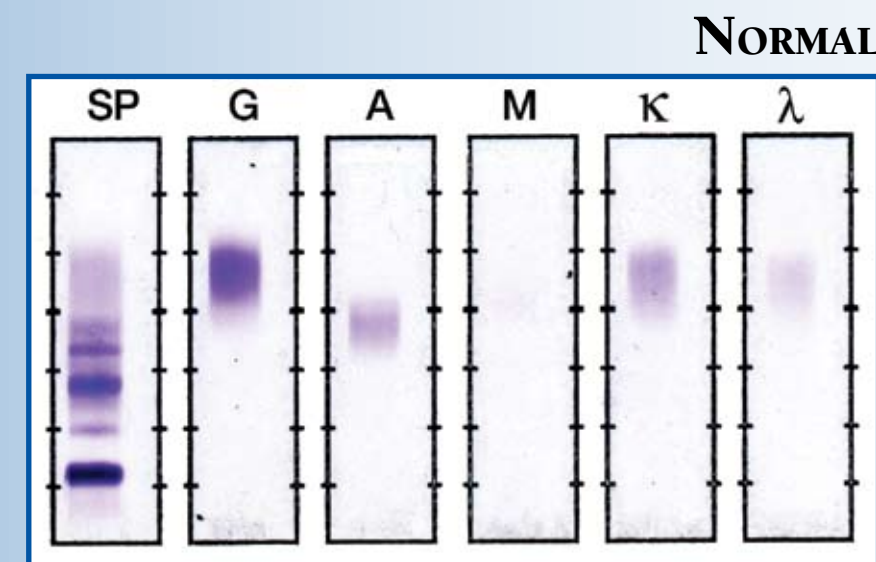


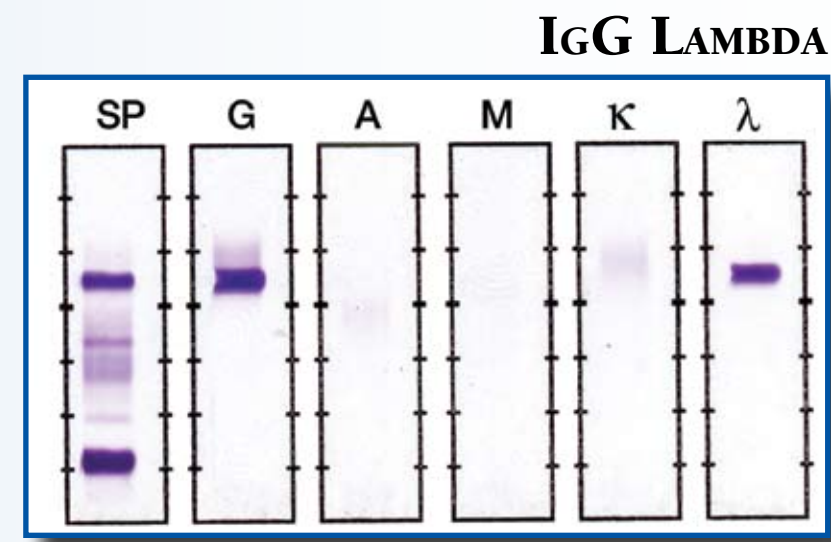
SERUM IFE

URINE IFE

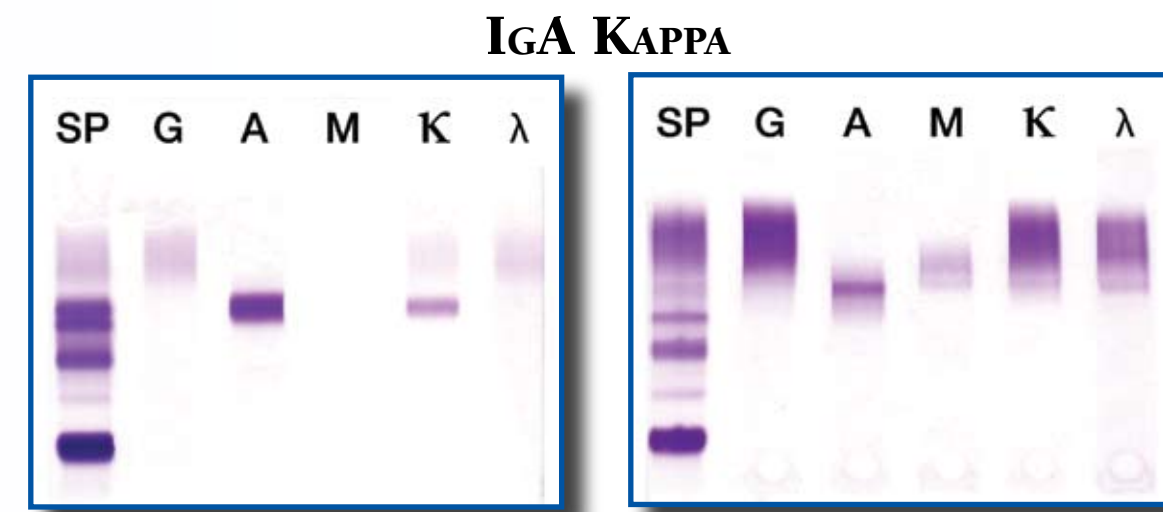
COMMONLY OBSERVED PATTERNS



- All immunofixation lanes should have some diffused stain or "blush". This reflects the normal distribution of immunoglobulins.



