

## Details of the Collaborative Activities under Functional MoUs/linkages

**Collaborating Institute:** Bhat Bio-Tech India Private Limited, Bangalore

**Month and Year of MoU:** 2017

### Activities

#### 1. Joint Research Project

Title: Development of early diagnostic assay of renal cell carcinoma using urinary proteomes was formulated jointly by Dr Shobha D, Dr Mujeeburahiman, Dr TS Keshava Prasad, YRC and Dr Sham Bhat from Bhat Biot-Tech India Pvt. Ltd. The same was submitted to Sree Padmavathy Venkateshwara Foundation for funding.

ATTESTED


Dr. Mangadhara Somayaji KS  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

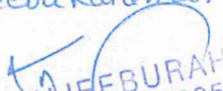
Certificate from the Investigators

**Project Title: Development of early diagnostic assay for renal cell carcinoma (RCC) using urinary proteomics**

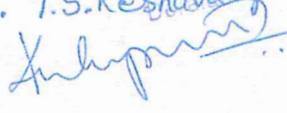
It is certified that

1. The same project proposal has not been submitted elsewhere for financial support.
2. We/I undertake that spare time on equipment procured in the project will be made available to other users.
3. We/I agree to submit a certificate from Institutional Biosafety Committee, if the project involves the utilization of genetically engineered organisms. We/I also declare that while conducting experiments, the Biosafety Guidelines of Department of Biotechnology, Department of Health Research, GOI would be followed in toto.
4. We/I agree to submit ethical clearance certificate from the concerned ethical committee, if the project involves field trails/experiments/exchange of specimens, human & animal materials etc.
5. The research work proposed in the scheme/project does not in any way duplicate the work already done or being carried out elsewhere on the subject.
6. We/I agree to abide by the terms and conditions of SERB grant.

Name of Principal Investigator : **Dr. Shobha D**  
Signature of Principal Investigator:   
Date: **08-03-2021**  
Place: **Mangalore**

Name of Co-PI : **Dr. Mujeebu Rahiman**  
Signature of Co-PI:   
Date: **08-03-2021**  
Place: **Mangalore**


**Dr. MUJEEBURAHIMAN**  
KMC Reg. No. 96885  
Professor & HOD, Dept. of Urology  
Yenepoya Medical College  
Mangalore-575018

Name of Co-PI : **Dr. T.S. Keshava Prasad**  
Signature of Co-PI:   
Date: **08-03-2021**  
Place: **Mangalore**

**ATTESTED**

  
**Dr. Gangadhara Somayaji KS**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

Name of Co-PI : **Dr. Shama Bhat**  
Signature of Co-PI:  
Date: **08-03-2021**  
Place: **Bangalore**





## **Title: Development of early diagnostic assay for renal cell carcinoma (RCC) using urinary proteomics**

### **Origin of the Proposal: (Maximum 1 page)**

Renal cell carcinoma (RCC) is also called kidney cancer is one of the 10 most common cancers found in adults. Although it's a serious disease, finding and treating it in early stage makes it more likely that it will be cured. The diagnosis of RCC starts from the physical exam following with laboratory tests and imaging. Many RCC patients remain asymptomatic until they have an advanced stage disease (4). Small kidney tumors cannot be seen or felt during a physical exam. The routine tests using urine (urinalysis) and blood analysis may provide some indications about kidney cancer. This profile sometimes overlaps with the other diseases such as urinary tract infections. Sometimes people do not show any symptoms until the cancer is quite large and might have spread to other parts of the body. Ultrasound is less expensive and can detect some early kidney cancers but it cannot differentiate benign tumors from small renal cell carcinomas. Computed tomography (CT) scans and magnetic resonance imaging (MRI) scans can often find small kidney cancers, but these tests are expensive.

Tissue biopsy is a routine procedure carried out by clinicians to examine the histopathological and molecular characterization of a tumor for diagnosis and prognosis. However, tissue biopsies are considered an invasive procedure. Until today, there are no recommended screening tests for kidney cancer in early stage. Therefore, it is an immense requirement of identification of biomarkers for early detection. In this context, high-throughput mass spectrometry based proteomic approach is a key development for the detection of early specific cancer biomarkers. An important approach to early detection of RCC is to identify biomarkers in the body fluids. Utilizing biological fluids as a liquid biopsy would offer a non-invasive or minimally invasive strategy to monitor disease progression and possibly be more representative of the molecular features associated with tumorigenesis [5]. The urine profiling may provide the mirroring of the physiological status of kidney of an individual. Relative to plasma, urine has a narrower range of protein concentration, and the reduced high abundant proteins, such as albumin, transferrin, and haptoglobin, which allows the detection of low abundant proteins in urine [6, 7]. With respect to the malignancies related to kidney, urine may be considered an ideal biological fluid that may offer a richer source of proteins of interest. With the ultimate goal of identifying potential candidates for disease diagnosis and early detection of RCC, we wish to carry out urinary proteomics in control and diseased conditions using high throughput mass spectrometry based proteomic approach. The identified dysregulated highly immunogenic proteins (4 to 6 proteins) will be used for the development of MRM assay using synthetic peptides from the vendors. MRM assay will be developed using a standard calibrated concentration curve obtained for synthetic peptides in aqueous solutions. Thereafter, the MRM assay will be tested against synthetic peptides spiked in normal urine samples and MRM assay will be optimized for sensitivity of detection or detection limit in the urine. This assay will be carried out with our mass spectrometry core facility. The validated immunogenic proteins will be used for the development of lateral flow assay kit using monoclonal and polyclonal antibodies with industry partner (Bhat Biotech India Pvt Ltd, Bangalore). This point-of-care testing system will be capable of providing a complete "sample-to-answer" solution in a single step.

Dr. Jangadhara Somayaji K S  
Rector  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

## 2. Review of status of Research and Development in the subject

### 2.1 International Status: (Maximum 2 pages)

With an estimated incidence of 403,000 people a year are diagnosed with neoplasms of the kidney, constituting 2.2% of all cancer diagnoses with two thirds of cases are diagnosed in males [8]. According to GLOBOCAN statistics report, mortality of 175,000 people from kidney cancer in 2018, which constitutes 1.8% of global cancer deaths. Multiple studies have been reported based on the protein profiling of tissue samples of RCC to identify differential expressed protein profiles comparing with normal adjacent tissues using different proteomic approaches, followed by immunoblotting or immunohistochemical validation in an independent sample (9; 10; 11; 12; 13). However, tissue biopsies are considered an invasive procedure and may not be fully representative of the tumor due to the limited sampling area (14). Using biological fluids such as blood, urine, interstitial fluids would offer a minimally invasive, low risk, rapid and high throughput procedure. The liquid biopsy can be easily repeated if needed and can be used as often as necessary to monitor the patient's progress (5). Mass spectrometry (MS)-based proteomic approaches are well-suited for unveiling the complex molecular events of tumorigenesis and identification of cancer biomarkers (15).

Of the multiple biological fluids found in the human body, blood and urine are often considered to be the ideal source for the identification of protein candidates. In the case of malignancies associated with the kidney, urine is a proximal biological fluid that may offer a richer source of proteins of interest relative to blood. Compared to plasma, urine has narrower range of proteins and reduced amount of high abundant proteins. It allows the detection of low abundant proteins (6, 7). The composition of urine including urea, inorganic salts, and other biomolecules along with the proteins presents a challenge in the proteomic sample processing, however, many techniques have been developed to enrich proteins from urine (16; 17; 18).

Sandim et al carried out urinary proteomics in patients with clear cell renal cell carcinoma (ccRCC), using mass spectrometry-based methods. They performed in three groups, i.e, control group (CG), good prognosis (GP) and poor prognosis (PP) and identified a total of 354 proteins. Proteins such as kininogen-1, uromodulin, apolipoprotein D, polyubiquitin, and CD59 glycoprotein were down secreted in CG compared to GP and PP. In contrast, apolipoprotein A, fibrinogen, and haptoglobin were upregulated in patient groups compared to control (19). N-glyco-FASP-based method was used for urinary N-glycoproteomics of clear cell renal cell carcinoma (ccRCC) patients at different stages and identified some altered expressions in N-glycoproteins. Among them, CD97, COCH and P3IP1 were upregulated and APOB, FINC, CERU, CFAH, HPT and PLTP were downregulated in ccRCC patients, which were directly related to stage progression (20).

