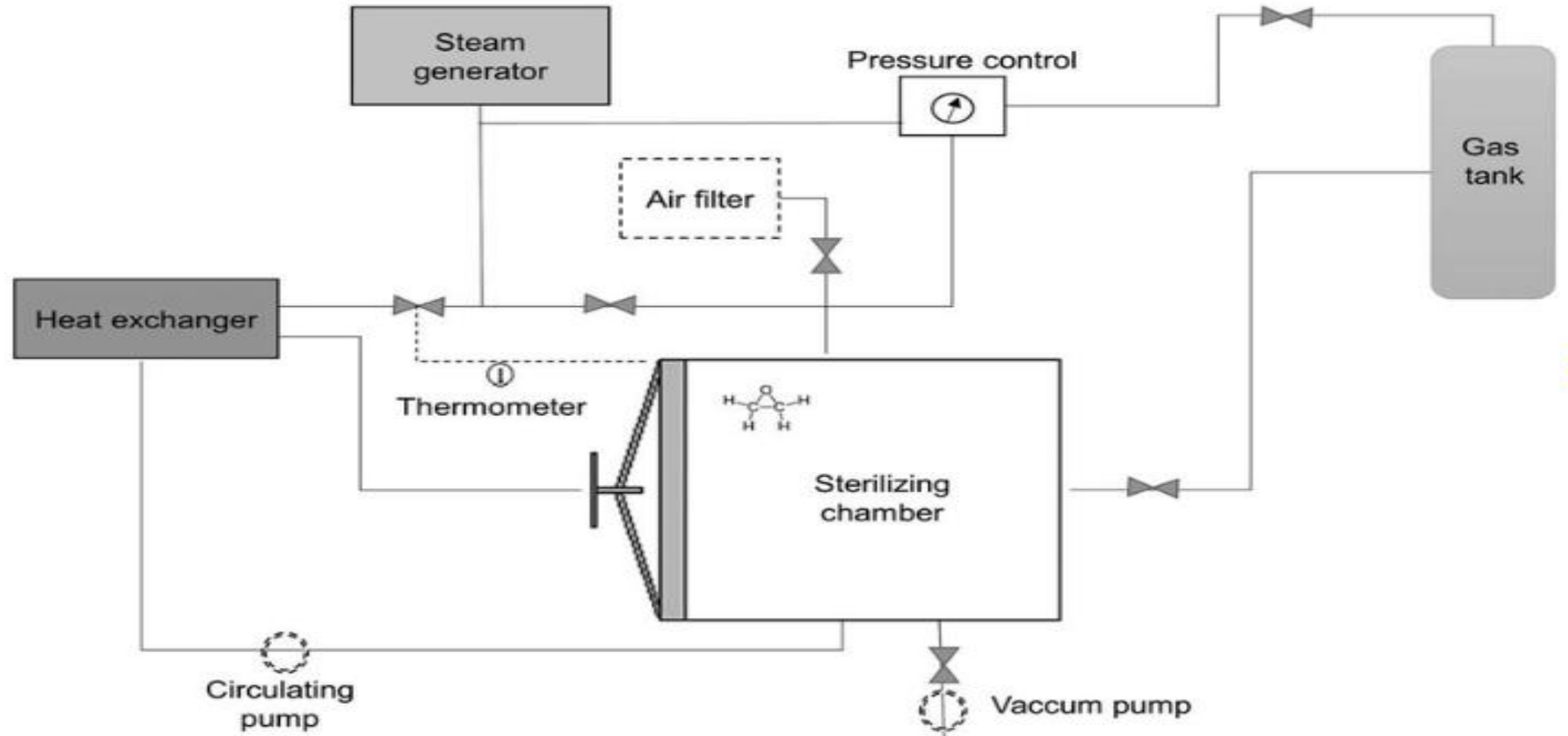
## Ethylene Oxide Gas Sterilizer Operation