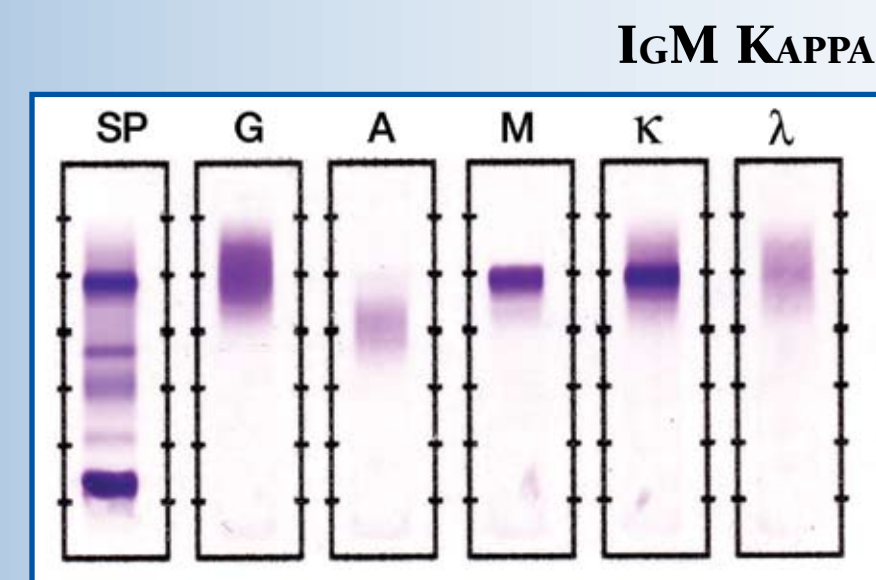
- When evaluating immunofixation patterns
- Look for well-defined edge on restricted band in both heavy and light chains migrating anywhere from alpha1 to gamma.
 - Note intensity of uninvolved immunoglobulins.
 - Examine "blush" carefully for small bands hidden in color.