Urinary proteomics have also performed to differentiate ccRCC patients from other renal disorders such as VHL disease (VHLD). The study by Mandili et al (2019) identified 10 differentially expressed proteins. Among these, two proteins such as alpha-1-antitrypsin (A1AT) and APOH (beta-2-glycoprotein-1) were overexpressed in the urine of VHLD patients with a history of ccRCC. The study suggested A1AT and APOH could be promising non-invasive biomarkers of renal cancer in von Hippel-Lindau patients (21). Urinary proteomics in four groups including renal oncocytoma, progressive ccRCC, non-progressive ccRCC and healthy controls identified 131 dysregulated proteins healthy controls and early stage ccRCC patients. Of these, six proteins such as GLRX, CST3, SLC9A3R1, HSPE1, FKBP1A, and

EEF1G showed upregulation in early stage ccRCC patients relative to healthy controls. This suggested the diagnostic and prognostic utility of urinary protein markers for early-stage renal tumors (22). The study by Han et al reported that Human kidney injury molecule-1 (hKIM-1) expression was significantly higher in urine of ccRCC patients compared to the control. This suggests that may serve as a new biomarker for early detection of RCC (23).

## 2.2. National status

The investigation of spectrum of RCC in India with regards to age of onset, stage at presentation and survival was performed and observed that in India, more and more patients are presenting at a younger age and in advanced stage of the disease (24). Choudhury et al (2015) compared the master images of 2D electrophoretic pattern of proteome of control and clear cell RCC patients with image analyzer and found 85 protein spots in follow-up sample compared to 118 spots in urinary sample of clear cell RCC patients & 15 protein spots were found to be similar. But they could not be validated with this method and they suggested that this study may form the basis for future direction for analyzing urinary proteins for a reliable biomarker in RCC (25). Each of the diagnostic methods diagnoses RCC at an advanced stage of RCC, when tumor becomes metastatic. The advanced molecular techniques in the few decades have increased our ability to identify molecular and genetic abnormalities in diseases, which help in search of potential biomarkers. To date, no standard approaches to biomarker sampling or analysis have been adopted for RCC diagnosis as many of the putative tumor markers themselves are still under active investigation. Potdar and Sen (2017) successfully isolated, enumerated, and molecularly characterized CTCs from liquid biopsies of different metastatic cancer patients. Molecular profiling of CTCs and whole liquid biopsies clearly indicated the expression of metastatic genes and adhesion molecules involved in the metastatic process (26).

A comprehensive urinary proteome map was performed at using Orbitrap mass spectrometer at Institute of Bioinformatics, Bangalore. They identified a total of 1823 proteins, of which 671 proteins have not been previously reported in urine. The overexpression of proteins such as heat shock 70 kDa protein 8 (HSPA8), annexin A4 (ANXA4), tubulin beta (TUBB2C), 14-3-3 beta (YWHAB) in formalin-fixed paraffin-embedded samples of ccRCC (27), which were reported earlier was also detected in the urine. The study reported that this data may serve as a reference list for future studies in the identification and characterization of urinary biomarkers for various diseases (28).

  
ATTESTED

Dr. Gangadhara Somayaji KS  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Derlakatte  
Mangalore 575 018, Karnataka.

### **2.3. Importance of the proposed project in the context of current status (Maximum 1 page)**

Renal cell carcinoma is the most common type of kidney cancer accounts for 2% of global cancer diagnoses and deaths worldwide. When symptomatically diagnosed, renal cancer has already metastasized to lymph nodes or other organs in 30% to 40% of patients. Additional 20–30 % develops metastases within a period of months or years after nephrectomy. A key challenge in cancer medicine is to detect the disease as early as possible to allow the maximum chance of early therapeutic intervention. The substantial progress has been made in the field of identification of early potential biomarkers for different types of cancer including RCC in the past few decades. The early detection of RCC can significantly reduce cancer mortality and saves lives. But until today, no biomarker has been established as an “ideal” cancer screening tool for the early diagnosis. The current scenario necessitates the need for the identification of early detection markers and thereby improves clinical outcomes. Although there are numerous studies reported for the identification of candidate biomarkers, yet none have been evaluated along each phase of the biomarker pipeline for successful adoption into clinical practice.

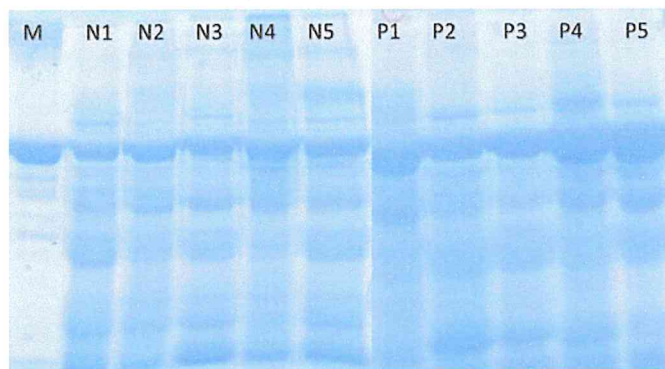
Under the diseased conditions, the variations in gene expression, alternative splicing and posttranslational modifications reflects the changes of proteome profiles in the whole protein content of cell, tissue, or an organism, as well as of different bodily fluids. As the urine represents a reflection of serum composition and kidney function, as well as a source of most of the plasma proteins, urine could actually be a quite accurate and specific diagnostic and prognostic tool for kidney cancer. Though the protein concentration of urine is 1000 fold lower than the plasma, non-invasive accessibility of urine and simplicity of sampling makes it very convenient diagnostic source. The team at CSBMM led by Dr. Keshava Prasad has over 15 years of experience in the field of OMICs-based studies with a primary focus on identifying biomarkers and therapeutic targets for cancers and infectious diseases. Therefore, we are in an ideal position to undertake this study. A successful outcome of this study will result in the development of MRM assay with our core mass spectrometry facility, which aid in the early detection of RCC with the cost from Rs. 1500 to 2000 like how screen and diagnose the inborn errors of metabolism in children using MS. The validated highly immunogenic proteins will be used for the development of lateral flow assay by outsourcing. The development of MRM assay and lateral flow kit can aid in the early diagnosis of RCC using urine. This study also helps in the development of point-of-care early diagnosis and individualized treatment of RCC by non-invasive and convenient tests in the future. It helps to provide the most appropriate therapy to the patient in the early stage.

### **2.4. If the project is location specific, basis for selection of location be highlighted:**

Not applicable

ATTESTED  


Dr. Jangadhara Somayaji KS  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.



BSA - Standard; N1 to N5 (healthy samples); P1 to P5 (patient samples)

Fig 1. Normalized gel image showing patterns of protein expression in urine of healthy and patient samples (AKI)

### 3.2 Time Schedule of activities giving milestones through BAR diagram.

	Year 1				Year 2				Year 3			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Identification of potential urinary peptide signature associated with renal cell carcinoma using proteomics												
Validation of identified signature and development of MRM assay												
Development of lateral flow assay kit using monoclonal and polyclonal antibodies from outsourcing												

ATTESTED

Dr. Gangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

#### 4. Expertise:

##### 4.1 Expertise available with the investigators in executing the project

###### **The expertise of Dr. Shobha D**

Dr. Shobha D. obtained her Ph.D in Plant Molecular Biology from Mangalore University. After completion of her Ph.D, she worked as Post-Doctoral Fellow at Department of Medical Microbiology, Faculty of Medicine University of Malaya, Kuala Lumpur, Malaysia. Currently she is working as Scientific Officer/Assistant Professor. She is involved in the identification of potential biomarkers and therapeutic targets by using high-throughput technologies in genomics and proteomics in various diseases including cancer. She is well trained in performing proteomics and phosphoproteomics sample preparation and data analysis

###### **The expertise of Dr. T.S. Keshava Prasad.**

Dr. T. S. Keshava Prasad is the Professor and Deputy Director of Yenepoya Research Centre. He has successfully established proteomics and bioinformatics facilities and research teams in three Institutes – i) Institute of Bioinformatics, Bangalore; ii) National Institute of Mental Health and Neurosciences, Bangalore; and iii) Yenepoya Medical College (deemed to be University), Mangalore. His research group is now increasingly focusing on genomic, proteomic, and metabolomic approaches to investigate cancer, infectious diseases and neurological diseases. He is collaborating with several clinicians and basic researchers in India and abroad. He has published more than 175 research articles in reputed journals. He also discovered and provisionally patented diagnostic- and community screening –utility of antigens of malaria excreted into the urine of malaria patients, which is being taken up for translation in the form of the point-of-care device using lateral flow assay.

