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#### Chromatography

Group of techniques used to separate complex mixtures on basis of different physical interactions between a stationary and mobile phase



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#### **Chromatography (cont)**

Basic components - mobile phase (gas or liquid)



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#### Chromatography (cont)

- stationary phase (solid or liquid)



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#### Chromatography (cont)

- column holding stationary phase



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#### Chromatography (cont)

- separated components (eluate)



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#### Chromatography (cont)

- complex mixture (sample)



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#### Chromatography (cont)

Forms - Planar



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Chromatography (cont)

- Paper



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#### **Chromatography (cont)**

Column

- Gas (GC)- can be mobile or stationary (polymer silica)



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#### Chromatography (cont)

- Liquid (LC) - mobile phase - high pressure and connected to mass spec



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**Chromatography (cont)** 

Modes of Separation

- Adsorption - liquid-Solid (hydrophobic and Hydrophilic bonds)



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#### Chromatography (cont)

- Partition - Liquid-Liquid



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#### Chromatography (cont)

- Steric exclusion - Variation of liquid-Solid



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#### **Chromatography (cont)**

- Ion-exchange chromatography - Magnitude and charge (separation of amino acids)



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#### Chromatography (cont)

- Affinity



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#### **CHROMATOGRAPHIC PROCEDURES**

Thin-layer chromatography (TLC)

- A variant of column chromatography



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#### **CHROMATOGRAPHIC PROCEDURES (cont)**

- Thin layer of sorbent is uniformly coated on glass/plastic plate.



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#### **CHROMATOGRAPHIC PROCEDURES (cont)**

- Samples are applied as spots near edge of plate.



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#### **CHROMATOGRAPHIC PROCEDURES (cont)**

- One edge of plate is placed in solvent.



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#### **CHROMATOGRAPHIC PROCEDURES (cont)**

- Solvent migrates up thin layer by capillary action.



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#### **CHROMATOGRAPHIC PROCEDURES (cont)**

- After solvent reaches predetermined height, plate is removed and dried.



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#### HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

- Uses pressure for fast separations, controlled temperature, in-line detectors, and gradient elution techniques



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#### HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC) (cont)

- Components: pumps, columns, sample injectors, detectors, recorders



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