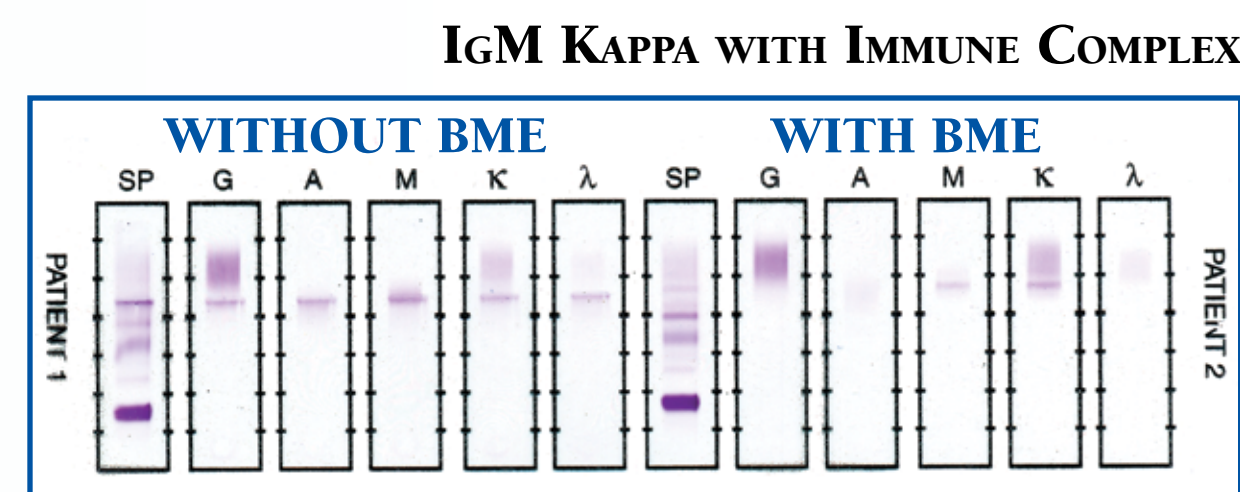
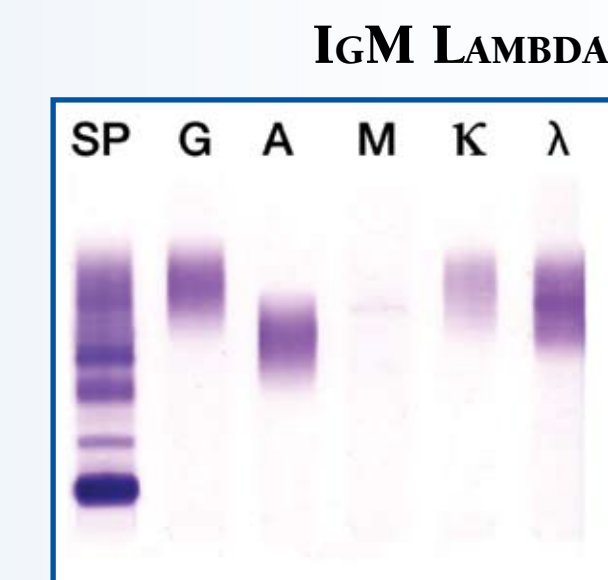
- Sometimes a light chain associated with an IgA will not react with the antisera. This may be caused by sequestration of the epitopes due to quaternary structure.
- This specimen could be repeated using other anti-light chain antisera or treated with BME. Otherwise it can be reported as IgA with no discernible light chain.
- IgA typically migrates in the beta region and tends to be present in large amounts, causing distortion of heavy chain bands.

About IFE

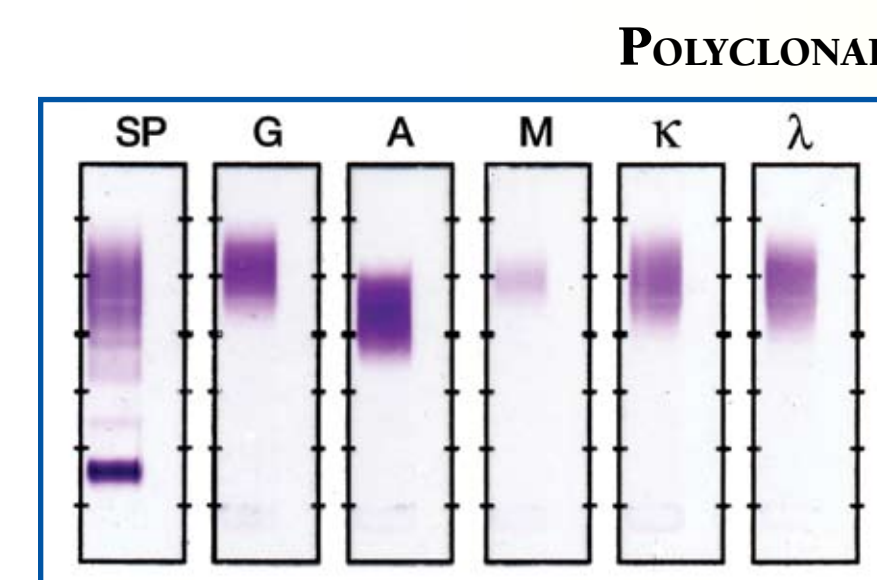
Characterization of monoclonal immunoglobulins is the primary use of immunofixation or IFE. Clinically, IFE aids both in making initial diagnoses of a variety of disease states as well as following treatment progress. IFE is a two-stage procedure using agarose electrophoresis to first separate proteins by electrophoretic charge followed by immunoprecipitation to identify the protein bands. For expert help with your IFE questions call Helena Laboratories at 800-231-5663.