###### **The expertise of Dr. Mujeebu Rahiman**

Dr. Mujeebu Rahiman is the professor in the department Of Genitourinary Surgery & Renal Transplant & Robotic surgery, Yenepoya Medical College Hospital, Deralakatte, Mangalore. He was awarded the "Best Doctor Award" from Indian Medical Educational Trust in 2006. He is the Founder Chairman of "Prostate Care Foundation", Mangalore. He is competent in endourological procedures, open surgeries, laparoscopic surgery and renal transplantation. He has collaboration with Yenepoya Research Centre with many clinical projects related to urology. His main collaboration with us on the work 'establishment of isolation and characterization of circulating tumor cells in RCC'.

###### **The expertise of Dr. Shama Bhat (Bhat Biotech Pvt Ltd)**

Dr. Shama Bhat is the Chairman and Managing Director of Bhat Biotech Pvt Ltd. He is also the Founder Director of Navachethan Retirement Residency (P) Ltd. He has more than 35 years of rich experience in R&D and manufacturing in the Biotechnology area, to conceive this enterprise. His organization is specialized in the design development, manufacture and marketing of diagnostic products and Biotechnology based products. Diagnostic test devices for various types of tests like, Pregnancy, HIV, Hepatitis, Malaria, Dengue, Chikungunya, Swine Flu (H1N1), Syphilis, TB, Cardiac Markers, Dry Chemistry, Bio-Chemistry, Haematology & Immunology and ELISA`S used in the analysis of body fluids in human. They are expertise in diagnostic kit development and keep on upgrading technologies according to the latest developments.

Dr. Gangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.



#### 4.2 Summary of roles/responsibilities for all Investigators:

Sl. No.	Name of the Investigators	Roles/Responsibilities
1	Dr. Shobha D	Design of the experiment, sample collection, sample preparation for proteomics, LC-MS/MS analysis, data analysis, validation experiments, development of lateral flow assay kit along with an industry partner, manuscript writing
2	Dr. Mujeebu Rahiman	Designing the clinical cohorts for samples, Providing the clinical samples and sample details, manuscript writing, validating the POC assays in the clinical setting
3	Dr. T.S. Keshava Prasad	Helping Dr. Shobha in the design of experiments, LC-MS/MS analysis, critical inputs for proteomic data analysis, monitoring the progress of lateral flow assay kit development with the industry partner,
4	Dr. Shama Bhat Bhat Biotech Pvt. Ltd	Generation of antibodies, optimization, stability assay, preparation of proof of principle lateral flow assay kit

#### 4.3 Key publications published by the Investigators pertaining to the theme of the proposal during the last 5 years

##### Publications of Dr. Shobha D

- Subbannayya, Y., Pinto, S. M., Mohanty, V., Dagamajalu, S., Prasad, T. S. K. and Murthy, K. R. (2020). What makes cornea immunologically unique and privileged? Mechanistic clues from a high-resolution proteomic landscape of the human cornea. *OMICS: A Journal of Integrative Biology*. 3, 129-139. [PubMed]
- Dagamajalu, S., Vijayakumar, M., Shetty, R., Rex, D. A. B., Narayana Kotimoole, C. and Prasad, T. S. K. (2020). Proteogenomic examination of esophageal squamous cell carcinoma (ESCC): new lines of inquiry. *Expert Review of Proteomics*. 10.1080/14789450.2020.1845146. [PubMed]
- Dagamajalu, S., Rex, D. A. B., Gopalakrishnan, L., Karthikkeyan, G., Gurtoo, S., Modi, P. K., Mohanty, V., Rahiman, M., Soman, S., Raju, R., Tiwari, V. and Prasad, T. S. K. (2020). A network map of endothelin mediated signaling pathway. *Journal of Cell Communication and Signaling*. 10.1007/s12079-020-00581-4. [PubMed]
- Dagamajalu, S., Rex, D. A. B., Palollathil, A., Shetty, R., Bhat, G., Cheung, L.W.T. and Prasad, T. S. K. (2020). A pathway map of AXL receptor-mediated signaling network. *Journal of Cell Communication and Signaling*. 10.1007/s12079-020-00580-5. [PubMed]
- Najar, M. A., Rex, D. A. B., Modi, P. K., Agarwal, N., Dagamajalu, S., Karthikkeyan, G., Vijayakumar, M., Chatterjee, A., Sankar, A., Prasad, T. S. K. (2020). A complete map of the Calcium/calmodulin-dependent protein kinase kinase 2 (CAMKK2) signaling pathway. *Journal of Cell Communication and Signaling*. 10.1007/s12079-020-00592-1

  
Dr. Jangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

26. Potdar PD, Sen K. Profiling of circulating tumor cells in liquid biopsies from metastatic cancer patients. *J Cancer Metastasis Treat*, 2017, 3: 6-15.
27. Perroud B, Ishimaru T, Borowsky AD, Weiss RH. Grade-dependent proteomics characterization of kidney cancer. *Mol Cell Proteomics*. 2009 May;8(5):971-85. doi: 10.1074/mcp.M800252-MCP200. Epub 2009 Jan 21. PMID: 19164279; PMCID: PMC2689781
28. Marimuthu A, O'Meally RN, Chaerkady R, Subbannayya Y, Nanjappa V, Kumar P, Kelkar DS, Pinto SM, Sharma R, Renuse S, Goel R, Christopher R, Delanghe B, Cole RN, Harsha HC, Pandey A. A comprehensive map of the human urinary proteome. *J Proteome Res*. 2011 Jun 3;10(6):2734-43. doi: 10.1021/pr2003038

## 5. List of Projects submitted/implemented by the Investigators

### 1. PI: Dr. Shobha D

5.1 Details of Projects submitted to various funding agencies: Nil

5.2 Details of Projects under implementation: Nil

5.3 Details of Projects completed during the last 5 years: Nil

### 2. Co-PI: Dr TS Keshava Prasad

#### 5.1 Details of Projects submitted to various funding agencies

S. No.	Title	Cost in Lakh	Month of submission	Role as PI/Co-PI	Agency	status
1.	Development of urine based cost-effective and non-invasive rapid diagnostic test kit for P. falciparum and P. vivax infections	140	January 2020	Co-PI	DHR	Submitted
2.	Interdisciplinary Life Science Program for Advance Research and Education in Omics and Translational Systems Biology	990	February 2021	PI	DBT	Submitted
3.	Skill Development in Mass spectrometry-based Metabolomics Technologies	400	December 2019	Co-PI	DBT	Approved
4.	Completed the due diligence formalities for London School of Hygiene & Tropical Medicine	70	October 2019	Co-PI	LSHTM	Approved

 ATTESTED

Dr. Mangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Derlakatte  
Mangalore 575 018, Karnataka.

	collaborative project in metabolomics					
5.	Development of point of care diagnostic tests for differentiating paralytic form of rabies encephalitis from Guillain Barré syndrome	170	February 2021	Co-PI	ICMR	Submitted

### 5.2 Details of Projects under implementation:

S. No.	Title	Cost in Lakh	Month of submission	Role as PI/Co-PI	Agency	Status
1.	Center of Excellence in Malaria Research	640	November 2015	Co-PI	DBT	ongoing
2.	Immunomodulation by parasitic macrophage migration inhibitory factor in Type II diabetes	23	June 2017	Co-PI	ICMR	ongoing
3.	Discovering new therapeutic targets and drugs to combat AMR tuberculosis: proteomics characterization and drug screening of mycobacterium-infected macrophages	90	September, 2018	Co-PI	Olav Thon Foundation	ongoing

### 5.3. Details of Projects completed during the last 5 years:

	Title of Project	Funding Agency	Role	Amount	Date of sanction and Duration
1	Establishment of National Database on Tuberculosis (TB) - Phase II	DBT	PI	28.54	June 10, 2011 3 years
2	<u>Genomic and Proteomic Analysis of Chronic Meningitis</u> as a part of "DBT Programme Support on Neuroproteomics for Proteomic Investigation of Neurological Disorders	DBT	Co-PI	696.65	Dec 26, 2008 5 years

ATTESTED  


Dr. Jangadhara Somayaji K S  
 Registrar  
 Yenepoya (Deemed to be University)  
 University Road, Daralakatte  
 Mangalore 575 018, Karnataka.

