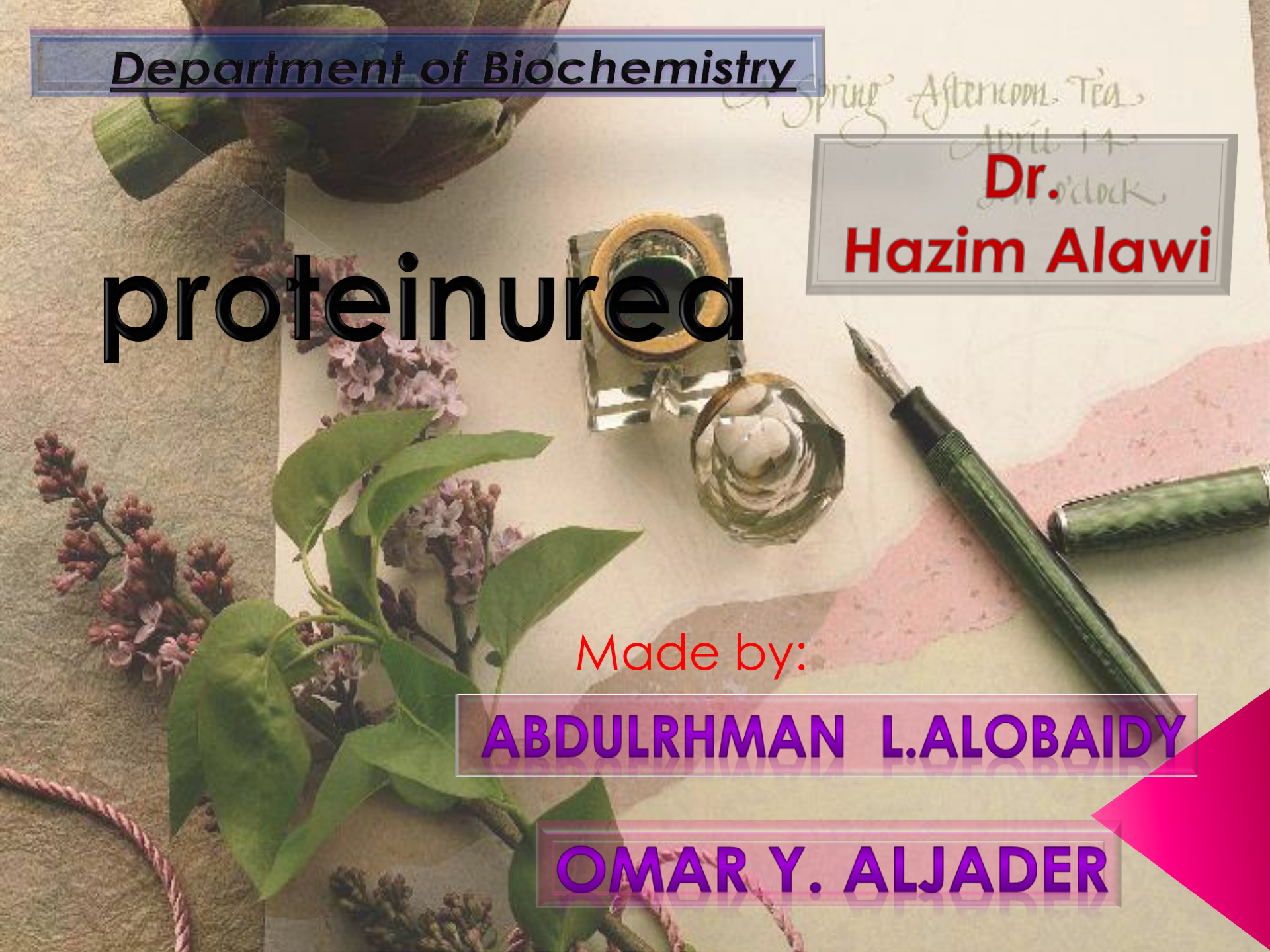
Department of Biochemistry
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proteinurea
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INTRODUCTION

The protein is found in normal urine, and it's divided into:

1-60% plasma proteins: albumin (major) IgG, IgA ,light chains ,heavy chains , transferrin ,haptoglobin ,lysozyme ,amylaze ,kallikrein.

2- 40% originating from the secretions of the urinary tract including: tamm-horstall ,urokinase and secertory IgA.