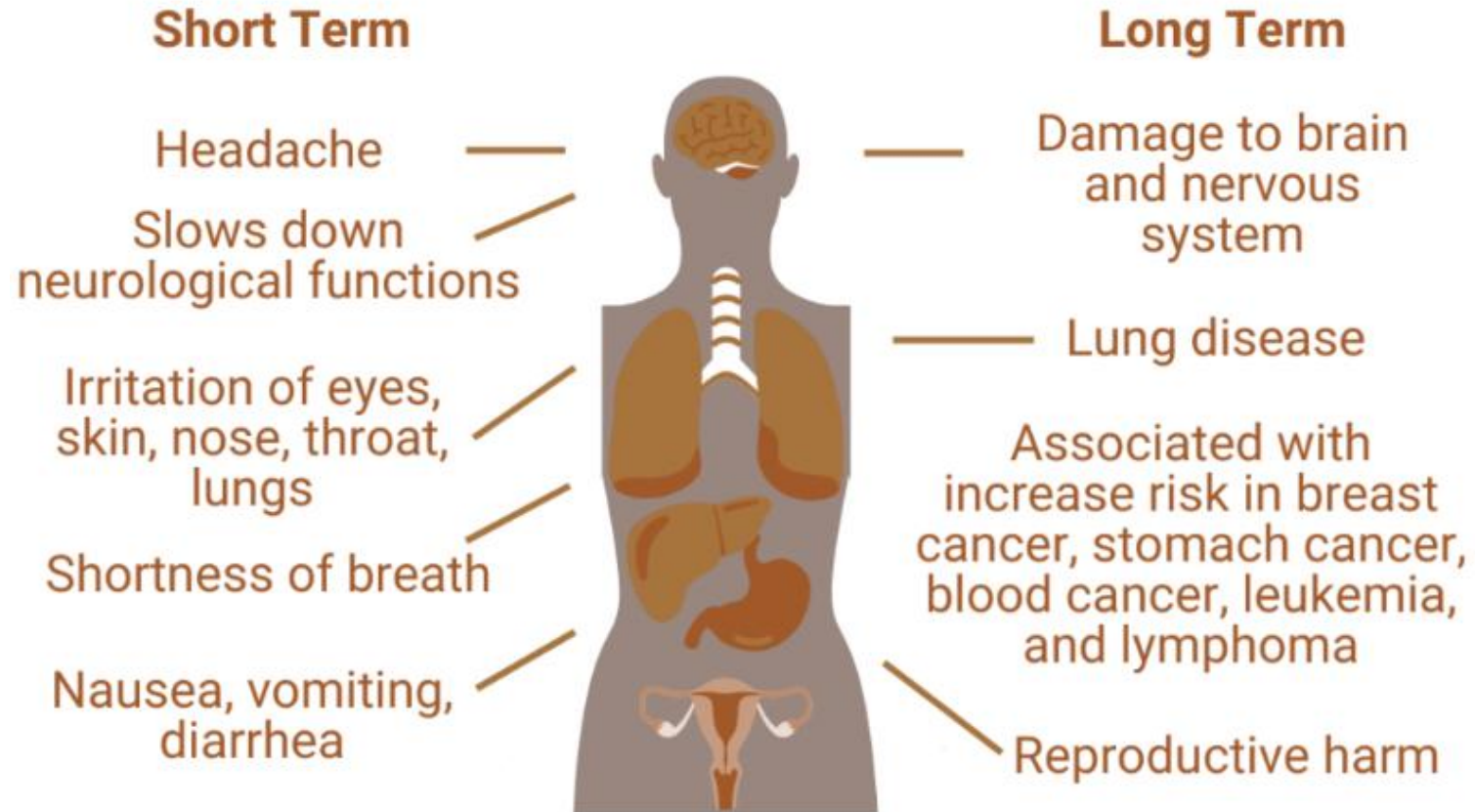
# STAGES OF ETO STERILIZATION CYCLE



# ETO GAS STERILIZATION



# EXPOSURE TO ETO





# MODE OF ACTION

- The microbicidal activity of ETO - result of **alkylation of protein, DNA, and RNA.**

## MICROBICIDAL ACTIVITY

- ETO inactivates all microorganisms although bacterial spores (especially *B. atrophaeus*)
- For this reason *B. atrophaeus* is the recommended biological indicator.