3	<u>Development of Infrastructure and a Computational Framework for Analysis of Proteomic Data</u> as a part of “ <i>DBT Programme Support on Neuroproteomics for Proteomic Investigation of Neurological Disorders</i> ”	DBT	PI	40.56	Dec 26, 2008 5 years
4	Proteomic Profiling of squamous cell carcinoma of Esophagus	DBT	PI	39.30	May 19, 2010 2 years
5	Identification of genes involved in X-linked mental retardation	DBT	PI	33.87	Sep 25, 2008 3 years
6	Development of Mouse Protein Reference Database	DBT	PI	32.96	Aug 20, 2008 2 years
7	Establishment of National Database on Tuberculosis (TB)	DBT	PI	13.47	Mar 24, 2008 One time
8	A functional analysis of Protein Tyrosine Phosphatases in EGF Receptor signal transduction pathway using a novel Substrate Trapping Mutant strategy	DBT	PI (RGYI)	16.27	Nov 23, 2007 3 years

### 3. Co-PI: Dr. Mujeebu Rahiman

5.1 Details of Projects submitted to various funding agencies: Nil

5.2 Details of Projects under implementation: Nil

5.3 Details of Projects completed during the last 5 years: Nil

### 4. Co-PI: Dr. Shama Bhat

5.1 Details of Projects submitted to various funding agencies: Nil

5.2 Details of Projects under implementation: Nil

5.3 Details of Projects completed during the last 5 years: Nil

## 6. List of facilities being extended by parent institution(s) for the project implementation.

### 6.1 Infrastructural Facilities

S.No.	Infrastructural facility	Yes/No/ Not required Full or sharing basis
1.	Workshop Facility	Yes
2.	Water & Electricity	Yes
3.	Laboratory Space/ Furniture	Yes
4.	Power Generator	Yes
5.	AC Room or AC	Yes
6.	Telecommunication including e-mail & fax	Yes
7.	Transportation	Yes

  
**Dr. Mangadhara Somayaji KS**  
 Registrar  
 Yenepoya (Deemed to be University)  
 University Road, Deralakatte  
 Mangalore 575 018, Karnataka.

8.	Administrative/ Secretarial support	Yes
9.	Information facilities like Internet/Library	Yes
10.	Computational facilities	Yes
11.	Animal/Glass House	Yes
12.	Any other special facility being provided	

**6.2 Equipment available with the Institute/ Group/ Department/Other Institutes for the project:**

Equipment available with	Generic name of equipment	Model, make and year of purchase	Remarks including accessories available & current usage of equipment
PI's department	Orbitrap Fusion Triband Mass spectrometer	Orbitrap Fusion, Thermo Scientific, 2015	-in use-
	QTRAP 6500 mass spectrometer	QTRAP 6500, AB Sciex, 2015	-in use-
	EASY nLC 1200 HPLC	EASY nLC 1200, Thermo Scientific 2015	-in use-
	Agilent 1290 Infinity II LC Systems	1290 Infinity II, Agilent, 2015	-in use-
	Centrifuge with fixed angle rotor	SorvallST, Thermo Scientific 2015	-in use-
	Speed Vac Concentrator	Savant, Thermo Scientific 2015	-in use-
	HPLC System	Elite Lachrom, Hitachi, 2015	-in use-
	Sonicator	Ultrasonics, PCI Analytics, 2015	-in use-
	Deep freezer, -20°C	PL6500, Thermo Scientific 2017	-in use-
	Refrigerator	175L, SamSung 2018	-in use-
	Vortexer	Tarson, Tarson, 2019	-in use-
	-80°C Deep freezer	Thermo Scientific, 2019	-in use-
	Disruptor	Disruptor Digital, Genei, 2019	-in use-
	Thermal cycler	Prime Trio, Hi Media Ltd, 2019	-in use-
RotoSpin	RotoSpin, Tarsons, 2019	-in use-	

Dr. Jangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

Cell Disruptor	Fast Prep 24, MP Biomedicals, 2019	-in use-
Microplate Reader	Multiskan sky, ThermoScientific, 2019	-in use-
LG 630L refrigerator	GR-H812HLHU, LG Company, 2019	-in use-
Vortex mixer	Spinix, Tarsons, 2019	-in use-
Gel Rocker	Gel Rocker, BioBee, 2016	-in use-
Western blotting apparatus	BioRad, 2018	-in use-
Vertical Electrophoresis Unit	Tetrad, Bio Rad, 2017	-in use-
Power supply	PowerPac Universal, BioRad, 2018	-in use-
Minicentrifuge	TabSpin, HiMedia, 2018	-in use-
Gel Rocker	Rockymax, Tarsons, 2018	-in use-
Horizontal Gel Electrophoresis	LA665, Genei, 2018	-in use-
Power supply	LA690, Genei, 2018	-in use-
Liquid N2 storage tank	Locator Junior Plus, ThermoScientific, 2018	-in use-
Liquid N2 Transfer tank 30L	ThermoScientific, 2018	-in use-
Liquid N2 Transfer tank 5L	ThermoScientific, 2018	-in use-
Vaccum Pump	Rocky 600, Tarsons, 2017	-in use-
Phase Contrast Microscope	Primovert, Carl Zeiss Ltd, 2017	-in use-
Deep freezer, -20°C	Vestfrost, Vestfrost Solutions, 2018	-in use-

ATTESTED

Dr. Jangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.



**T. S. Keshava Prasad, Ph.D.**  
Professor and Deputy Director  
BiSEP Course Coordinator

Mob: +91-9972250102  
keshav@yenepoya.edu.in  
http://csbmm.yenepoya.res.in

**Center for Systems Biology and Molecular Medicine | Yenepoya Research Centre**  
Yenepoya (Deemed to be University) | Mangalore 575018 | India

Sept 12, 2020

To,  
Sree Padmavathi Venkateswara Foundation (SreePVF),  
Vijayawada,  
Andhra Pradesh.

**Subject:** "Submission of grant proposal under "Sree Ramakrishna Paramahansa Research Grant 2020 (Round 2)"

Dear Sir/Madam,

With respect to the above mentioned subject, I am herewith submitting the grant proposal for the project entitled "Development of point of care diagnostic tests for differentiating paralytic form of rabies encephalitis from Guillain Barré syndrome" under Sree Ramakrishna Paramahansa Research Grant 2020 (Round 2).

I would also like to bring to your kind notice that Center for Systems Biology and Molecular Medicine (CSBMM), Yenepoya University, Mangalore is a premier center for research in the cutting-edge areas of proteomics, genomics and bioinformatics. Yenepoya University is the first deemed to be private university in the district of Dakshina Kannada, recognized under Section 3(A) of the UGC Act 1956 and accredited recently by NAAC with 'A' grade.

The university offers medical, dental and nursing courses and also focuses on research in basic and allied health sciences. CSBMM which is a part of Yenepoya Research Centre (YRC) was established with an aim to provide advanced Systems biology platform to students, clinicians and scientists belonging to academic fraternity of various Institutes.

The filled-in grant proposal with additional documents has been enclosed for your kind perusal.

Best regards

(Keshava Prasad Ph.D.)

