

# DEPARTMENT OF BIOTECHNOLOGY

## EXTENSION ACTIVITIES

### Session 2019- 2020

We consider three major duties of faculties of Higher Education,

1. **Teaching**
2. **Research, and**
3. **Extension Activities**

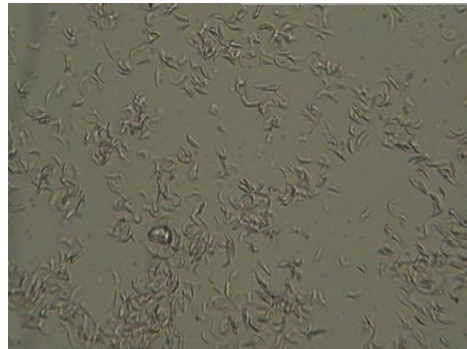
Under Extension activities our priority areas are-

- **Programme I**

Screening of prevailing hemoglobinopathy in our society, preferably, Sickle cell Anaemia, Glucose- 6- phosphate dehydrogenase deficiency etc. and to conduct mass awareness programme to prevent its further spread. Under this extension service we have already established one Sickle cell unit in our department which is serving people without any cost.



**Fig. 1 A showing Sick Cell Anaemia Screening Programme organized at Department of Biotechnology, Govt. V.Y.T. PG. Auto. College, Durg, Chhattisgarh.**



**Fig. 1 B Showing sickle-shaped RBCs.**

# DEPARTMENT OF BIOTECHNOLOGY

## EXTENSION ACTIVITIES

Session 2019- 2020

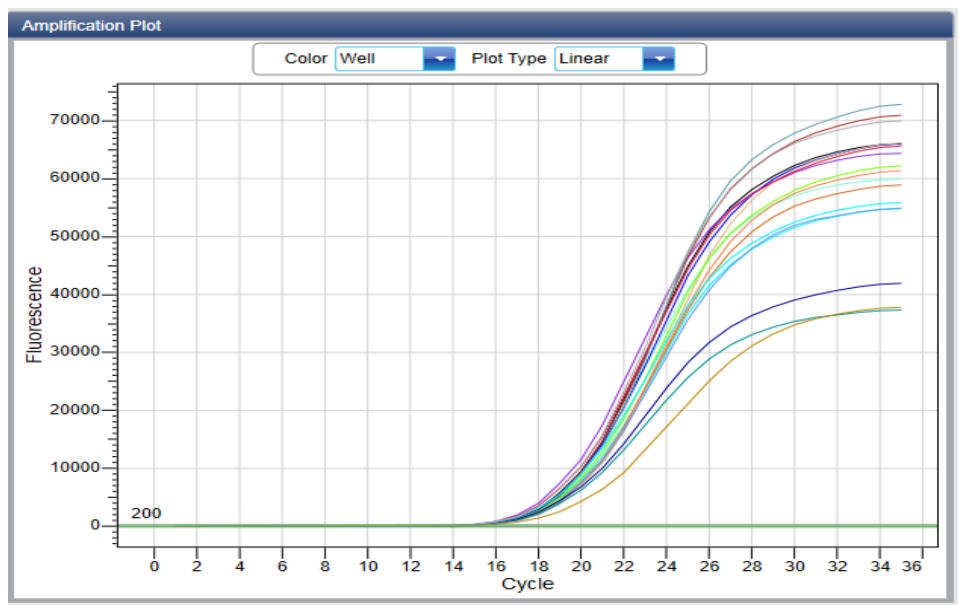
### ▪ Programme II

Detection of genetic diseases and variants from our society. Under this programme we have first time reported three new genetic variants (Mahidol, Chinese and Union) from human population of Chhattisgarh.

Besides, we are trying to establish major genetic variants from Chhattisgarh for Renal dysfunctions, Immunological disorders and hemoglobinopathy.



**Fig. 2 A** showing sample collection at Shahid Domeswar Sahu Government College Jamgaon (R) Bharar Dist. - Durg (C.G.) 491223

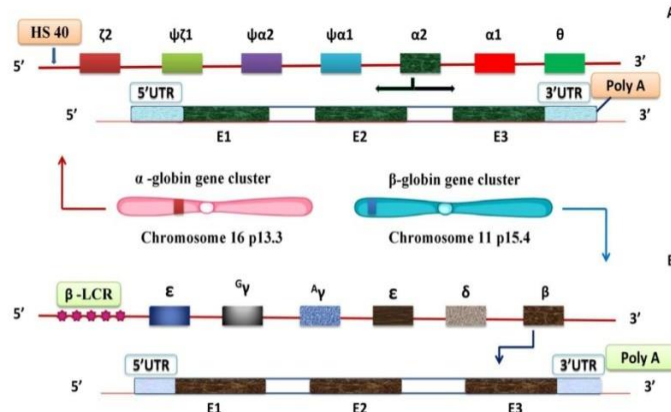


**Fig. 2 B** showing new genes, Mahidol, Union and Chinese have been reported from population of Chhattisgarh in a genomic study.

