

# Exercise 31

**Aim:** To detect the presence of albumin in the given sample of urine.

**Principle:** Nitric acid causes the precipitation of albumin. When heated or treated with sulphosalicylic acid, albumin undergoes coagulation.

**Requirement:** Glasswares: Test tubes, graduated pipette (5 mL capacity), spirit lamp; Chemicals: Concentrated nitric acid, acetic acid, Robert's solution, sulphosalicylic acid or a solution containing 13% salicylic acid and 20% sulphuric acid; Miscellaneous: test tube stand, test tube holder.

## Procedure

### (a) Nitric acid ring test

- Take 5 mL of concentrated nitric acid in a test tube.
- Incline the tube and add the urine sample with a dropper, so that the latter flows down slowly along the side of the test tube to form a separate layer.
- A white ring develops at the junction of the two liquids which indicates the presence of albumin in the urine sample.

**OR**

- Take about 5 mL of Robert's solution in a test tube.
- Now incline the test tube and add 2 to 3 mL of the given sample of urine by means of a dropper along the inner side of the test tube so that it forms a layer over the Robert's solution.
- The presence of white ring at the junction of two layers indicates the presence of albumin in the sample.

### (b) Heat coagulation test

- Take about 6 to 8 mL of urine in a test tube.
- Incline the test tube at an angle and heat the upper one-third of the test tube by a low flame.
- Turbidity develops in the heated portion of the urine.
- Add 1% acetic acid drop by drop and boil or simply add a drop of 33% acetic acid.
- If the turbidity persists it confirms the presence of albumin in the urine sample (disappearance of turbidity, confirms the presence of phosphates).

### Exercise 31

#### (c) Sulphosalicylic acid test

- Take 3 mL of urine in a test tube.
- Add a few drops of sulphosalicylic acid and heat it gently.
- A whitish or cloudy turbid solution or precipitate (coagulation) in the solution indicates the presence of albumin in the urine sample.

### Discussion

A trace of protein which is less than 250 mg (in 24 hours urine) is found in normal urine. Under pathological conditions like albuminuria, albumin is found in urine above normal level. This amount is so negligible that it escapes detection by any of the simple test. In kidney disturbance and in high blood pressure, albumin level in urine is significantly high.

### Questions

1. What is the colour of the urine and name the pigments responsible for this characteristic colour?
2. In which organ of our body, highly toxic ammonia is converted into urea?
3. Name the disorder that shows presence of excess urea in the urine.
4. Name the disorder in which glucose level is high in urine.
5. What do you call those animals that eliminate nitrogen mainly in the form of urea?
6. Which other organ of our body also excretes urea in small amount?
7. Which reagents will demonstrate presence of protein in urine?
8. What is the significance of appearance of different colours while performing Benedict's test?
9. What is the significance of performing Seliwanoff's test?