

## Annual Progress Report (2021-2022)

We are happy to share the achievements of GMERF for the year 2021-22. To start with, the training and academic short term research activities for undergraduate and post-graduate students continued with active research topics. We have conducted workshop on flow cytometry, renewed the SIRO-DSIR recognition till 2025, purchased new equipment to explore further, and presented various research achievements at national and international conferences by the faculty and the research students. Most importantly Dr. Lakshmi Kiran Chelluri received a prestigious project from DST-SERB POWER grant. The detailed information of the successful activities that took place during the year 2021-22 are as follows.

### 1. **Projects:**

- **On-going projects**

**Title:** Articular cartilage tissue construct by microfluidics in an organ-on-chip.

**Project funding:** DST-SERB POWER Grant (File No: SPF/2021/000126).

**Duration:** 2021 December - 2024 December (Three years)

**Principal Investigator:** Dr.Lakshmi Kiran Chelluri

**Research fellow:** Miss Upasna Upadhyay

**Key Findings:**

- The Human bone marrow derived mesenchymal stem cells (hBMSCs) differentiated chondrocytes extracellular matrix (ECM) compositional analysis on various biomimetic constructs, provided comparative understanding of native articular cartilage for mimicking *in-vivo* tissue
- The microfluidic system provided a platform for *in-vitro* culturing of cartilage-on-chip and characterizing its ECM components
- The LCMS compositional analysis provided more accurate characterization of ECM components for generating tissue-specific niche for culturing cartilage on chip

- **Projects accepted for evaluation (DST-SERB) under CRG program**

**I. Title:** Investigating the significance of Gut microbiome signatures in Liver Transplantation

**Principal Investigator:** Dr. Chandan kumar

**II. Title:** Role of Tip60 mediated Foxp3 in regulating Th17/Treg balance and post Transcriptional modifications in Rheumatoid Arthritis

**Principal Investigator:** Dr. K Prasanna Latha

- **Completed Projects**

**Title:** Cell Death Mechanisms in Infection and Inflammation

**Project funding:** Indo-US collaboration.

**Duration:** 2017-2020 (Three years)

## 2. National /International Conferences and workshops:

### *December 2022:* (Accepted)

- *Oral presentation:* **Upasna Upadhyay, Lakshmi Kiran Chelluri**, Saketh Kolla. Human articular cartilage tissue construct organ-on-chip using microfluidics system organized by STERMI –BIO-Remedi 2022 Translation for healthcare at International Conference on Biomaterials, Regenerative medicine and Devices. Conference dates: December 14- December 18, 2022  
Venue: IIT,Guwahati,Assam,India.
- *Poster presentation (Clinical Nutrition) :* **Naga Malleswari A.** Nutrition risk and Sarcopenia in Liver Disease: An Indian Perspective at 22<sup>nd</sup> annual conference of PENSA at Hyderabad
- *Oral Talk:* **Naga Malleswari A.** Fibers in long term EN feeding
- *Oral/Invited Talk (Hepatology):* **Sashanka.** Comparative study of Gut Microbiome Signatures in Cirrhotic and their healthy donors undergoing living donor liver transplantation” at New Delhi

### *November 2022*

- Poster Presentation: **Upasna Upadhyay, Lakshmi Kiran Chelluri**, Saketh Kolla. Human Native Articular Cartilage Extracellular Matrix Compositional Analysis in comparison to the Biomimetic Tissue Constructs at Microphysiological systems: Advances and applications in human-relevant research organized by EMBO.
- Lecture course and hands-on workshop organized by EMBO on fabricating and characterizing the PDMS devices for organ-on-chip using static and microfluidic platforms.  
Conference dates: October 31-November 4, 2022  
Venue: CSIR-IICT, Hyderabad,Telangana,India.
- Poster Presentation: Immunocon, **Chandra Shekhar, Lakshmi Kiran Chelluri** at PGIMER, Chandigarh

### *June 2022:*

- 2<sup>nd</sup> International Conference on Integrative Biology and Applied Genetics
  1. Oral Talk: Effect of FOXP3 genetic variants and regulatory role of CD4<sup>+</sup> and CD25<sup>+</sup> FOXP3<sup>+</sup> in Asthma Pathogenesis by **Dr. Prasanna Latha K**
  2. Poster presentation: Role of Gut microbiome signatures in patients with end stage liver disease and healthy donors of living donor liver transplantation by **Zulekha Mahween, Prasanna Latha K, Kondal Reddy, Chandan Kumar. K. and Lakshmi Kiran Chelluri**

### *March 2022:*

- Flow cytometer hands-on workshop conducted by BD FACS for three days (March 18-20, 2022) with number of participants enrolled: 11.