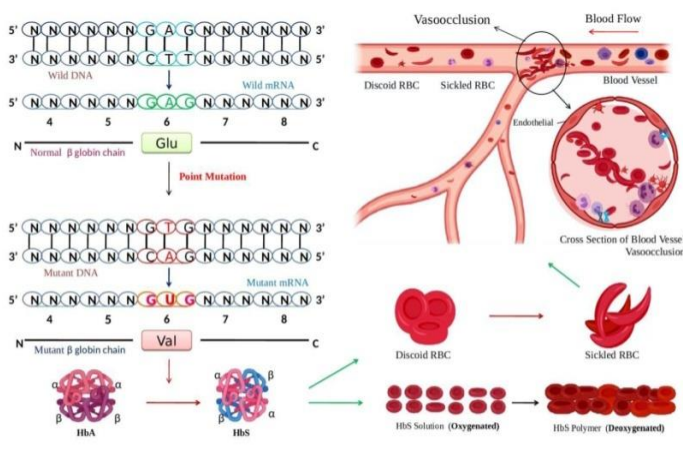
# DEPARTMENT OF BIOTECHNOLOGY

## EXTENSION ACTIVITIES

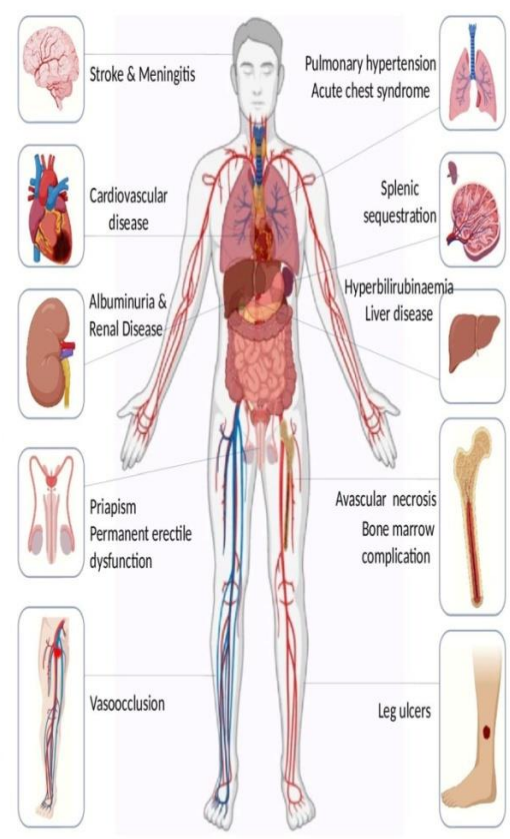
### Session 2019- 2020



**Fig. 1. Structural organization of the  $\alpha$  and  $\beta$  globin gene clusters.** The alpha gene cluster ( $\zeta$ ,  $\alpha 1$ , and  $\alpha 2$  along with pseudo-genes  $\psi\zeta 1$ ,  $\psi\alpha 1$  and  $\psi\alpha 2$ ) present on chromosome 16 p13.3. The beta gene cluster on chromosome 11 p15.4 with the  $\epsilon$ ,  $\gamma$  and  $\delta$  and  $\beta$  genes, arranged in the order of their developmental expression. HS-40 = Hypersensitive site-40,  $\beta$ -LCR =  $\beta$ -Locus control region (upstream regulatory elements).



**Fig. 2 - SCD and Vaso-occlusion.** A single nucleotide substitution (GAG→GTG) leads to the replacement of Glutamic acid with Valine in position 6 of the  $\beta$ -globin chain (HbS =  $\alpha_2\beta_2^{(S/S)}$ ) resulting in a mutant form of Hb known as sickle Hb (HbS). The Polymerization of deoxy HbS initiates the complication of disease by injuring the sickled RBCs. Upon deoxygenation, RBC change their shape from a healthy round disk to a crescent or sickled shape. The sickled cells are rigid, and stickier than normal, healthy cells, so they consequently may stick to each other and tend to form clumps that get stuck in the blood vessels and obstruct blood flow and leads to vaso-occlusion and painful. Neutrophils, platelets , vascular endothelial cells and various cell adhesion molecules participates in vaso-occlusive event.



**Other complications -** Acute & Chronic pain, Anemia, Inflammation, Ophthalmic complication, Infection & Bacterial Sepsis, Transient aplastic crisis, Multisystem Organ Damage, Haemolytic crisis and Oxidative Stress.

**Fig. 3. Pathophysiology of Sickle Cell Disease:** SCD can lead to various Acute and Chronic complications such as Pain, Inflammation and multiple organ damage etc.