**ATTESTED**

Dr. Mangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

**Sree Ramakrishna Paramahansa Research Grant Application Form**

*(To be filled by the applicant)*

**PART I: GENERAL INFORMATION**

1. Name of the Institute/University/Organisation submitting the Project Proposal: **Centre for Systems Biology and Molecular Medicine, Yenepoya Research Center, Yenepoya (Deemed to be University), Mangalore**
2. State: **Karnataka, India**
3. Type of Institute: **Deemed to be University**
4. Name and designation of the Executive Authority of the Institute/University forwarding the application: **Dr. Gangadhar Somayaji, The Registrar, Yenepoya (Deemed to be University), Mangalore**
5. Project Title:  
**Development of point of care diagnostic tests for differentiating paralytic form of rabies encephalitis from Guillain Barré syndrome**
6. Category of the Project (Please tick): **R&D/ ~~Programme Support~~**
7. Specific Area of Research: **Translational research**
8. Duration: **3Years**
9. Total Cost (Rs.) .....**283.90 lakhs**.....
10. Is the project Single Institutional or Multiple-Institutional (S/M)? : **M**
11. If the project is multi-institutional, please furnish the following:

Name of Project Coordinator: **Dr. T. S. Keshava Prasad**

Affiliation: **Yenepoya (Deemed to be University), Mangalore**

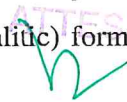
Address:

**Professor and Deputy Director, Centre for Systems Biology and Molecular Medicine, Yenepoya Research Center, Yenepoya (Deemed to be University), Mangalore**

12. Scope of application indicating anticipated product and processes  
**Rapid diagnostic screening and confirmatory test for point of care diagnosis to differentiate between Guillain-Barré syndrome and paralytic rabies**

13. Project Summary (Not to exceed one page. Please use separate sheet).

Rabies is an important public health problem in developing countries such as India where an alarmingly high incidence of the infection is reported every year despite the availability of highly effective, potent and safe vaccines. In clinical practice, diagnosis of the furious (encephalitic) form of rabies poses

  
**Dr. Gangadhar Somayaji K S** 1  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Derakatte  
Mangalore 576 018, Karnataka.



**Sree Padmavathy Venkateswara Foundation (SreePVF)**

**PART II: PARTICULARS OF INVESTIGATORS**

*(One or more co-investigators are preferred in every project. Inclusion of co-investigator(s) is mandatory for investigators retiring before completion of the project)*

**Principal Investigator:**

14. Name: **Dr. T. S. Keshava Prasad,**

Date of Birth: **08/04/1975** Sex (M/F): **M**

Designation: **Professor and Deputy Director**

Department: **Center for Systems Biology and Molecular Medicine, Yenepoya Research Centre**

Institute/University: **Yenepoya (Deemed to be University), Mangalore**

Address: **Yenepoya Research Centre, 3rd floor, Academic block Yenepoya Medical College**

**Yenepoya (Deemed to be University), University Road Deralakatte, Mangalore Karnataka, India**

**PIN: 575018**

Telephone: **+91-9972250102** Fax:.....

E- mail: **keshav@yenepoya.edu.in; tskprasad@gmail.com**

Number of research projects being handled at present: **3**

**Co-Investigator**

15. Name: **Dr. Anita Mahadevan**

Date of Birth: **19/12/1969** Sex (M/F): **F**

Designation : **Professor**

Department : **Department of Neuropathology**

Institute/University: **National Institute of Mental Health and Neurosciences**

Address : **Professor, Department of Neuropathology, National Institute of Mental Health and**

**Neurosciences, Bangalore, National Institute of Mental Health and Neuro Sciences (NIMHANS),**

**Hosur Road, Bangalore**

**PIN : 560029**

Telephone: **+91-080-26995137**

Fax: .....

E-mail: **mahadevananita@gmail.com**

Number of Research projects being handled at present: **04**

**ATTESTED**  


**Dr. Gangadhara Somayaji K S**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

**Co-Investigator**

16. Name: .Dr. Madhu Nagappa

Date of Birth: 20/07/1981 Sex (M/F) : .F

Designation : .Additional Professor

Department : Department of Neurology

Institute/University : **National Institute of Mental Health & Neurosciences (NIMHANS), Bengaluru**

Address : **Department of Neurology, National Institute of Mental Health and Neurosciences, Bangalore, National Institute of Mental Health and Neuro Sciences (NIMHANS), Hosur Road, Bangalore** PIN : 560 029

Telephone : 080-26995145 Fax ..... E-mail : [madhu\\_nagappa@yahoo.co.in](mailto:madhu_nagappa@yahoo.co.in)

**Number of Research projects being handled at present: 02**

**Co-Investigator**

17. Name : **Dr. Reeta S. Mani**

Date of Birth : **12/12/1972** Sex(M/F) : F

Designation : **Additional Professor**

Department : Department of Neurovirology

Institute/University : **National Institute of Mental Health & Neurosciences (NIMHANS), Bengaluru**

Address : **Department of Neurovirology, National Institute of Mental Health and Neurosciences, Bangalore, National Institute of Mental Health and Neuro Sciences (NIMHANS), Hosur Road, Bangalore** PIN : 560 029

Telephone : **080-26995495** Fax ..... E-mail : [drreeta@gmail.com](mailto:drreeta@gmail.com)

**Number of Research projects being handled at present: 4**

**Co-Investigator**

18. Name: **Dr. Shama Bhat**

Date of Birth: **25-11-1949** Sex(M/F) : M

Designation: **Managing Director**

Department: N/A

Institute/University: **Bhat Biotech India (P) Ltd**

**ATTESTED**

**Dr. Gangadhara Somayaji K S**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

Address: **No. 11-A, 4<sup>th</sup> Cross, Veerasandra Industrial Area, Electronics City, Bengaluru**

**PIN : 560100**

Telephone: **9341257708**

Fax .....

E-mail: **bhatbiotech@gmail.com**

Number of Research projects being handled at present: **4**

*Note : Use separate page, if more investigators are involved*

**ATTESTED**  


**Dr. Gangadhara Somayaji K S**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

**PART IV: BUDGET PARTICULARS**

**Budget (In Rupees)**

**A. Non-Recurring (e.g. equipments, accessories, etc.)**

S. No.	Item	Year 1	Year 2	Year 3	Total
1.	SpeedVac – High speed vacuum concentrator	6,00,000			6,00,000
2.	Imagene dispensing machine	20,00,000	Nil	Nil	20,00,000
3.	Incubator	5,00,000			5,00,000
4.	CO2 incubator	10,00,000			10,00,000

**Sub-Total (A) = 41,00,000**

**B. Recurring**

**B.1 Manpower (Salaries should be in accordance with Ministry of Science and Technology guidelines)**

S. No.	Position No.	Consolidated Emolument	Year 1	Year 2	Year 3	Total
1.	Project Associate-II (2 Nos.)		1050000	1050000	1050000	3150000
2.	Senior Project Associate – (1 nos)		4,83,600	4,83,600	5,46,000	15,13,200
3.	Sr. Scientist- 1 nos		7,20,000	8,00,000	8,70,000	23,90,000
4.	Scientist- 2 nos		4,80,000	5,20,000	5,80,000	15,80,000

**Sub-Total (B.1) = 86,33,200**

**B.2 Consumables**

S. No.	Item	Quantity	Year 1	Year 2	Year 3	Total
1.	Synthetic heavy and lite peptides	10 labelled and 10 light peptides from JBT, Germany	20,00,000	5,00,000	5,00,000	30,00,000
2.	Sequence grade Trypsin					
3.	LCMS solvents					
4.	C18 columns					
5.	Ultra-high purity nitrogen and helium	Solvents and columns depends on standardization and run times				
6.	Special reagents		20,00,000	23,00,000	26,00,000	69,00,000
7.	Common lab reagents					
9.	Animals and feeds					
10.	ImmunoChemicals, reagent buffers, blades, slides, coverslips	For investigation of 100 GBS, 100 PR and 200 neurological investigations				
11.	Molecular diagnostics reagents		23,00,000	15,00,000	7,00,000	45,00,000
12.	Radiological investigations					
	Biochemical investigations					

**Sub-Total (B.2) = 1,44,00,000**

ATTESTED  


Dr. Jangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

Other items	Consolidated Emolument	Year 1	Year 2	Year 3	Total
<b>B.3 Travel</b>		65,000	55,000	35,000	<b>1,55,000</b>
<b>B.4 Contingency</b>		260000	240000	240000	<b>7,40,000</b>
<b>B.5 Overhead (If applicable)</b>		200000	100000	64896	<b>3,64,896</b>
<b>Sub-total of B (B.1+B.2+B.3+B.4+B.5)</b>		-	-	-	<b>2,42,93,096</b>
<b>Grand Total (A + B)</b>		-	-	-	<b>2,83,93,096</b>

**Note : Please give justification for each head and sub-head separately mentioned in the above table.**

Financial Year : April - March

In case of multi-institutional project, the budget estimate to be given separately for each institution.