- IgM commonly presents as a large band but can sometimes present as a thin, barely discernible, narrow band.
- Often the presence of a distinct light chain band may be more apparent, leading to closer examination of IgM for a band that aligns with the light chain.

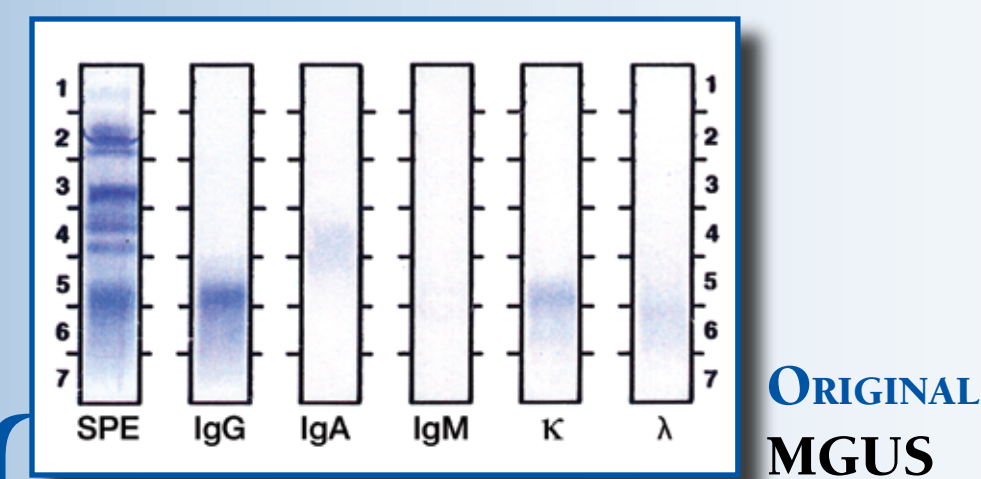


- IgM tends to form immune complexes and stay at the point of application with bands in all five immunofixation lanes.
- Use of BME will sometimes make it easier to identify.

