



Department of  
BioTechnology,  
Government  
of India

सत्यमेव जयते



PSGR Krishnammal College for Women



## **DBT BUILDER**

### **Boost to University Interdisciplinary Life Science Departments for Education and Research**

#### **The overall aim of this programme is to**

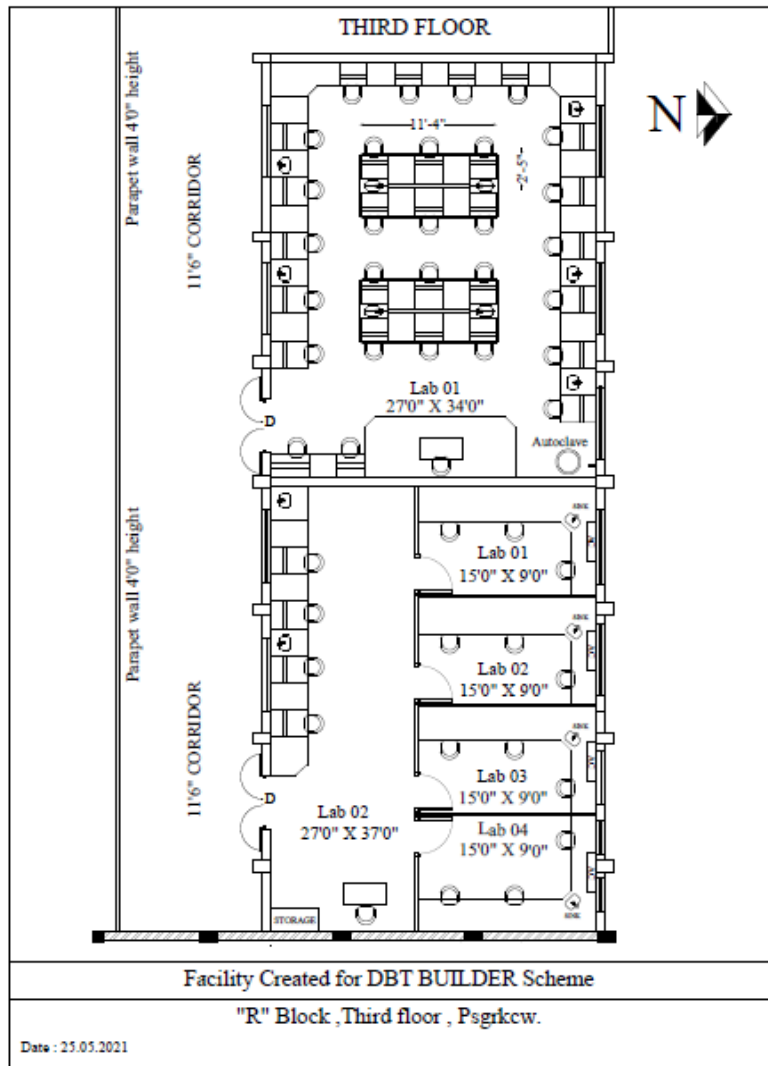
- establish interdisciplinary School of Life Sciences for advanced research and education in universities/ colleges
- develop world-class School of Life Science in advanced research and education.
- encourage interdisciplinary studies to improve ability of students towards critical thinking and to take up research in Biological Sciences integrated with Chemical and Physical Sciences, Bioinformatics, Machine Learning and Artificial Intelligence.

#### **DBT-BUILDER - PSGR Krishnammal College for Women - Interdisciplinary Life Science Programme for Advance Research and Education**

#### **Objectives of the programme are to**

- upgrade, modernise life science laboratories – teaching learning , research and skill enhancement training
- augment inter-disciplinary bioscience core research through inter-departmental and inter-institutional collaboration.
- extend Innovative research in Biotechnology(from discovery to market) through re-grouping research activities and training programmes
- increase the number of postgraduate students at M.Sc., Ph.D., and Postdoctoral levels with quality education, skills and research temperament is envisaged.
- bridge the gap between Academia and Industry resulting in public-private partnership to establish interdisciplinary and trans-disciplinary advanced Education and research
- create and promote young Bio-entrepreneurs with meaningful contributions towards Bioeconomy