## 3. Students for Ph.D programme:

S.No	Name of candidate	Designation	Status
1.	Upasna Upadhyay	Research Fellow	To be enrolled
2.	Nishita	Research Assistant	To be enrolled

3.	Chandrashekar Mallarpu	Research Fellow	Perusing
4.	Sirisha D	Research Associate	Thesis submitted
5.	Priya	Research Associate	Thesis submitted
6. DNB Thesis submitted by <b>Kondal Reddy</b> . Study of Gut Microbiome signatures in Patients of End Stage Liver disease and healthy donors going for living donor liver transplantation-A single center Prospective observational study. June 2022 Supervisor: <b>Dr. K. Chandan kumar</b> ; Co-Guide: <b>Dr. Lakshmi Kiran Chelluri</b>			

#### 4. List of Publications:

1. Soujanya Ganta, **Prasanna Latha Komaravalli**, Shazia Ahmad, Suman Latha Gaddam Influence of genetic variants and mRNA expression of Interleukin IL-17A gene in Asthma susceptibility. (Accepted, Ref. No.:GENEJOURNAL-D-22-01817) 2022
2. Vangara S, Kedarisetty CK, Mogili KR, Chelluri LK, Burra NG, Latha P. Comparative Study of Gut Microbiome signatures in cirrhotics and their healthy donors undergoing Living Donor Liver Transplantation. Journal of Clinical and Experimental Hepatology. 2022 Jan 1;12:S49-50.
3. Joshi L, Chelluri LK, Gaddam S. Cytokine production and polymorphisms in the IFN gamma, IFN gamma R1 and IL12 genes. Polymorphism. 2021 Jan 25;7:1-2.
4. Chelluri LK, Mohanram Y, Jain R, Mallarpu CS, Ponnana M, Kumar D, Venuganti VV, Kancherla R, Papineni RV, Towner R, Ghosal P. Effect of engineered superparamagnetic iron oxide nanoparticles in targeted cardiac precursor cell delivery by MRI. Biochemical and Biophysical Research Communications. 2021 Feb 19;541:15
5. Mallarpu CS, Ponnana M, Prasad S, Singarapu M, Kim J, Haririparsa N, Bratic N, Brar H, Chelluri LK, Madiraju C. Distinct cell death markers identified in critical care patient survivors diagnosed with sepsis. Immunology Letters. 2021 Mar 1;231:1-0.

#### 5. List of Academic Project list at GMERF (2021-2022)

##### BATCH 1

##### List of Project Titles of UG Student (St. Francis College for Women/ St. Ann's UG Project Title)

##### (Dec 2021- Mar 2022-Microbiology)

- Testing of Serum Biomarkers for the diagnosis of Rheumatoid Arthritis
- Diagnosis of Cytomegalovirus (CMV)
- HAIN'S Test in Suspected Multidrug Resistant TB Patients
- Drug Metabolism and CYP3A5 genotypes in Liver Transplant Patients
- Effect of Microbes on Locally Fermented beverages (St. Ann's UG)

**BATCH 2 (Feb- Aug, 2022) GENETICS (Shadan Degree and PG College for women)**

- Detection of viral load by Q-RT-PCR in HBV Infected Patients
- HAINS Test in Suspected Multidrug resistant TB Patients
- Factor V Leiden Mutation Detection in Cardiac Transplant Patients
- Gene Expression of Collagen II in articular cartilage
- Gene Expression of Aggrecan gene in Cartilage Tissue
- Hepatitis C- Virus Quantification by RT-PCR
- Factor V Leiden R506Q Mutation Detection R506Q Mutation Detection and risk of Thrombosis in cardiac Transplant Patients
- Gut Microbiome in Living Liver Transplant Patients
- Association of CYP3A5 Polymorphism in Liver Transplant Patients Receiving Tacrolimus Drug
- Detection of viral load in Hepatitis C virus infected Patients by Q-RT-PCR
- Association of IL-17 Gene Polymorphism in Rheumatoid Arthritis
- 16s RNA Sequencing to detect Gut Microbiome signatures in LT Donors and Recipients
- Screening for FOXP3 Gene polymorphism in Rheumatoid Arthritis