The reasonable upper limit of normal protein excretion in healthy children = 150 mg/24 hrs.

DEFINITION:

The excretion of an excessive amount of protein (>150mg/day) in the urine as defined by qualitative, semi-quantitative, and quantitative methods.

PATHOGENESIS

There are three basic types of Proteinuria :

1-glomerular

2-tubular

3- Overload

1. Glomerular

- mechanisms:
  - . increased GFR
  - . increased glomerular permeability of:
    - basement membrane
    - endothelial, epithelial cell injury
    - electrostatic charge barrier

2. Tubulointerstitial

- impaired tubular reabsorption of filtered proteins
- proteins: low M.W.(molecular weight) proteins, lysozyme, B2-microglobulin
- Tamm-Horstall protein

3. Overload Proteinuria

- increased load overloads tubular reabsorptive capacity

- proteins: low MW plasma proteins, Ig light chains, myoglobulin, lysozyme, albumin


OMAR YAKDAN

Abnormalities of Proteinuria :

1. Benign Proteinuria :

a. *Benign Transient Proteinuria:*

benign proteinuria associated with precipitating factors - fever, exercise, stress, cold weather, dehydration, high blood pressure, seizures, etc

b. *Orthostatic Proteinuria:*

- diagnosis based upon the Postural Test
- has a benign clinical course

c. Persistent Asymptomatic Proteinuria

d. Congenital Nephrotic Syndrome

f. Poststreptococcal GN

g. Hemolytic Uremic Syndrome

h. Henoch-Schoenlein Purpura

i. Primary Glomerulonephritis

j. Secondary Glomerulonephritis

k. Hereditary Tubulointerstitial Proteinurias

2. Pathologic Proteinuria

A- Glomerular:

1. Hereditary

2. Non-Hereditary

B-Tubulointerstitial :

1. Hereditary

2. Non-Hereditary

Glomerular:

1. Hereditary:

Congenital Nephrotic Syndrome

Alport Syndrome

2. Non-hereditary:

a) Acute (GN)

b) Chronic (primary and secondary)

3. Overload Proteinuria

1. Neoplastic

Amyloidosis

Leukemia (monocytic, monomyelocytic) -
lysozymuria

Multiple Myeloma

Waldenstrom's Macroglobinemia

Family History

helps to differentiate hereditary from non-hereditary forms of both glomerular and tubulointerstitial forms of proteinuria:

1. Proteinuria

family members must have had previous urinalysis to ascertain this

2. Renal Disease

Polycystic Kidney Disease

Nephrotic Syndrome, Fanconi Disease

renal dialysis

kidney transplantation

3. Others

hearing/ocular impairment (Alport Syndrome)


Omar Fawaz

Specific Entities:

1. Benign Transient Proteinuria

2.Orthostatic Proteinuria

INVESTIGATIONS : Proteinuria (Diagnosis)

1. **Qualitative – Dipstick**

- measures a range of protein concentrations
- depth of colour increases in a semiquantitative manner with increasing urinary protein concentration
- to rule out false positives must have:
  - 3 samples with proteinuria
  - first voided early morning samples
  - pH < 6.0 with known specific gravity

- 1+ (72-240 mg/24 hrs) or greater is considered abnormal
- dependent on specific gravity of urine sample
- FP: gross hematuria, highly alkaline urine, UTI

2. Semi-quantitative - Protein/Creatinine Ratio in Urine

- random early morning single voided specimen
  - children < 2 years : < 0.5
  - children > 2 years : < 0.2
  - nephrotic : > 3.5
- correlates with the 24 hour protein excretion data

3. Quantitative - 24 hr. urine collection

- gold standard
- if dipstick is 1+ or more than obliged to do a 24 hour urine collection
- 24 hr. urine collection
  - Protein (mg)/m2/hr
    - < 4 mg/m2/hourr (normal)
    - 4-40mg/m2/hour (proteinuria)
    - 40 mg/m2/hour (nephrotic)
  - Protein (mg)/24 hr
    - 2 to 12 months : > 155 mg/24 hr
    - 3 to 4 years : > 140 mg/24 hr
    - 4 to 10 years : > 190 mg/24 hr
    - 10 to 16 years : > 250 mg/24 hr
- FP: radiographic contrast media, cephalosporins, pencillin analogues, sulfonamide metabolites

MANAGEMENT:

1)Treat underlying disorder

2)Treat complications