Title: Standardization of Ocular and Stage Micrometer and Measurement of a Cell

Objective: To standardize the ocular micrometer using a stage micrometer and measure the size of a given cell specimen using a calibrated microscope.

Introduction: Accurate measurement of microscopic specimens requires the calibration of the ocular micrometer. The ocular micrometer is a small glass disc placed inside the eyepiece of a microscope with engraved divisions. Since these divisions have no fixed values, calibration using a stage micrometer is necessary. A stage micrometer is a glass slide with a precisely known scale, typically 0.01 mm or 10 µm per division. By aligning the scales of both micrometers, the value of each ocular division can be determined, allowing precise measurement of cell structures.

Materials Required:

1. Compound microscope
2. Ocular micrometer
3. Stage micrometer (with known scale)
4. Prepared cell specimen slideFine adjustment knob
5. Distilled water
6. Tissue paper

Procedure:

1. **Calibration of Ocular Micrometer:**
    - Insert the ocular micrometer into the eyepiece of the microscope.
    - Place the stage micrometer onto the microscope stage and focus it under low power.
    - Align the scales of both micrometers and determine how many ocular divisions correspond to one stage micrometer division.
    - Calculate the value of one ocular division using the formula:

$$Value\ of\ one\ ocular\ divisions = \frac{Known\ value\ of\ one\ stage\ micrometer\ division \times Number\ of\ stage\ divisions}{Number\ of\ ocular\ divisions}$$

    - Repeat the procedure at 10x and 40x magnifications and record the calibration values.
2. **Measurement of a Cell:**
    - Place the prepared cell specimen slide on the stage.
    - Focus on the specimen using the calibrated ocular micrometer.
    - Count the number of ocular divisions covering the cell's length and width.
    - Convert the measured ocular divisions into actual size using the calibration factor obtained earlier.
    - Record the cell dimensions in micrometers (µm).

Observations:

Magnification	No. of Stage Micrometer Divisions	No. of Ocular Micrometer Divisions	Value of One Ocular Division (µm)
10x	10	50	2.0
40x	10	200	0.5

Cell Measured	Ocular Divisions	Actual Size (µm)
Epithelial Cell	25	50
Onion Epidermal Cell	40	80

Discussion: Standardization of the ocular micrometer ensures precise measurement of microscopic specimens. The calibration factor varies with magnification and must be determined for each objective lens. Using an adequately calibrated ocular micrometer, accurate cell measurements can be obtained.

Conclusion: The ocular micrometer was successfully standardized using a stage micrometer at 10x and 40x magnifications, and the size of the given cell specimen was measured accurately. This method is essential for biological and cytological studies requiring precise microscopic measurements.

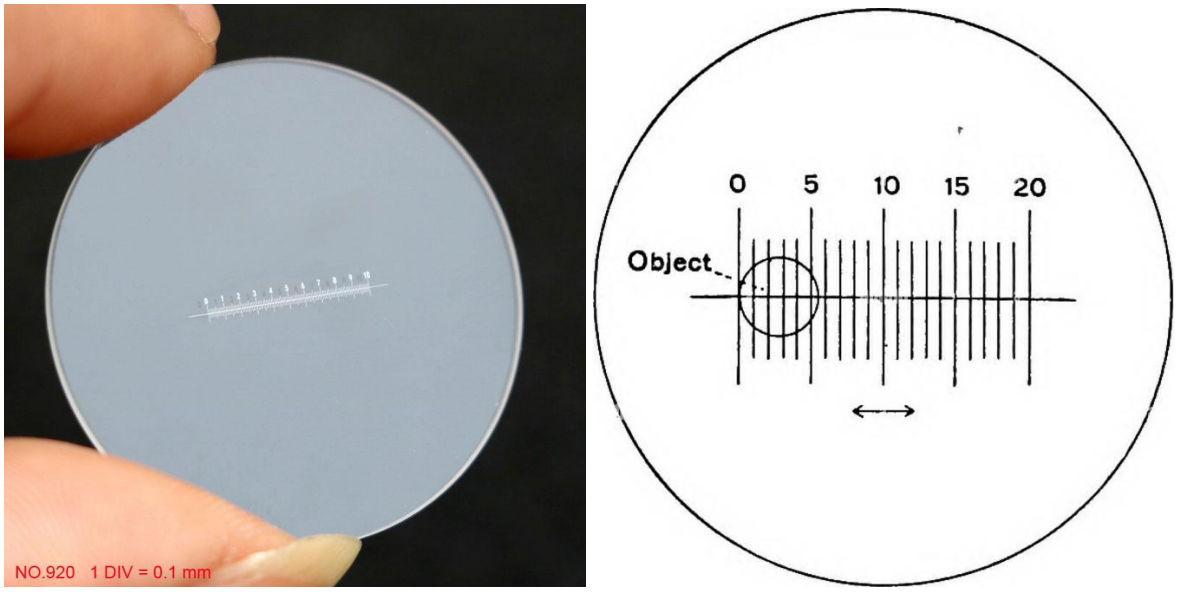

Figure 1: Ocular Micrometer

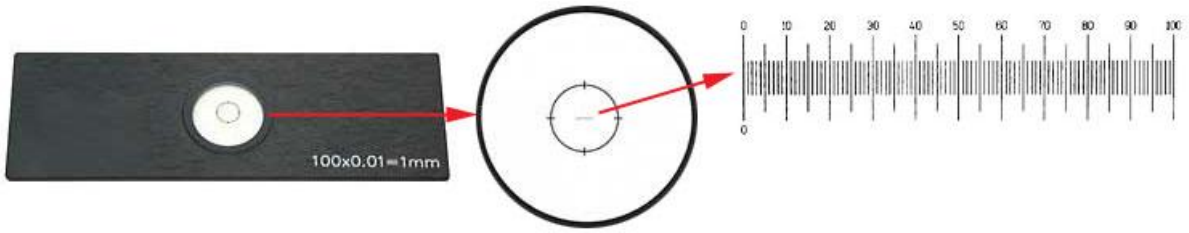

Figure 2: Stage Micrometer