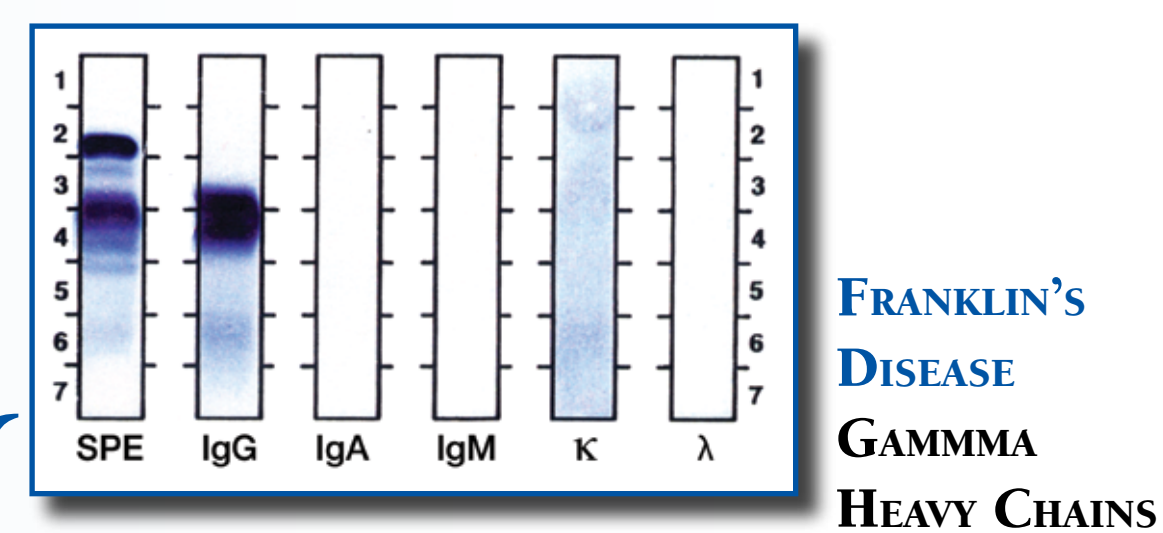


- For a pattern to be considered polyclonal in nature it needs to have a diffuse increase in at least one heavy chain and both light chains.
- Polyclonal increases may be indicative of chronic inflammation.