**ATTESTED**

**Dr. Rangadhara Somayaji K S**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

**DETAILED BREAKUP OF BUDGET WITH JUSTIFICATIONS**

**Full Summary (in Rs.)**

Institute	Manpower Budget	Consumables	Travel	Equipment	Contingencies	Overhead Costs	Total (Rs.)
Yenepoya (Deemed to be University, Mangalore)	31,50,000	30,00,000	50,000	6,00,000	50,000	1,84,500	70,34,500
NIMHANS, Bangalore	15,13,200	45,00,000	75,000	0	90,000	1,80,396	63,58,596
Bhat Biotech India Pvt Ltd, Bangalore	39,70,000	69,00,000	30,000	35,00,000	6,00,000	0	1,50,00,000
<b>Total</b>	<b>86,33,200</b>	<b>1,44,00,000</b>	<b>1,55,000</b>	<b>41,00,000</b>	<b>7,40,000</b>	<b>3,64,896</b>	<b>2,83,93,096</b>

**Institute Yenepoya (Deemed to be University), Mangalore**

**Name :**

**Summary :**

Budget Head	Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
Manpower	10,50,000	10,50,000	10,50,000	31,50,000
Consumables	20,00,000	5,00,000	5,00,000	30,00,000
Travel	30,000	20,000	0	50,000
Equipment	6,00,000	0	0	6,00,000
Contingencies	30,000	10,000	10,000	50,000
Overhead Costs	1,00,000	50,000	34,500	1,37,000
<b>Grand Total (in Rs.)</b>	<b>3780000</b>	<b>1620000</b>	<b>1587000</b>	<b>70,34,500</b>

  
**ATTESTED**  
**Dr. Gangadhara Somayaji K S**  
 Registrar  
 Yenepoya (Deemed to be University)  
 University Road, Derlakatte  
 Mangalore 575 018, Karnataka.

**Manpower Budget Detail :**

Designation	Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
Project Associate-II (2 Nos.)	1050000	1050000	1050000	3150000

**Justification for Manpower :**

1. Two Project Associate-II are to carry out standardizations and to develop mass spectrometry based assays for the identified proteins. They will also be involved in extensive evaluation of the assay in statistically determined sample numbers for validation.
2. The project associates will also be involved in conducting workshops and faculty development programs

**Consumable Cost Detail :**

Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
2000000	500000	500000	3000000

**Justification for Consumables :**

1. Synthetic heavy peptides for targeted proteomic analysis are required for quantitation from serum/plasma. Targeted proteomic analysis will be performed and the results will be cross verified and co-related with ELISA. High quality sequence grade Trypsin is required to prepare sample for mass spectrometry. Since CSBMM has an existing mass spectrometry (MS) facility, accessories for UHPLC are required for data acquisition. Ultra-high purity nitrogen and helium gases are essential for mass spectrometry. MS grades solvents are required for performing targeted proteomics

**Travel Cost Detail :**

Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
30000	20000	0	50,000

**Justification for Travel :**

1. Center for Systems Biology and Molecular Medicine, Yenepoya, Mangalore: The budget allocated for travel will include expenses of the investigator for travel to meetings with other collaborators. The budget allocated for contingency will include office stationery expenses

**Equipment Cost Detail :**

Generic Name	Quantity	Estimated Cost (Rs.)
SpeedVac – High speed vacuum concentrator	1	6,00,000

**Justification for Equipment:**

1. SpeedVac provides optimal conditions to dry the samples after sample preparation and will be suitable to run in MS.

ATTESTED

Dr. Jangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

**Institute Name: NIMHANS, Bangalore  
Summary**

Budget Head	Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
Manpower	483,600	483,600	546000	1,513,200
Consumables	23,00,000	1500000	700000	4500000
Travel	25000	25000	25000	75000
Equipment	0	0	0	0
Contingencies	30000	30000	30000	90000
Overhead Costs	100000	50000	30396	180396
<b>Grand Total (in Rs.)</b>	<b>2938600</b>	<b>2088600</b>	<b>1331396</b>	<b>63,58,596</b>

**Manpower Budget Detail :**

Designation	Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
Senior Project Associate – (1 nos)	4,83,600	4,83,600	5,46,000	1,513,200

**Justification for Manpower :**

1. One Senior Project Associate to carry out standardizations and to develop ELISA based assays and validation in statistically determined sample numbers.

**Consumable Cost Detail :**

Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
23,00,000	1500000	700000	4500000

**Justification for consumables :**

1. The budget allocated for consumables will be utilized for sample processing, storage, recruitment of patients etc. Good polyclonal antibodies are essential for sensitive diagnostics and antibody development is a key part of this work. Other consumables include ImmunoChemicals, reagent buffers, blades, slides, coverslips. Molecular diagnostics reagents, Radiological and biochemical investigations for the experiments.

**Travel Cost Detail :**

Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
25000	25000	25000	75000

**Justification for Travel :**

1. The budget allocated for travel will include expenses of the investigator for travel to meetings with other collaborators. The budget allocated for contingency will include office stationery expenses

**ATTESTED**  


Dr. Jangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Derlakatte  
Mangalore 575 018, Karnataka.



**Equipment Cost Detail :**

Generic Name	Quantity	Estimated Cost (Rs.)
Nil	Nil	Nil

**Industry Collaborator: Bhat Biotech India Pvt. Ltd., Bangalore  
Summary**

Budget Head	Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
Manpower	1200000	1320000	1450000	3970000
Consumables	2000000	2300000	2600000	6900000
Travel	10000	10000	10000	30,000
Equipment	3500000	0	0	3500000
Contingencies	200000	200000	200000	600,000
Overhead Costs	0	0	0	0
<b>Grand Total (in Rs.)</b>	<b>6910000</b>	<b>3830000</b>	<b>4260000</b>	<b>15000000</b>

**Manpower Budget Detail :**

Designation	Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
Sr. Scientist- 1 nos	7,20,000	8,00,000	8,70,000	23,90,000
scientist- 2 nos	4,80,000	5,20,000	5,80,000	15,80,000
<b>Grand Total</b>	<b>12,00,000</b>	<b>13,20,000</b>	<b>14,50,000</b>	<b>39,70,000</b>

**Justification for Manpower :**

- At Bhat Biotech for the work, we are planning to hire two MSc level and one Ph.D level scientists. The current salary for a senior scientist will be Rs. 60,000.00 per month and Jr. scientist will be Rs. 20,000.00 per month and an increment of 10% per year is estimated.
- Dedicated manpower for the project for various stages is important. They will work on poly and monoclonal antibody development as well as lateral flow assay kit designing and development.

**Consumable Cost Detail :**

Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
2000000	2300000	2600000	6900000

**Justification for Consumables:****Itemwise:**

- Special reagents
- Common lab reagents
- Animals and feeds

- The special reagents are related to the cloning and selection of clones.
- Animals used are rabbits for polyclonal antibody production and mice for monoclonal antibody production

**ATTESTED**

Dr. Jangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Doralakatte  
Mangalore 575 018, Karnataka.

**Travel Cost Detail :**

Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
10000	10000	10000	30,000

**Justification for Travel :**

- 1.The budget allocated for travel will include expenses of the investigator for travel to meetings with other collaborators. The budget allocated for contingency will include office stationery expenses

**Equipment Cost Detail :**

Generic Name	Quantity	Estimated Cost (Rs.)
Imagene dispensing machine	1	20,00,000
Incubator	1	5,00,000
CO2 incubator	1	10,00,00

**Justification for Equipments :**

1. Imagene coating machine to be imported from USA for striping or coating of the antibodies for making the lateral flow test kits, without which the project can not be completed. The ones we have is already overloaded and used for manufacturing purpose.
2. Incubator is used for drying the lateral flow test membranes. This will be purchased locally.
3. Co2 incubator will be used for the growing of cloned cells. Lot of clones will be developed which needs dedicated CO2 incubator. This also needs to be imported as the local ones are not satisfactory.

**Contingencies Cost Detail :**

Year-1 Amt (in Rs.)	Year-2 Amt (in Rs.)	Year-3 Amt (in Rs.)	Total (Rs.)
200000	200000	200000	600,000

**Justification for Contingency :**

1. The budget allocated for contingency will include office stationery expenses, postages, transportation of samples and cartridges to collaborators.
2. We do not seek any Overhead in the budget.