**Fig. 2 C Impact of Sickle Cell Disease on different organs mediated through cytokine receptors: A Genomic Study.**

# DEPARTMENT OF BIOTECHNOLOGY

## EXTENSION ACTIVITIES

Session 2019- 2020

### ▪ Programme III

We are working under our extension programme for detection of heavy metals in our soil and water of the society and its adverse health hazard impact on human population. Under this programme we have detected Arsenic contamination from Ambagharh Chowki of Rajnandgaon District and have correlated its impact on human population. We are also expecting Fluoride contamination from near Orrisa- Chhattisgarh border and presently analysing for that.



**Fig. 3 showing Leucomelanosis in human populations of Kaurikasa Village of Chhattisgarh affected with Arsenicosis.**

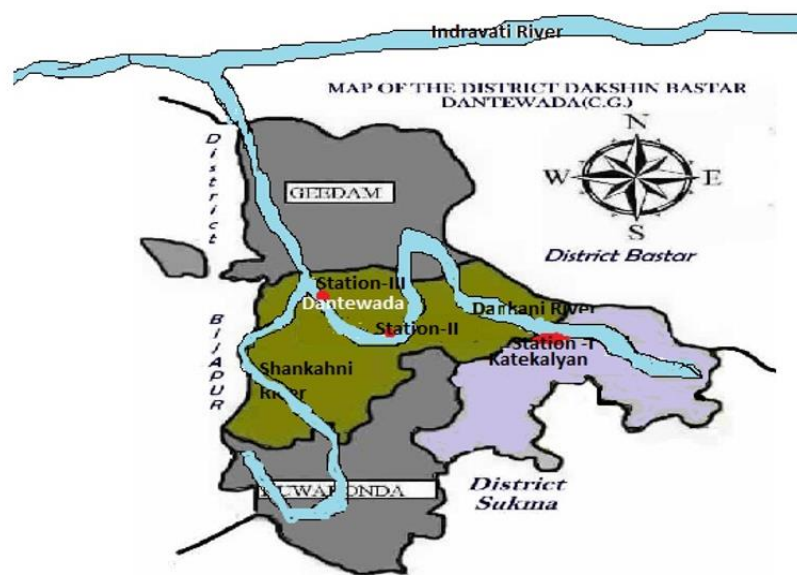
# DEPARTMENT OF BIOTECHNOLOGY

## EXTENSION ACTIVITIES

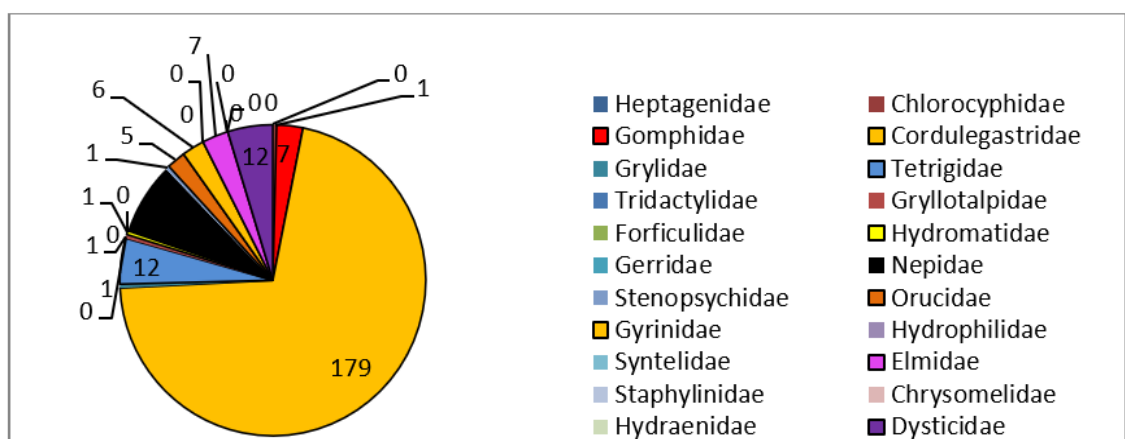
Session 2019- 2020

### ▪ Programme IV

Our next extension programme is environmental analysis and under this, we are analysing physiochemical and biological studies of water bodies (Rivers); and their related biodiversity.



