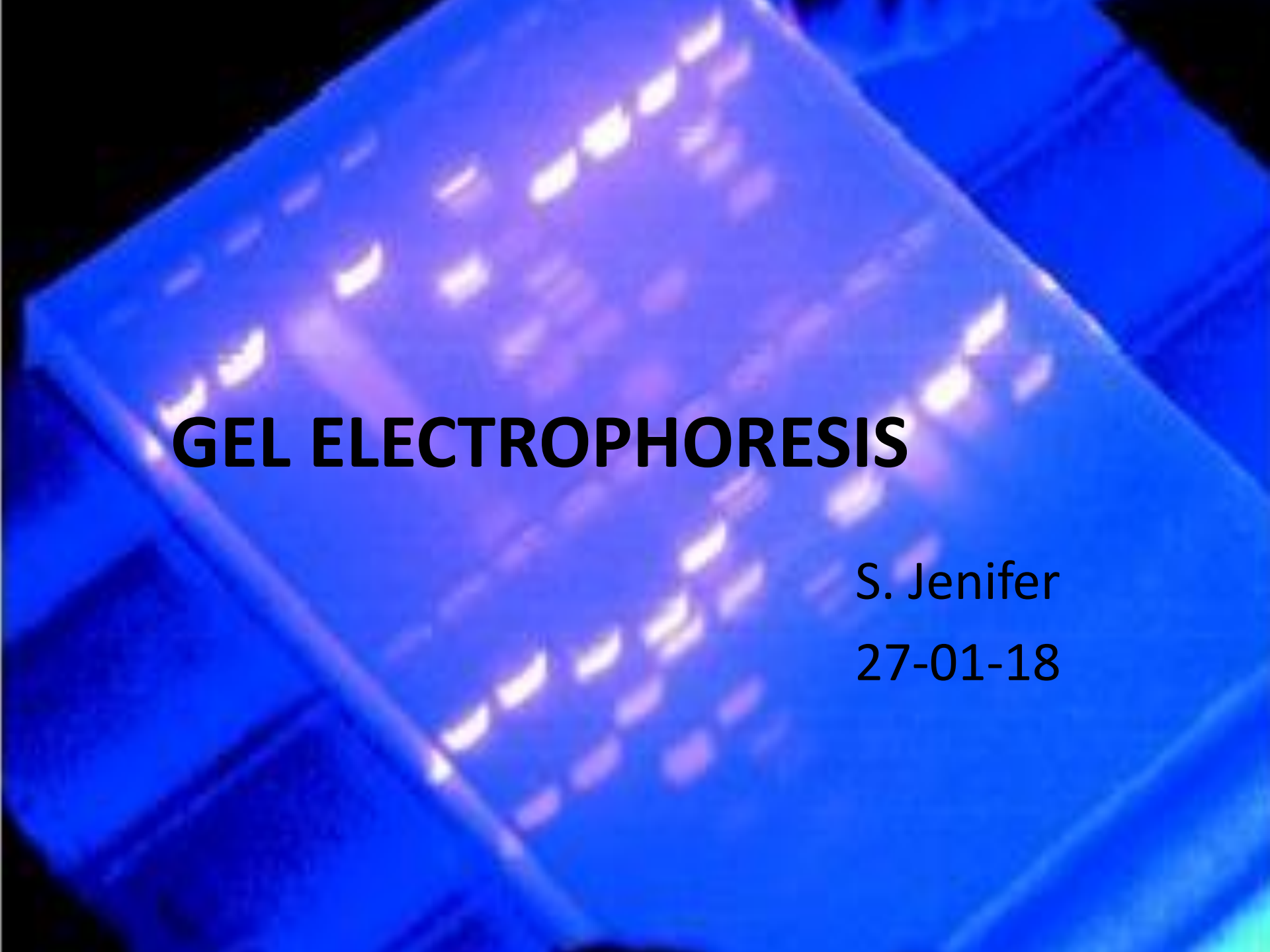

GEL ELECTROPHORESIS

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27-01-18

Introduction:

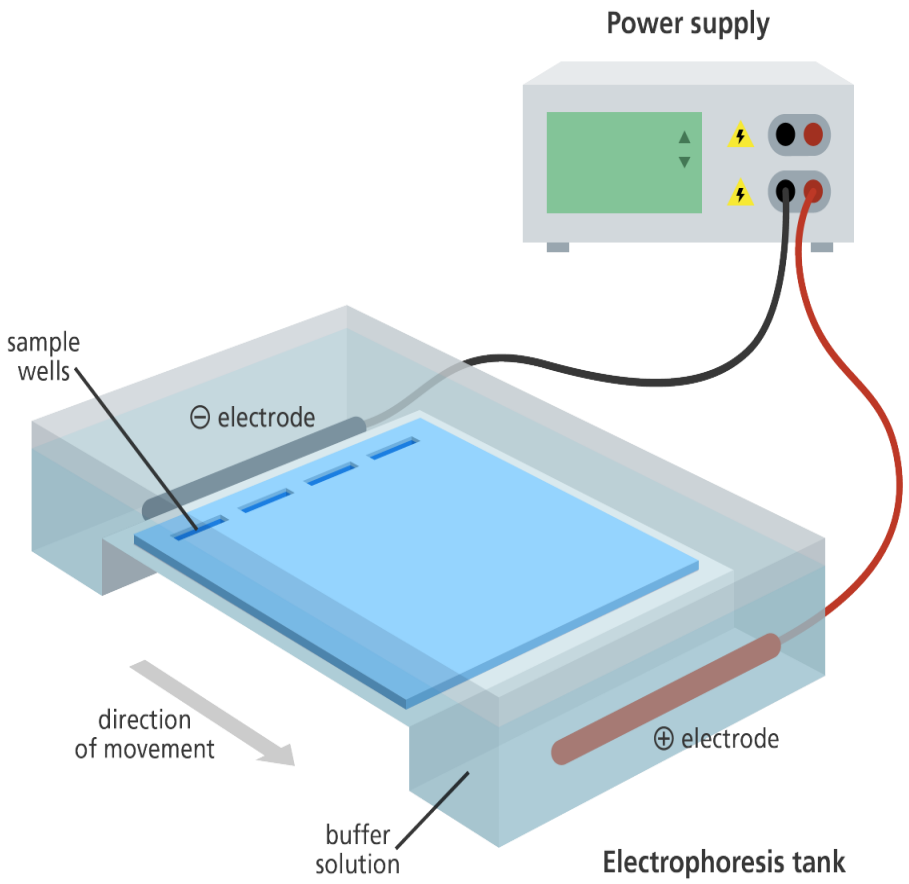
- **Migration of a charged particle under the influence of electric field**
- **Electro**-charged particle
- **Phoresis**-movement

- This electrokinetic phenomenon was observed for the first time in **1807** by **Russian professors Peter Ivanovich Strakhov and Ferdinand Frederic Reuss** (Moscow State University)

- Migration of **clay particles** dispersed in water on application of a constant electric field

Principle:

- Laboratory technique to **separate macromolecules (DNA, RNA and Proteins** based on **size**.
- Charged species such as protein, DNA and RNA migrate towards the **oppositely charged electrode**.
- **Gel** acts as a size **filter/ Seive**, with smaller fragments migrating faster than larger fragments.
- Gels also serves to maintain the finished separation, so that a post electrophoresis stain can be applied.



https://infograph.venngage.com/p/220088/gel-electrophoresis-technique

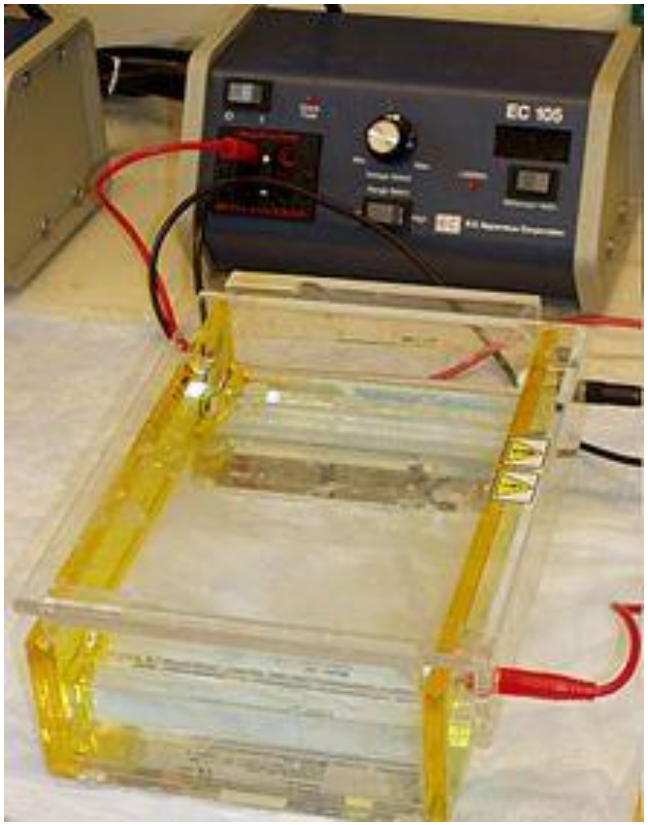
Instrumentation:

1. **Electrophoretic Apparatus:**

- **Power Supply:** voltage of 5 volts per cm (distance between electrodes) of gel.
- **Staining Box:** ethidium bromide
- **Trans-illuminator:** UV light box to visualize stained DNA in gels.