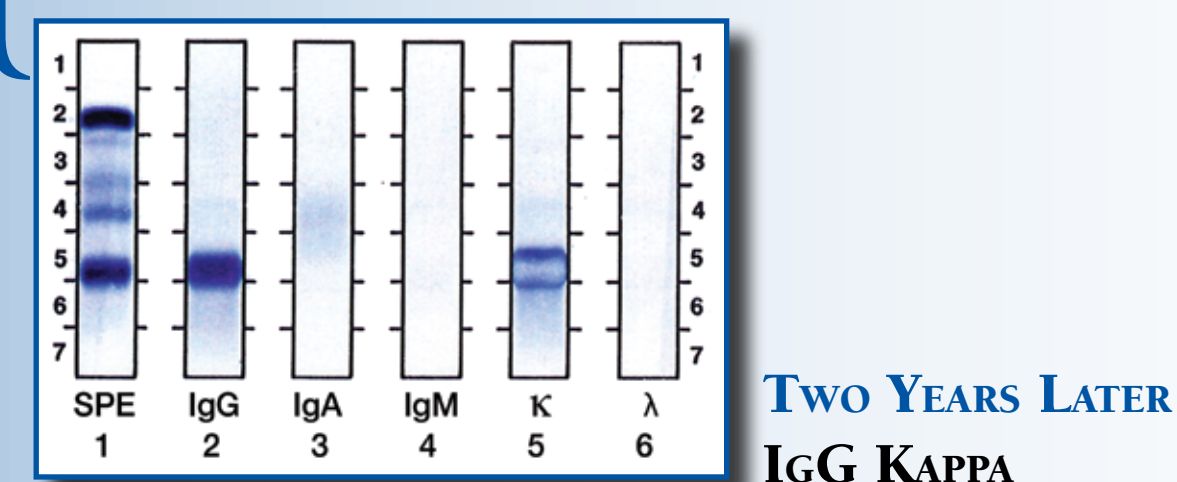
MORE COMPLEX PATTERNS



ORIGINAL
MGUS

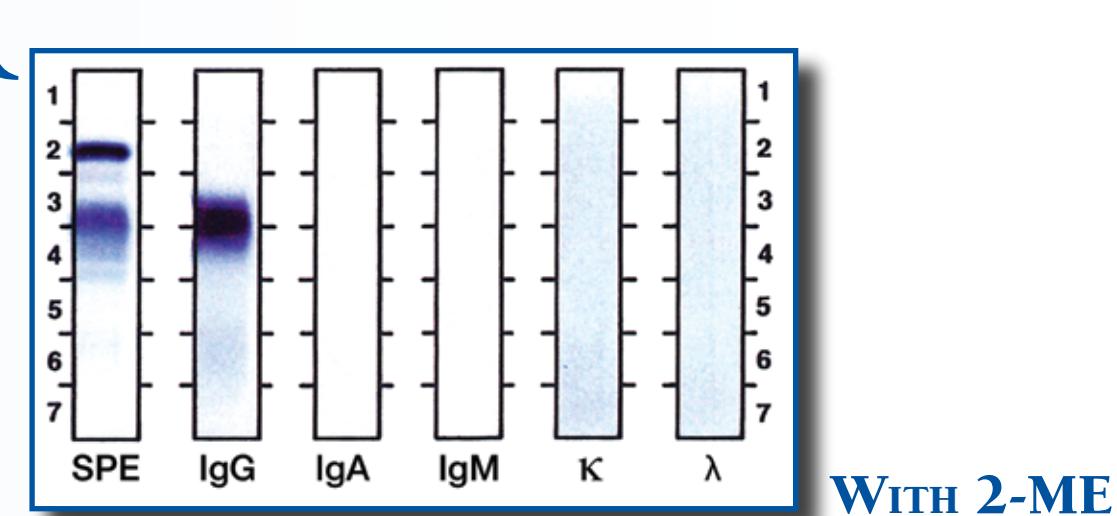


FRANKLIN'S
DISEASE
GAMMA
HEAVY CHAINS



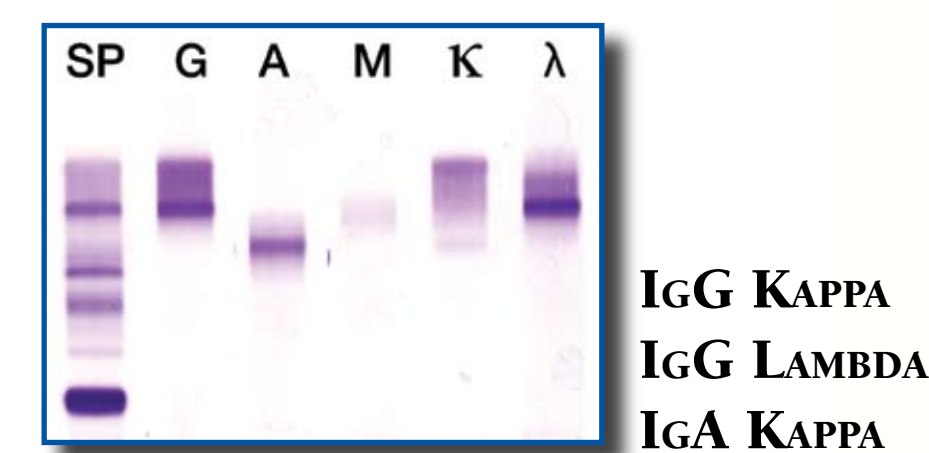
TWO YEARS LATER
IGG KAPPA

- Poorly defined or suspicious bands may become significant, so report all findings and follow up at regular intervals.
- This patient shows a two-year progression from MGUS (monoclonal gammopathy of undetermined significance) to large monoclonal IgG Kappa multiple myeloma.