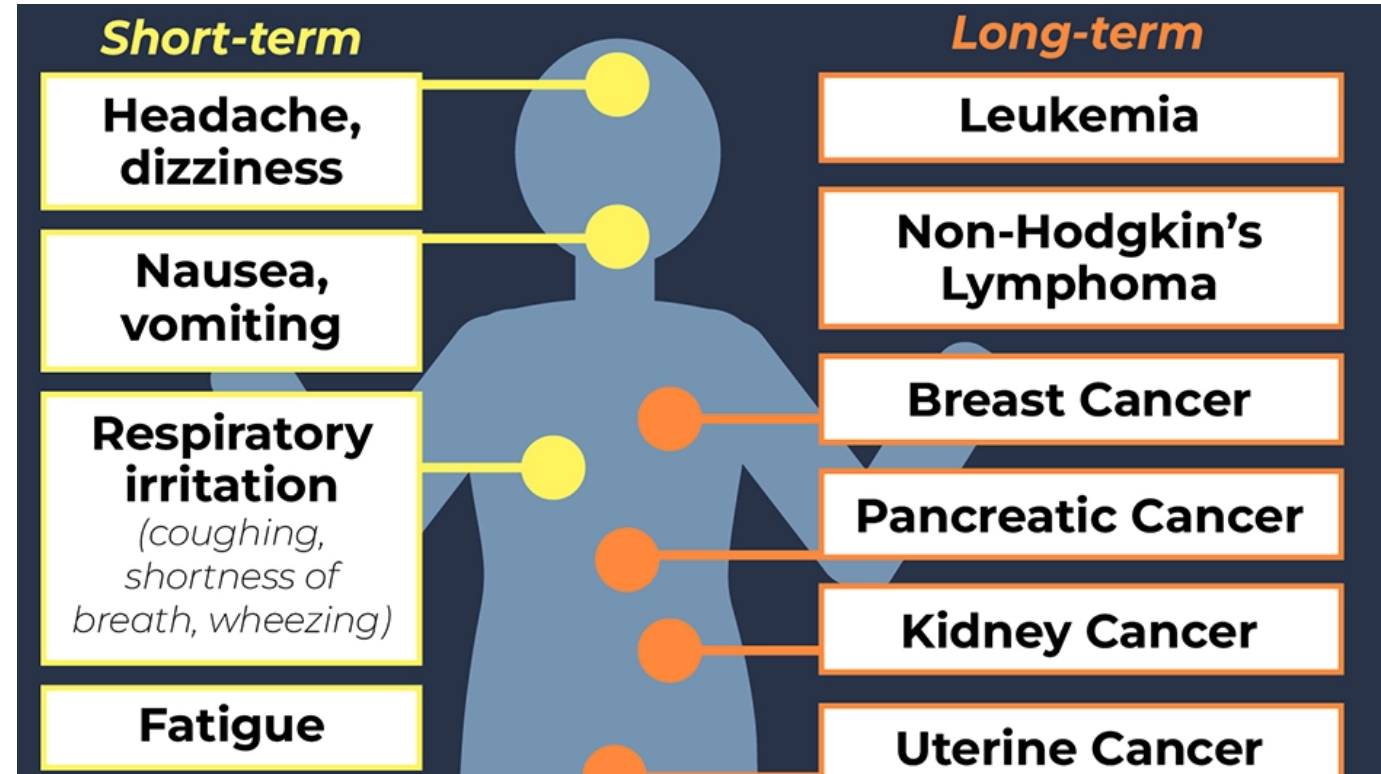
# ADVANTAGES

- Sterilize heat- or moisture-sensitive medical equipment.
- Carried out at low temperatures.
- Non-corrosive - preferable for sterilizing metal, plastic and rubber.
- High/ Deep penetration capacity makes it very efficient.
- Sterilize a large number of products.



# DISADVANTAGES

- Lengthy cycle time
- Cost
- Its potential hazards to patients
- Human carcinogen, on exposure can increase the risk of certain cancers.



# SAFETY PRECAUTIONS

- ETO is a toxic gas - pose health hazards to healthcare workers and patients.
- Strict safety precautions must be taken to ensure the ETO process is performed safely.
- **Personal Protective Equipment (PPE)**
- Healthcare workers should wear appropriate PPE - gloves, masks, and protective clothing.



# REFERENCES

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- <https://www.steris-ast.com/solutions/ethylene-oxide-sterilization/>
- <https://www.advamed.org/our-work/key-issues/sterilization-ethylene-oxide/>
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# THANK YOU