## Builder Labs



## Equipment

- Floor Model High Speed Centrifuge – Avanti JXN 30
- NanoDrop One Microvolume UV-Vis Spectrophotometer with Wi-Fi
- Sanger's dna sequencer
- E-porator
- CO2 incubator with tc sensor
- PCR
- -20°C Deep freeze
- Laminar flow clean air Klenzaid
- Refrigerated Centrifuge
- Gel documentation
- Olympus -Fluorescence microscope-Model : cx-43
- High end Flow Cytometry
- Biorad gel documentation with software
- Shimadzu double beam Spectrophotometer

- Biohazard safety cabinet
- Remi refrigerated centrifuge
- Natsteel 5L/hr metal distilled water still
- pH meter
- Incubator
- Hot air oven
- Vertical Autoclave
- Mini Gel tanks and Fixed power packs
- Magnetic hot plate stirrer
- Binocular microscopes
- HP-Z240 tower workstation

### **Action plan**

- Initiation of research groups and collaboration with life science related R and D institutes and industries
- Research in Plant Exosome: Isolation of Plant-derived extracellular vesicles (exosomes), analysis of size, Imaging the exosomes, mi-RNA identification and mRNA sequence, Drug loading and Testing the efficacy in cells lines
- Research in Anticancer compounds, Antimicrobial peptides of plant origin, Biosensors, PGPRs, Antiviral drugs and Metabolic finger printing of Medicinal plants
- Training for faculty, students, technicians and scholars of PSGRKCW and other Institutions
- Presentation and publication of research findings
- Patenting
- Product development
- Laboratory to Market

### **Proposed Activities**

#### **Main Focus : Plant exosome studies**

- Plant Exosomes may be highly proficient in the development of next-generation biotherapeutic and drug delivery nanoplatfoms
- These plant-edible Exosomes are believed to be excellent candidates for the treatment of inflammatory diseases, cancers, and other diseases.
- It is anticipated that our present investigations will significantly contribute to the development of natural nano-medicines.

#### **Other Research Activities**

- Quantitative estimation of Bisphenol-A and Phthalate in eater samples and microbial degradation studies
- Synthesis of anticancer compounds from insect biomaterials for health
- Predicting the binding affinity of antimicrobial peptides with anti-cancer cells
- Rationale of phytoconstituents as antiviral drug
- Structural, Pharmacological and Molecular docking/Computational studies of

- biologically active heterocyclic based analogs and their metal organic frameworks
- Metabolic finger printing of the medicinal plants
- Theoretical study on Peptide Nucleic Acid systems
- Molecular Characterization of Me-LTP1- an antimicrobial protein of plant origin and evaluating its efficacy against plant pathogens under natural conditions
- Isolation and Characterization of Potential Plant Growth Promoting Rhizobacteria Associated with Orchid Roots and Microbial Production of Auxin
- Anticancer Studies in Selected Medicinal Plants
- Development and optimization of polymer and microbial based smart sensors using nanotechnology

### **Linkages**

- ICAR-Indian Agricultural Research Institute, Regional Station, Wellington (Nilgiris)
- Golden Jubilee Biotechnology Park for Women, Chennai
- Jawaharlal Nehru Tropical Botanical Garden Research Institute, Trivandram
- Indira Gandhi Centre for Atomic Research, Kalpakkam, Tamil Nadu
- Indian Institute of Science, Bangalore
- Indian Institutes of Science Education and Research, Trivandram and Thirupathi
- Indian Institute of Technology
- PSG-Science & Technology Entrepreneurial Park (PSG-STEP), Coimbatore
- Technology Business Incubator- Agribusiness Incubation Society (ABIS), Directorate of Agribusiness Development, Tamil Nadu Agricultural University, Coimbatore
- Institute of Forest Genetics and Tree Breeding, Coimbatore
- Sugarcane Breeding Institute, Coimbatore
- Centre for Environment & Development, Trivandrum
- Confederation of Indian Industry (CII)
- International Advanced Research Centre for Powder Metallurgy and New Materials
- Indian Space Research Organisation
- South India Textile Research Organisation, Coimbatore
- Central Electrochemical research Institute, Karaikudi
- ICT academy, Chennai
- The Arya Vaidya Pharmacy, Kanjikode, Kerala
- Vellore Institute of Technology, Vellore
- Bharathiar university, Coimbatore
- Nagaland University Central, Nagaland
- Mizoram University, Aizawl, Mizoram