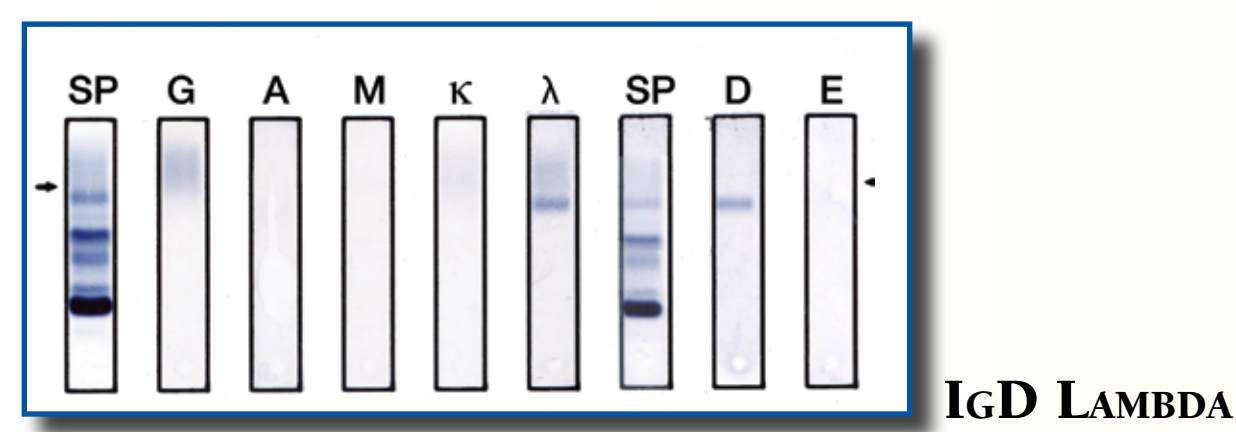
WITH 2-ME

- Rare, lymphoma-like disease
- No light chains present
- Must perform immunoselection for definitive identification as heavy chain



IGG KAPPA
IGG LAMBDA
IGA KAPPA

- Patients with monoclonal gammopathies may have more than one monoclonal protein band.



IGD LAMBDA

- When a light chain is seen with no apparent heavy chain, the specimen should be repeated with IgD and IgE.
- 90% of IgD have lambda light chains.
- IgE is extremely rare.

Urine IFE Specimens

24 Hour Urine Preferred; First Morning Specimen Acceptable



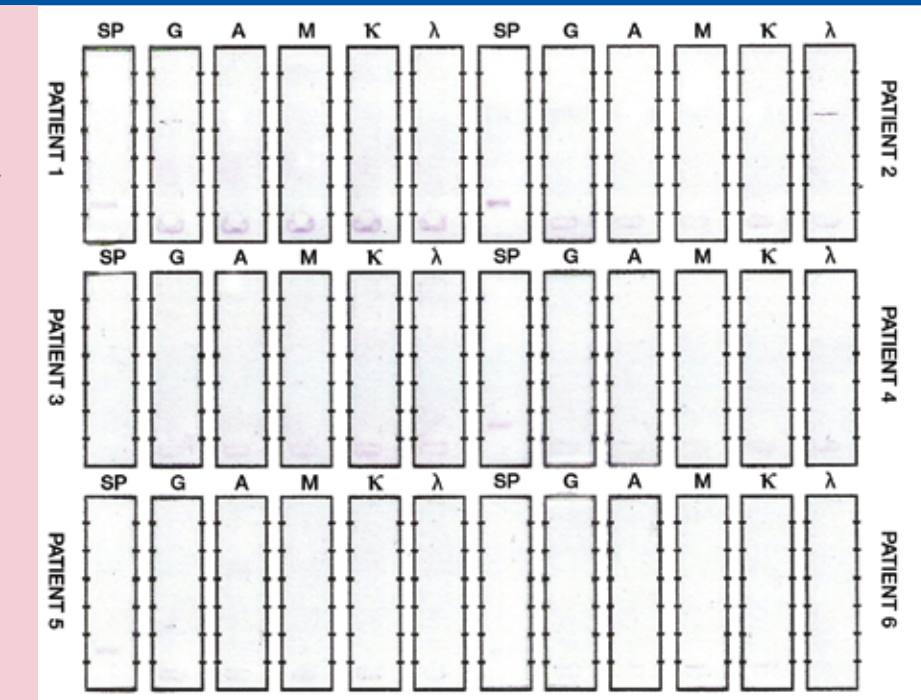
- No preservatives
- Refrigerate to store
- Room temperature to run
- Concentrate

24 Hour Urine Concentration

| Total Urine Protein | Concentration |
|---------------------|---------------|
| < 50 mg/dL | 100x |
| 50 - 100 mg/dL | 50x |
| 100 - 300 mg/dL | 25x |
| 300 - 600 mg/dL | 10x |
| > 600 mg/dL | 5x |

