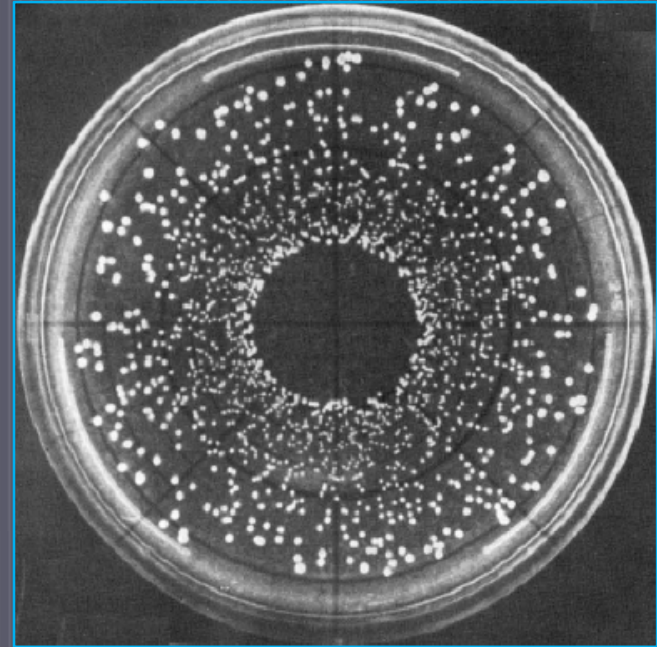


Bacterial Growth



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Measurement of Bacteria growth

- **Turbidity method**
 - When growth occur
 - Medium loss clarity
 - Become Cloudy or turbid
 - Greater the turbidity larger the population
 - Measurement – Naked eye behind paper and by Turbiditymeter or Spectrophotometer



Measurement by counting the cells

- **Direct or Total cell count**
 - Manually method
 - Small sample on slide
 - Cell count by Microscopy
- **Automated counters**
 - Colony counter
 - Electronically scan the culture
 - Counted by electronic sensor