ATTESTED

*u*  
 Dr. Mangadhara Somayaji KS  
 Registrar  
 Yenepoya (Deemed to be University)  
 University Road, Doralakatte  
 Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

4	Proteomic Profiling of squamous cell carcinoma of Esophagus	DBT	PI	39.30	May 19, 2010 2 years
5	Identification of genes involved in X-linked mental retardation	DBT	PI	33.87	Sep 25, 2008 3 years
6	Development of Mouse Protein Reference Database	DBT	PI	32.96	Aug 20, 2008 2 years
7	Establishment of National Database on Tuberculosis (TB)	DBT	PI	13.47	Mar 24, 2008 One time
8	A functional analysis of Protein Tyrosine Phosphatases in EGF Receptor signal transduction pathway using a novel Substrate Trapping Mutant strategy	DBT	PI (RGYI)	16.27	Nov 23, 2007 3 years


**Place : Bangalore**

**Date : 11/09/2020**



**Signature of Investigator**

**ATTESTED**

  
**Dr. Jangadhara Somayaji KS**  
Registrar  
Yonapoya (Deemed to be University)  
University Road, Doralakatte  
Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

Name: **Dr. Shama Bhat**

Designation: **Managing Director**

Department/Institute/University: **Bhat Bio-Tech India (P) Ltd**

Date of Birth: **25-11-1949** Sex (M/F): **F** **SC/ST** : **No**.....

**Education** (Post-Graduation onwards & Professional Career)

Sl No.	Institution Place	Degree Awarded	Year	Field of Study
1	<b>Poornaprajna College, Udupi, India</b>	<b>B.S.</b>	<b>1972</b>	<b>Biology/Chemistry</b>
2	<b>Kasturba Medical College, Manipal, India</b>	<b>M.S.</b>	<b>1975</b>	<b>Biochemistry</b>
3	<b>Indian Institute of Science, Bangalore, India</b>	<b>Ph.D.</b>	<b>1979</b>	<b>Biochemistry</b>

**D. Position and Honors**

**Position and Employment** (Starting with the most recent employment)

Sl No.	Institution Place	Position	From (Date)	To (date)
1	<b>Navachethan Retirement Residency (P) Ltd</b>	<b>Founder Director</b>	<b>2008</b>	<b>present</b>
2	<b>Bhat Bio-Tech India (P) Ltd., No. 11-A, 4th Cross, Veerasandra Industrial Area, Electronics City, Bangalore - 560 100. INDIA</b>	<b>Chairman and Managing Director</b>	<b>1994</b>	<b>present</b>
3	<b>Department of Neurology, University of Pennsylvania School of Medicine, Philadelphia, PA, USA</b>	<b>Associate Professor</b>	<b>1991</b>	<b>1994</b>
4	<b>Department of Neurology, University of Pennsylvania School of Medicine, Philadelphia, PA, USA</b>	<b>Associate Professor</b>	<b>1984</b>	<b>1991</b>
5	<b>Department of Neurology, University of Pennsylvania School of Medicine, Philadelphia, PA, USA</b>	<b>Research Associate</b>	<b>1983</b>	<b>1984</b>
6	<b>Department of Microbiology, University of Connecticut Health Center, Farmington, CT, USA</b>	<b>Postdoctoral Research Associate</b>	<b>1979</b>	<b>1983</b>

ATTESTED  


Dr. Langadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

## Sree Padmavathy Venkateswara Foundation (SreePVF)

### Honors/Awards

1975-1979	Junior and Senior Research Fellowships of Indian Council of Medical Research, New Delhi, India
1979	Dr. D.Y.N. Murthy Memorial Award for Higher studies abroad.
1980-1982	Post-doctoral Fellowship of National Multiple Sclerosis Society
1991	Cultural Festival of India Award for outstanding contributions in basic science research
1994	Ranbaxy Research Award

### Professional Experience and Training relevant to the Project

I have leveraged my 35 years of rich experience in R&D and manufacturing in the Biotechnology area, to conceive this enterprise. I was trained at the University of Connecticut Health Center, Farmington, USA. My discovery of Galactosyl Ceramide, as an alternative receptor for HIV in neural cells, won me both universal acclaim as well as the undivided attention of scientific circles, the world over. I am also a recipient of the prestigious Ranbaxy Award. Currently my organization is specialized in the design development, manufacture and marketing of diagnostic products and Biotechnology based products. Diagnostic test devices for various types of tests like, Pregnancy, HIV, Hepatitis, Malaria, Dengue, Chikungunya, Swine Flu (H1N1), Syphilis, TB, Cardiac Markers, Dry Chemistry, Bio-Chemistry, Haematology & Immunology and ELISA'S used in the analysis of body fluids in human. Our products are manufactured with International Standards and ISO 9001, ISO 13485, CE and GMP certified. We expertise in diagnostic kit development and keep on upgrading technologies according to the latest developments.

### List maximum of five recent publications relevant to the proposed area of work.

1. Mukti Nath Mishra<sup>1</sup>, aghavendra D. Kulkarni<sup>2</sup>, Jeevanandam Mohanraj<sup>1</sup>, S. Durairaju Nisshanthini<sup>1</sup>, G.S. Ajantha<sup>2</sup>, Arun Chandrasekhar<sup>1</sup>, Prachee Kenge<sup>1</sup> & Shama Bhat<sup>1</sup>, A novel ready-to-use dry-reagent polymerase chain reaction for detection of Escherichia coli & Shigella species, , Indian J Med Res 149, May2019, pp 671-676
2. Kulkarni RD, Mishra MN, Mohanraj J, Chandrasekhar A, Ajantha GS, Kulkani S, et al. Development of a dry-reagent mix-based polymerase chain reaction as a novel tool for the identification of Acinetobacter species and its comparison with conventional polymerase chain reaction. J Lab; Physicians 2018;10:68-72.
3. Bhat, S., Otsuka, T. and Srinivasan, A. Benzopurpurin and related compounds inhibit the binding of gp 120 to GalCer/sulfatide and infection of HIV. DNA and Cell Biol. 13, 211-215 (1994).
4. Bhat, S., Spitalnik, S., Gonzalez-Scarano, F. and Silberberg, D.H. Galactosyl ceramide or a molecule derived from it is an essential component of the neural receptor for HIV-1 envelope glycoprotein gp-120. Proc. Natl. Acad. Sci. USA. 88, 7131-7134 (1991).
5. Bhat, S. and Silberberg, D.H. Characterization of an antibody to galactosyl ceramide. Trans. Amer. Soci, Neurochem. 22, 195 (1991).

### **B. Publications** (Numbers only) 40

Books : ..... Research Papers, Reports : 40 General articles : .....

Patents : 1 Others (Please specify) : .....

ATTESTED

### **Selected peer-reviewed publications (Ten best publications in chronological order)**

Dr. Rangadhara Somayaji KS  
Registrar  
Yenepoya (Deemed to be University) 27  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

	<b>diagnosis of pebrine disease in silkworms</b>			<b>duration</b>
--	--	--	--	-----------------

*Shawartha*

**Place : Bangalore**

**Signature of Investigator**

**Date : 7/09/2020**

**Name: Dr.Anita Mahadevan**

**Designation: Professor**

**Date of Birth: 19/12/1969 Sex (M/F) Female**

**Department/Institute/University: Department of Neuropathology, National Institute of Mental Health & Neurosciences, Bangalore 560 029 Tel: 080-26995137, Email:mahadevananita@gmail.com**

**Educational qualification (Post-Graduation onwards & Professional Career)**

SI No.	Institution Place	Degree Awarded	Year	Field of Study
1	<b>Seth GS Medical College, KEM Hospital, Bombay University</b>	<b>M.D. (Pathology)</b>	<b>1998</b>	<b>Pathology</b>
2	<b>National Board Of Examinations, New Delhi</b>	<b>DNB</b>	<b>1998</b>	<b>Pathology</b>