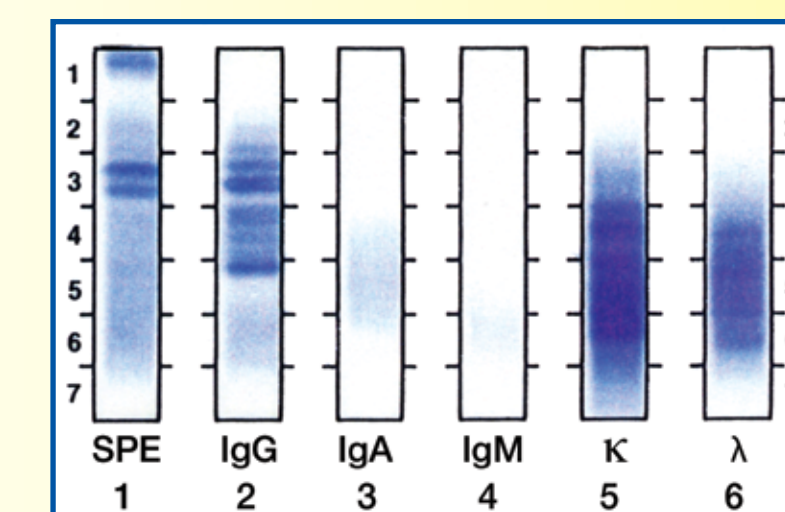
Total Protein (mg/dL)

- Pt 1 - 100
- Pt 2 - 112
- Pt 3 - 81
- Pt 4 - 74
- Pt 5 - 58
- Pt 6 - 74



URINE
NORMALS

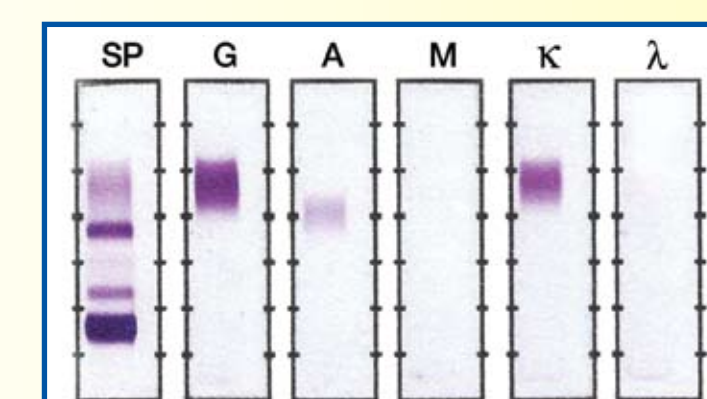
- Normal urine has small or no albumin and sometimes a small amount of transferrin.



URINE
POLYCLONAL
OR "LADDER"
LIGHT CHAINS

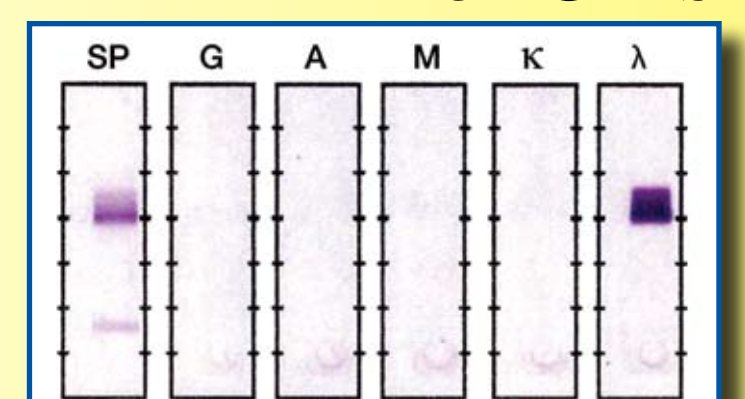
- When several small, evenly spaced bands are present in the light chain lane, this is called free polyclonal light chain or ladder light chains. It should be noted that this does not rule out monoclonal free light chains.
- If urine is too concentrated, then even normal urine will show polyclonal free light chains.

URINE
HEAVY CHAINS



- The presence of a monoclonal heavy chain and light chain is indicative of glomerular damage to the kidneys.

URINE
FREE LIGHT CHAINS



- The presence of light chain monoclonal protein indicates tubular damage to the kidneys.

Renal failure is the most common cause of death in multiple myeloma patients.