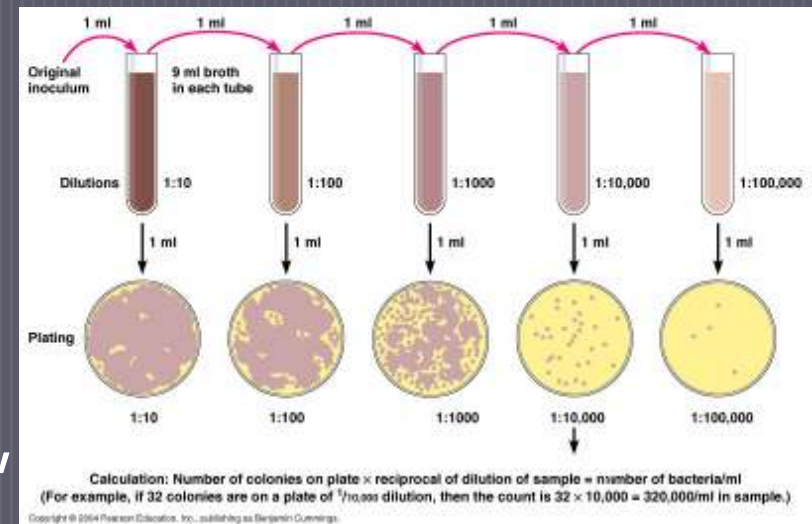
■ Flow cytometer

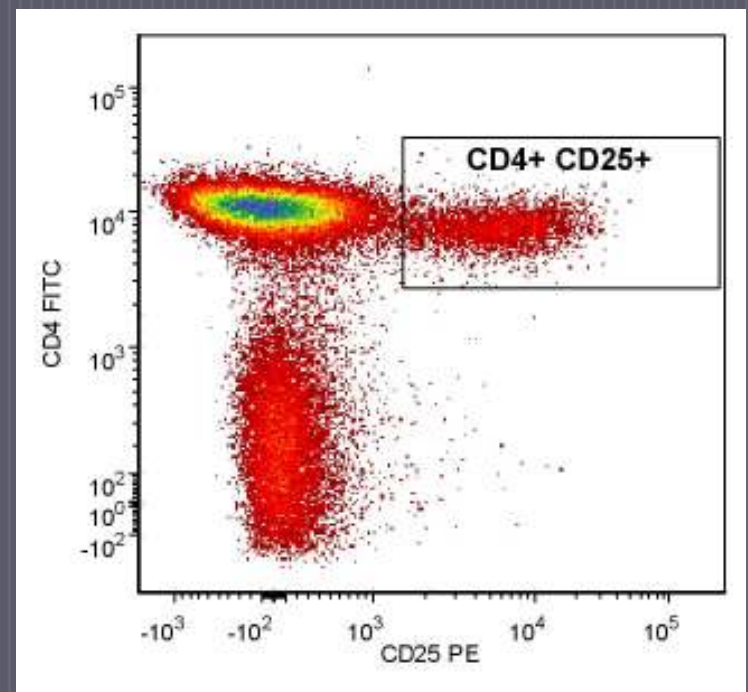
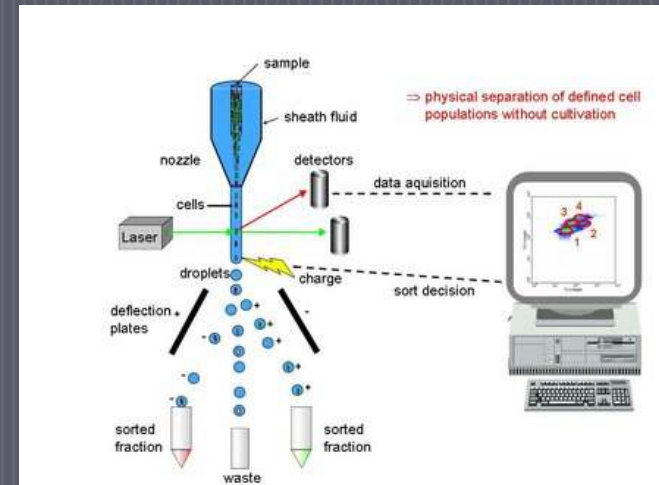
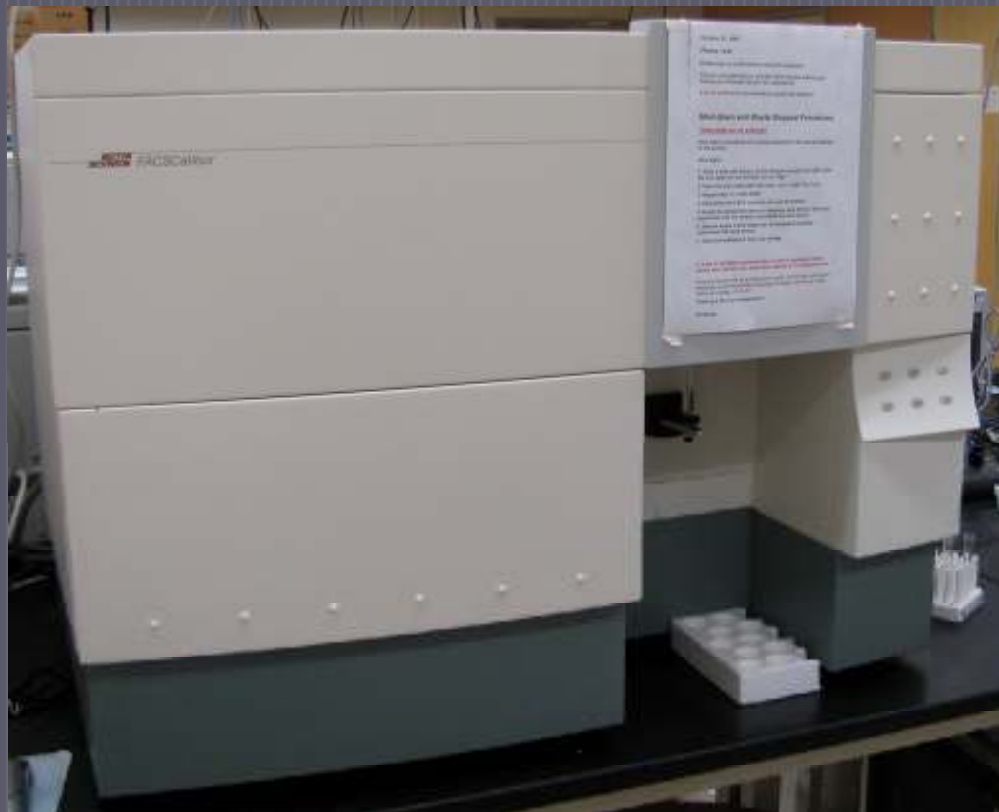
- Record number and size both
- Differentiate gram + and –
- Differentiate basis of G+C Content

