

Polarity

Gradation of character along the axis from one end to the other

I. Introduction

The concept of Polarity was the starting point to understand the principles of differentiation, because the polar organization underlies specific three-dimensional structure of the organism and provides for the integrity and coordination of its functions.

The polarity axes are established at the stage of zygote, extending to the developing embryo, and they "vectorize" subsequent plant growth and development.

Polarization of cells and tissues is crucial for plant morphogenesis, because the emerging morphogenetic gradients provide the basis for differential

activity at various stages of plant growth and development.

1. Introduction

2. Persistence of Polarity

a) Polarity in external structure (axes of shoot & root)

b) Polarity in internal structure (determination of plane of cell division)
causative of phototropic stimuli.

c) Polarity in cell ^{actin filament} surrounded by microtubules ^{plasma} membrane

d) Polarity in coenobia (volvox)

3. Role of Physiology in Polarity

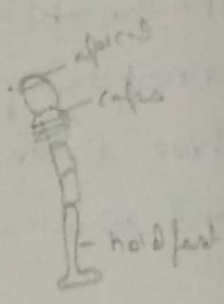
Polarity:- Gradation of character along the axis from one end to the other.

- Internal character
- Not genetic rather
- Acquired
- Acquisition on the basis of environmental character
- It is at level of organ, tissue, cell as well as at molecular level
- Polarity may be visible or invisible eg:- spirogyra
- Dictyostelium discoideum is connecting link between non-polarity to polarity.

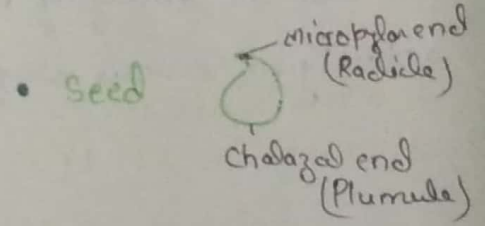
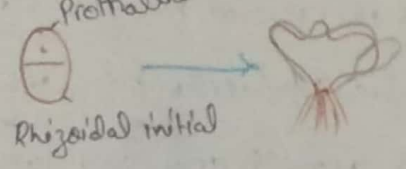
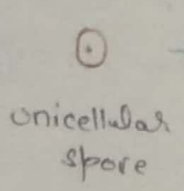
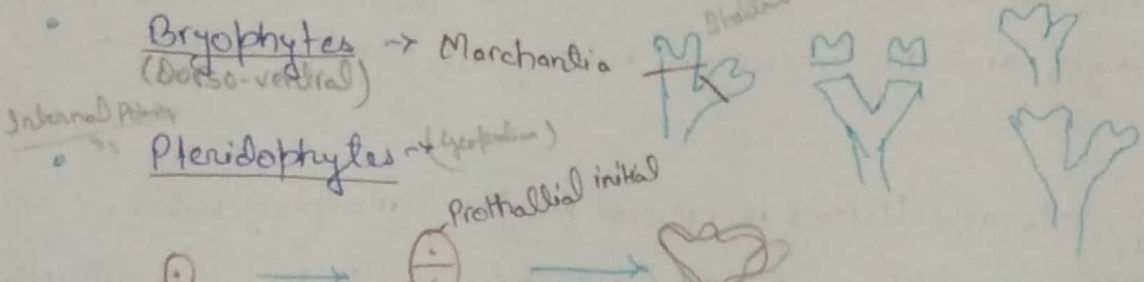


single cell stage of Dictyostelium discoideum is known as myxamoebae myxamoebae. It shows no polarity but during unfavorable condition it develops spore. spore consists of basal i.e. stalk and apical part i.e. fruiting body which shows polarity.

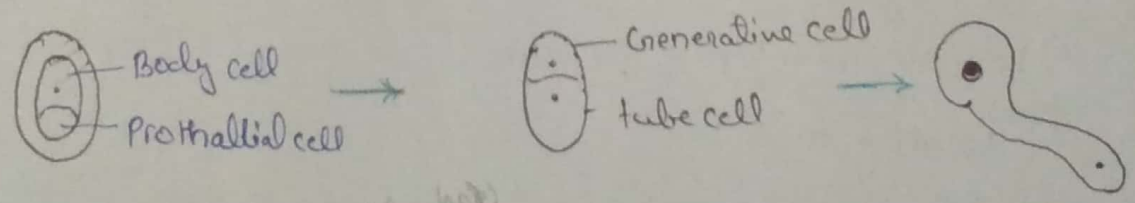
- Simple algae shows no polarity eg:- Dinoflagellate.
- Higher algae shows polarity like Oedogonium



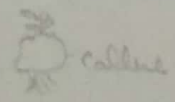
Fungi - spores of Rhizopus



Pollen grains



Callus - 6-Benzyl adenine (substitute of Auxin & cytokinin)



- Polarity is irreversible process affected by several environmental factors.
- Polarity development is combined action of water, hormones, light and gravity (seed germination).
 - auxin & cytokinin etc.
 - (short/long day plants)
- Light induced Polarity (phototropism) (gutt); phototaxis -> movement toward light.
- Polarity in ABC model
- Polarity in Agrobacterium (crown gall)