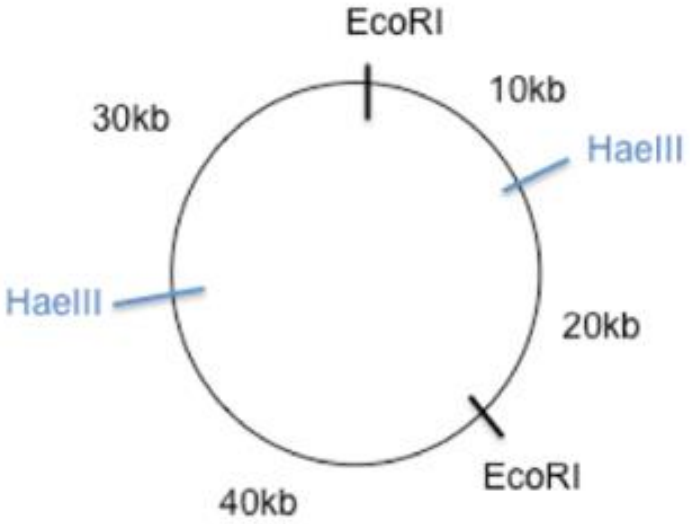
2. **Chemical Components:**

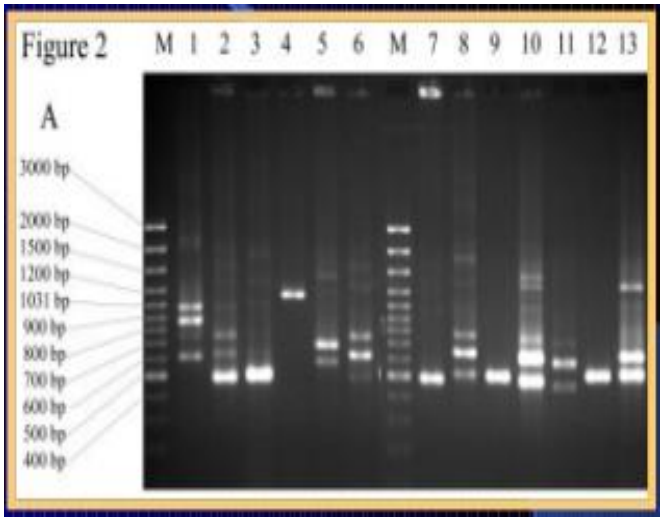
- **Supporting Media:** Cuts down convection current. Polyacrylamide gel & agarose
- **Buffer:** reduces pH changes due to the electric field. Tris/Acetate/EDTA (TAE) & Tris/Borate/EDTA (TBE)

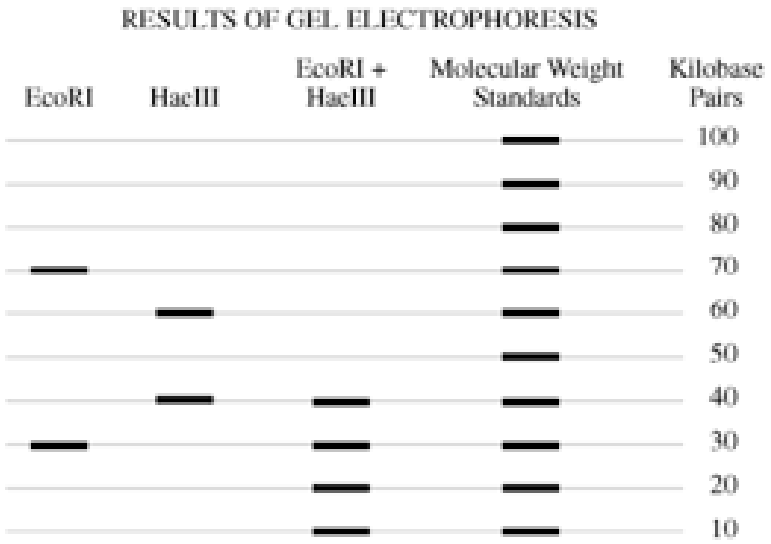


Applications:

- DNA Gel electrophoresis is usually performed for analytical purposes, often after amplification of DNA via polymerase chain reaction (PCR)
- DNA foot-printing: how proteins bind to DNA.
- To separate proteins by size, density and purity.
- It can also be used for plasmid analysis, which develops our understanding of bacteria becoming resistant to antibiotics.







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Thank you