**BATCH 3 (Aprl – Jun, 2022) BIOTECHNOLOGY (KOTI WOMEN'S COLLEGE)**

- Flow cytometric determination of intracellular collagen type 1 in Articular cartilage.
- Estimation of Aggrecan gene expression using western blotting.
- HLA Genotyping in liver transplant patients using a PCR-SSOP-LUMINEX Method.
- Flow cytometric analysis of intracellular levels of EC protein laminin using chondrocytes.
- Collagen type 1 Gene expression in chondrocytes by western blotting.
- Identification of Lymphocyte cross match in renal transplant through flow cytometry technique.
- Role of Anti-CCP (cyclic citrullinated protein antibodies) in predicting disease severity in rheumatoid arthritis.
- Estimation of mRNA Transcript levels of interleukin 17A cytokine and Th17 cell proportion in asthma patients and controls.

**BATCH 4 (Jun- Aug, 2022) Biochemistry (Shadan Degree and PG College for women)**

- Detection of Donor specific antibody and HLA genotyping in kidney transplant by LUMINEX
- Detection of Procalcitonin levels by ELISA and Viral Load by RT-PCR in CMV Patients.
- Estimation of PCT among Post Liver Transplant Patients using ELISA technique
- Association of IL-17 Cytokine Polymorphism in Asthma Susceptibility- A case control Study
- Detection of viral load by RT-PCR-A best predictor of the disease Progression in HIV Patients
- Role of IL-17 Genetic Polymorphism in the Premature Ovarian Failure Pathogenesis
- RNA Viral Load CD4<sup>+</sup> T- Lymphocyte count and Antibody response I HIV-1 Infected Patients.
- DNA Typing of HLA-A, B & DRB1 loci by a PCR-SSOP Luminex method in Liver Transplantation.

**BATCH 5 ( JULY-OCT, 2022) BIOTECHNOLOGY (LOYOLA COLLEGE)**

- Detection of M.Tuberculosis Positives by RT-PCR followed by HAIN'S Test
- Selection of Donor by Flow cytometry crossmatching (FCXM) in renal Transplantation
- Impact of Regulatory role of FOX P3 gene polymorphism in Liver Transplant patients
- Association of MTHFR Exon 4 (C677T) Variant (rs1801133C>T) with Fragile-X Associated Tremor Ataxia Patients
- Role of IL-17 Gene Polymorphism (-197 G>A) in Asthma Pathogenesis

**BATCH 6****NOV 2022-JAN 2023**

- Ongoing –Shadan Degree and PG College for women - Microbiology-03 /Genetics-01 students
- MNR PG & Degree College- Microbiology- 01 student

**Overall Academic Projects:** Total 45- PG students (3 batches) / UG students-12

**6. Collaborative courses offered at GMERF:**

- Nutritional Internship courses : Total 88 students (Jan-Nov 2022)
- Pharm D courses in collaboration with Avanthi Degree and PG College and Sree Dattha Institute of Pharmacy college:  
Total 54 students: Duration of 3 and 9 months

**7. New equipment purchased:**

- RT-PCR (Qiagen make)
- COLD CENTRIFUGE (Remi make)

**8. 9<sup>th</sup> Foundation Day Organised:** On 17<sup>th</sup> Nov, 2022, we have organised the events and we had two virtual guest lectures by two eminent speakers.

1. Analysis of Human Microbiome by Next Generation Sequencing in Human Health and Disease Pathogenesis **Dr. Anuradha. U**, PhD (Founder, GeneTech)
2. Sepsis Marks the Markers of Immune Response by **Dr. Charitha Madiraju**, PhD (Asso. Professor Biomedical Sciences, Marshall B. Ketchum University, CA)

**9. MoU Renewal:**

- DSIR certificate renewed for 3 years with validity till Mar, 2025