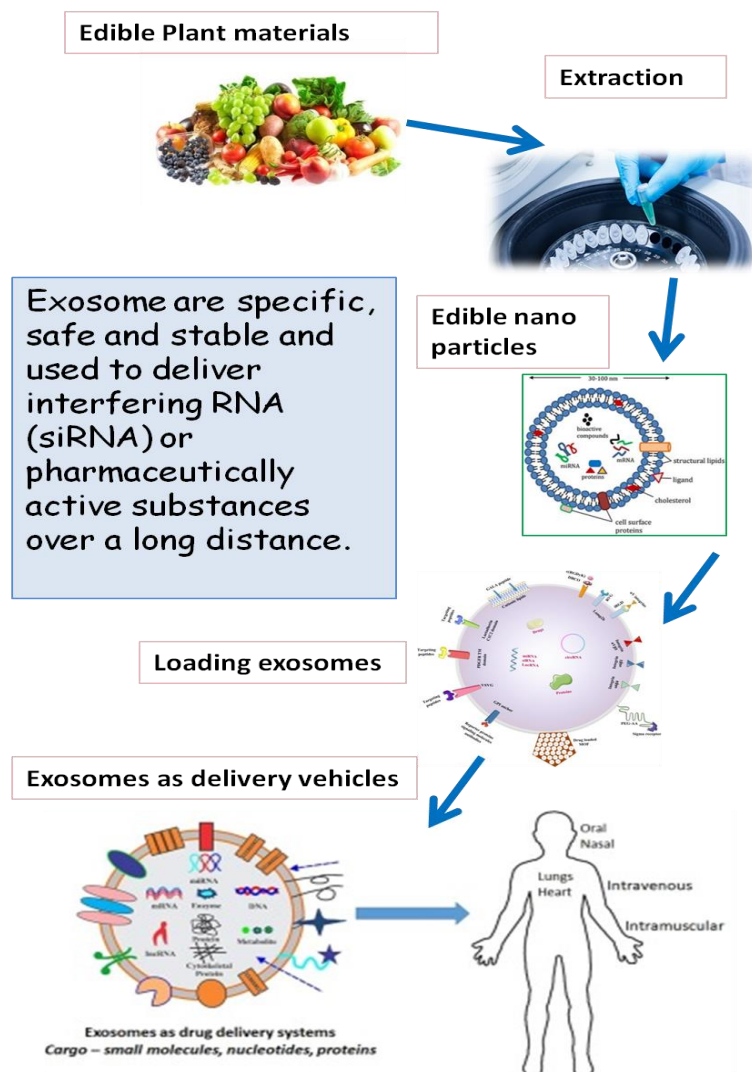
### **Outcomes**

- DBT BUILDER support will play a major role to create and promote young “Empowered Women”, fortify them with knowledge, skills and competencies to contribute through scientific research
- Hands on experience/ Workshops, Faculty Development Programmes in the Interdisciplinary areas of Life Science with Physical, Chemical, Mathematical and Computer Science will facilitate PG teaching and learning

- Students will be equipped with technical knowledge and skills relevant to pharmaceutical, health-care, agro, food and other biotech related industries, corporates, environmental sectors, research institutions and other regulatory agencies
- Support provided by DBT Builder on Interdisciplinary research will enhance the number of beneficiaries and also improves a strong network with other cluster colleges.
- PSGRKCW, with the support of DBT, would function as a Nodal Center to impart teaching and learning to academic and research institutions, industries (public private partnership) and society to foster Discovery, Innovation and Translation of Life Science, consistent with the Vision and Mission of DBT.

## Plant exosome studies

### Exosomes as drug delivery systems



### Project coordinators

Dr.K.S.Tamilselvi (Project coordinator 1 & Principal Investigator)

Dr.P.B.Harathi (Project coordinator 2 & Principal Investigator)