■ Plate count method

- Sample serially diluted 1:100, 1:1000, 1:10,000
- Measure the dilution and growth in Petri dish

■ Determine by Dry weight of cell

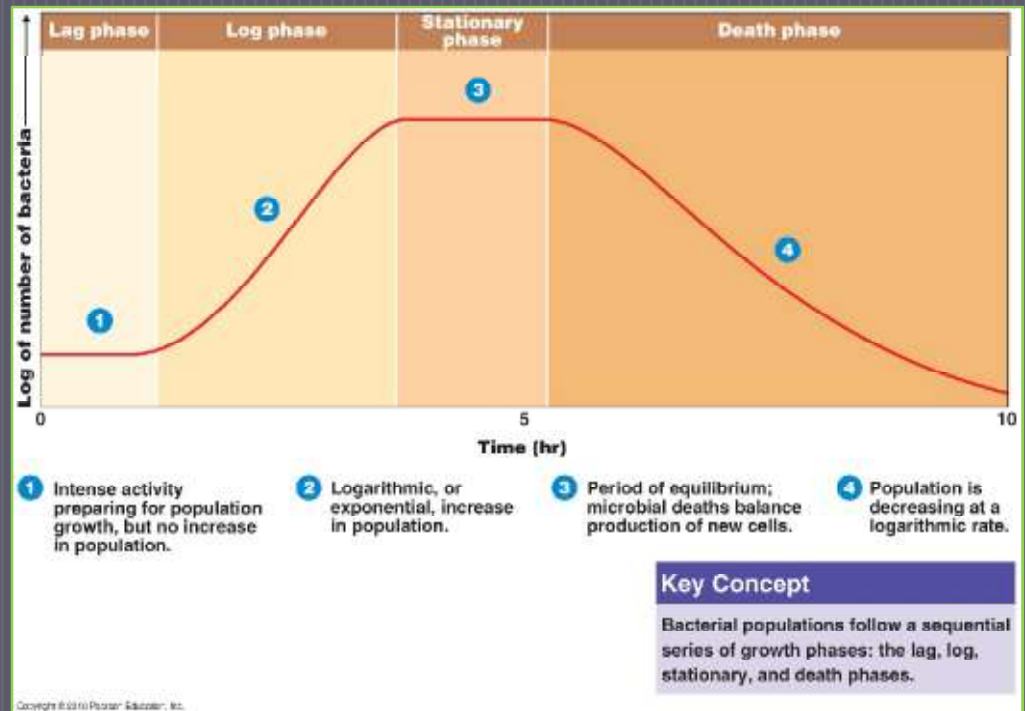




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Growth curve

- Lag Phase
- Log Phase (Exponential Phase)
- Stationary Phase
- Death Phase



- **Lag Phase**

- Very low growth
- Newly inoculated cells – Adjustment
- Require period to enlargement and synthesis
- Medium – dilute

- **Log Phase (Exponential Phase)**

- Maximum cell division
- Continuous growth till adequate medium

- **Stationary Phase**

- Population reaches maximum
- Curve level death of cells and multiplication
- Decline growth – depleted nutrient and oxygen

- **Death Phase**

- Speed in death occur
- Phase slower than log and stationary

Factor affecting Bacterial Growth

- Temperature

- Psychrophiles

- Minimum 0°C, Maximum 20°C, optimum 15°C

- Eg. *Staphylococcus aureus* grown in Refrigerator

- Mesophiles

- Minimum 10°C, Maximum 50°C, optimum 20-40°C

- human and plant pathogen

- *Clostridium*, *Bacillus* etc.

- **Thermophiles**

- Minimum 45°C, Maximum 80°C, optimum 50-60°C

- Also grown on direct sunlight exposive site

- **Alkalinity and Acidity**

- **Acidophiles**

- optimum 3.0

- **Neutrophiles**

- Optimum 6-8

- **Alkaliphiles**

- Optimum 10.5

- 
- 
- Oxygen
 - Aerobic
 - Anaerobic



Thankyou

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