**Fig. 4 A Showing Study area for Shankini-Dankani River in Dantewada District of Chhattisgarh**

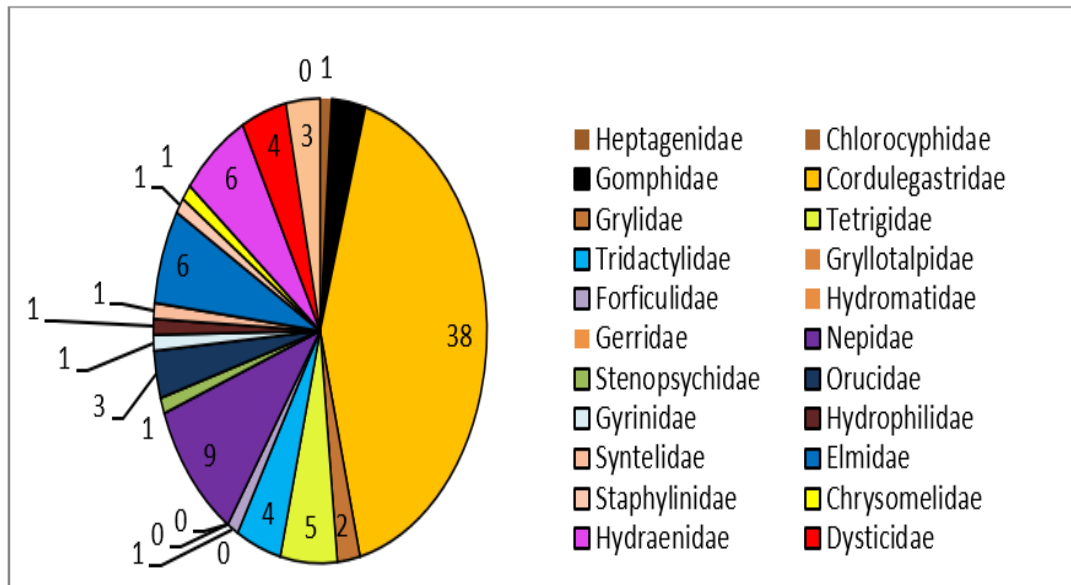


**Fig. 4 B Showing Insect Biodiversity from study station- 1 – Kodnar of Shankini-Dankini River**

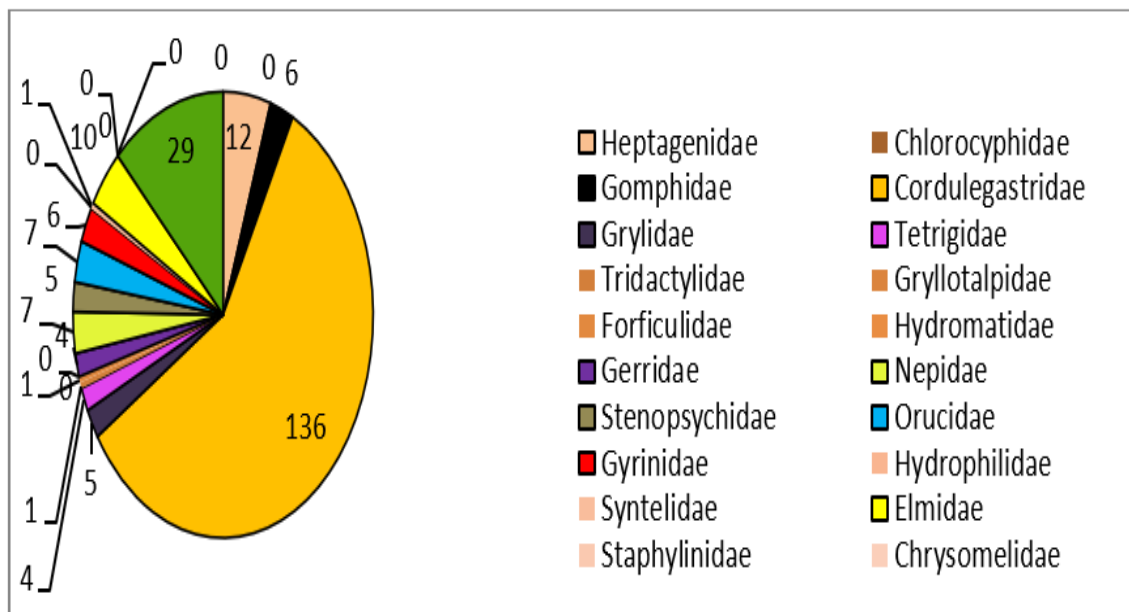
**DEPARTMENT OF BIOTECHNOLOGY**

**EXTENSION ACTIVITIES**

**Session 2019- 2020**



**Fig. 4 C Showing Insect Biodiversity from study station- 2 – Tenkar of Shankini-Dankini River**



**Fig. 4 D Showing Insect Biodiversity from study station- 3 – Lower Bridge of Shankini-Dankini River**

**DEPARTMENT OF BIOTECHNOLOGY**

**EXTENSION ACTIVITIES**

**Session 2019- 2020**



**Fig. 4 E Showing sample collection from Shivnath River**



**Fig. 4 F Showing pollution status of Shivnath River**

**DEPARTMENT OF BIOTECHNOLOGY**

**EXTENSION ACTIVITIES**

**Session 2019- 2020**



**Fig. 4 G Showing Insect collection from Shivnath River**