TLC THIN LAYER CHROMATOGRAPHY

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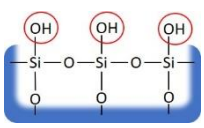
TLC is a analytical technique used to identify the purity of a radiopharmaceutical

HOW DOES TLC WORK?

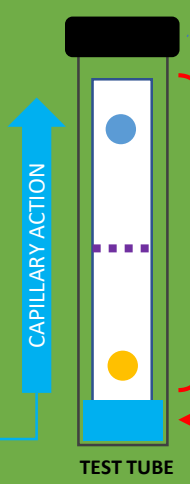
TLC separates radiopharmaceutical compounds (RPCs) based on variances in **polarity**



Polar groups in the media construct **dipole-dipole interactions** with polar solvents and components of the RPC

Solvent travels up the media by **adsorption** and **capillary action**. The solvent will mix with the RPC components and carry the components up media. Each component of the RPC will move up the media at different rates

CHROMATOGRAPHIC SYSTEM



CHROMATOGRAPHIC STRIP
[STATIONARY PHASE]

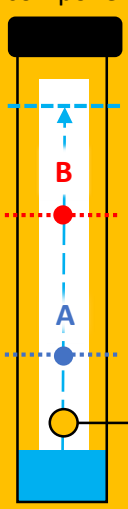
CUTE LINE

ORIGIN (O)
The region of the chromatographic strips spotted with the sample preparation for RPC

SOLVENT
[MOBILE PHASE]

SOLVENT + MEDIA

Selection of the appropriate **solvent system** permits separation of the different chemical components in RPC



Solvent front (S_f) is the distance the solvent travels from the origin of the chromatographic strip*

Relative front (R_f) the distance the *RPC component* travels from the origin relative to the S_f

**Mark before the solvent front before the solvent reaches the edge of the media*

Retention factor (R_f) value tell us the distance between the relative front in proportion to the solvent front, typically ranging from 0 to 1

$$R_f = \frac{(Sf - O)}{(Rf - O)}$$

R_f = Species A
R_f = Species B

$$\% \text{ activity net count} = \frac{(O)}{(O + Sf)} \times 100$$

Nonpolar RPC components will **form weak interactions** with the media and will travel **closer towards the solvent front**

Polar RPC components will generate for **strong interactions** with the media, thus moving relatively slower

RADIOCHROMATOGRAM ANALYSIS

After development of the chromatogram, the strip will be analyzed using a method & device for counting the **radioactivity distribution**

THREE METHODS FOR RPC ANALYSIS

1. SCAN using a mobile radiochromatogram scanner, guide the device along the strip for activity peak
2. DICE the strip into multiple 1 cm pieces
3. CHOP the strip **into** two separate pieces