**6. Position and Employment**(Starting with the most recent employment)

SI No.	Institution Place	Position	From (Date)	To (date)
1	<b>Department of Neuropathology, National Institute of Mental Health &amp; Neurosciences Bangalore, India</b>	<b>Professor</b>	<b>July 2017</b>	<b>Till date</b>
2	<b>Department of Neuropathology, National Institute of Mental Health &amp; Neurosciences Bangalore, India</b>	<b>Additional professor</b>	<b>Dec 2012</b>	<b>June 2017</b>
3	<b>Department of Neuropathology, NIMHANS, Bangalore, India</b>	<b>Associate Professor</b>	<b>June 2011</b>	<b>Nov 2012</b>
4	<b>Department of Neuropathology, NIMHANS, Bangalore, India</b>	<b>Assistant Professor</b>	<b>November 2007</b>	<b>June 2011</b>
5	<b>Nizam's Institute of Medical Sciences, Hyderabad, India</b>	<b>Assistant professor</b>	<b>March 2007</b>	<b>September 2007</b>

ATTESTED

Dr. Jangarhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

2	Biomarker discovery in seronegative Neuromyelitis optica (NMO) Role: Principal Investigator	ICMR	71,04,940	3 years, to be initiated
3	Effect of yoga and neurogenesis: morphological and electrophysiological evaluation of human hippocampus obtained during epilepsy surgery Role: Co-investigator	DST	58,25,720	3 years, 2018-2021
4	Analysis of synaptic and mitochondrial alterations in human brains with traumatic brain injury: Implications for neurological deficits and therapy in neurotrauma patients Role: Co-investigator	SERB	35,00,000	2019-2021

**Completed Research Projects (State only major projects of last 3 years)**


SI No.	Title of Project	Funding Agency	Amount	Date of sanction and Duration
1	Development of Neuroscience Educational Material for popularizing Neuroscience under Human Brain Bank, Department of Neuropathology, NIMHANS Role: Principal Investigator	ICMR	Rs.57,74,276	July 2014-2019
2	Effect of Yoga and Meditation on hippocampal neurogenesis in patients with chronic drug resistant mesial temporal lobe epilepsy. Role: Principal Investigator	Epilepsy Colloquium Research Fund (ECF)	22,56,000	2017-2019



**Signature of Investigator**

Place : Bangalore  
Date : 10/09/2020

**ATTESTED**

  
**Dr. Jangadhara Somayaji K S**  
 Registrar  
 Yenepoya (Deemed to be University)  
 University Road, Deralakatte  
 Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

Name: **Dr Reeta S. Mani**

Designation: **Additional Professor**

Department/Institute/University: **Department of Neurovirology National Institute of Mental Health and Neurosciences, Bangalore**

Date of Birth : **12/12/1972**

Sex (M/F): **F**

SC/ST : **N/A**

Education (Post-Graduation onwards & Professional Career)

Sl No.	Institution Place	Degree Awarded	Year	Field of Study
1	Government Medical College, Miraj	M.D	1999	Microbiology

A. Position and Honors

Position and Employment (Starting with the most recent employment)

Sl No.	Institution Place	Position	From (Date)	To (date)
1	Department of Neurovirology, NIMHANS, Bangalore	Additional Professor,	June 2017	Till date
2		Associate Professor	June 2014	May 2017
3		Assistant Professor	April 2011	May 2011
4		Post-doctoral Fellow Neurovirology	September 2008	March 2011
5	Department of Neuromicrobiology, NIMHANS, Bangalore	Senior Resident	August 2005	August 2008
6	Department of Microbiology, B.J Medical College and Sassoon Hospital, Pune	Lecturer	February 2001	April 2003
7	Department of Microbiology, Grant Medical College and J.J Group of Hospitals, Mumbai	Lecturer	March 2000	January 2001

**Honors/Awards**

1. Member-National Technical Advisory Committee (N-TAC), National Rabies Control Programme, Ministry of Health and Family Welfare, Govt of India
2. Member-Laboratory Expert Group Committee, National Rabies Control Programme, Ministry of Health and Family Welfare, Govt of India
3. Member-WHO Rabies Expert Committee Working Group on Laboratory Diagnostics

Dr. Rangadhara Somayaji K S  
HOD, Sinar  
Yenepoya (Deemed to be University)  
University Road, Doralakatte  
Mangalore 575 018, Karnataka.



**Sree Padmavathy Venkateswara Foundation (SreePVF)**

2	Providing technical support for establishing enhanced surveillance for Acute Encephalitis Syndrome in Bihar (Co-PI)	CARE India	Rs. 81 Lakhs	1 year (2019-2020)
3	Recombinant Rabies G protein vaccine trial-Testing of Blood samples for rabies antibodies by RFFIT (PI)	Cadila Pharmaceuticals, India	Rs 40 lakhs	5 years (2016-2021)

Completed Research Projects (State only major projects of last 3 years)

SI No.	Title of Project	Funding Agency	Amount	Date of completion
1	Strengthening Surveillance for Japanese encephalitis in India	Centers for Disease Control (CDC), USA	US\$ 28,13,696	September 2019



Place: Bangalore  
Date: 11/09/2020

Signature of Investigator

**ATTESTED**  


Dr. Jangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University),  
University Road, Deralakatte,  
Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

Name: **Dr. Madhu Nagappa**

Designation: **Additional Professor**

Date of Birth: **20/07/1981** Sex (M/F): **Female**

4. Department/Institute/University: Department of Neurology, National Institute of Mental Health & Neurosciences, Bangalore 560 029. Tel: 080-26995140, Email: [madhu\\_nagappa@yahoo.co.in](mailto:madhu_nagappa@yahoo.co.in)

5. Educational qualification (Post-Graduation onwards & Professional Career)


Sl No.	Institution Place	Degree Awarded	Year	Field of Study
1	Jawaharlal Institute of Post-graduate Medical Education and Research (JIPMER), Pondicherry	M.D. (Pathology)	2004-2007	Pathology
2	National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore	DM	2007-2011	Neurology

**6. Position and Employment** (Starting with the most recent employment)

Sl No.	Institution Place	Position	From (Date)	To (date)
1	National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore	Additional Professor	1 <sup>st</sup> July 2018	Till date
2	National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore	Associate Professor	1 <sup>st</sup> July, 2015	30 <sup>th</sup> June 2018
3	National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore	Assistant Professor (Regular)	27 <sup>th</sup> June, 2012	30 <sup>th</sup> June 2015
4	National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore	Assistant Professor (Ad hoc)	19 <sup>th</sup> May, 2011	27 <sup>th</sup> June, 2012
5	National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore	Non-PG Senior Resident (Neurology)	1 <sup>st</sup> August, 2010	18 <sup>th</sup> May, 2011
6	National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore	Senior Resident (DM, Neurology)	1 <sup>st</sup> March, 2008	31 <sup>st</sup> July, 2010
7	National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore	Junior Resident (DM, Neurology)	1 <sup>st</sup> August, 2007	29 <sup>th</sup> February, 2008

**7. Publications** (Ten publications in chronological order)

1. Wahatule R, Dutta D, Debnath M, **Nagappa M**, Mahadevan A, Sinha S, Sundaravadivel P, Rao GSU, Periyavan S, Binu VS, Rao S, Taly AB. GBS Ganglioside complex antibodies in an Indian cohort of GBS. Muscle Nerve (In Press).
2. **Nagappa M**, Wahatule R, Bindu PS, Sinha S, Taly AB. Spectrum of Sensory Conduction Abnormalities in Guillain Barre Syndrome. Neurology India (In Press).
3. Debnath M, **Nagappa M**, Dutta D, Talukdar PM, Subbanna M, Shivakumar V, Wahatule R, Sinha S, Bindu PS, Periyavan S, Umamaheswara Rao GS, Kumar MA, Taly AB. Evidence of altered Th17

**ATTESTED**  
  
**Dr. Jangadhara Somayaji K S**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

**PART VII: DECLARATION/CERTIFICATION**

To be provided for each participating institution.

It is certified that

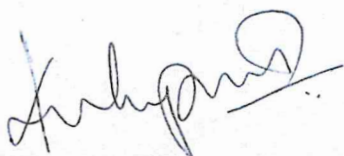
1. The research work proposed in the scheme/project entitled **“Development of point of care diagnostic tests for differentiating paralytic form of rabies encephalitis from Gullian Barré syndrome”** does not in any way duplicate the work already done or being carried out elsewhere on the subject.
2. The same project proposal has not been submitted to any other agency for financial support.
3. The emoluments proposed for the manpower are as admissible to persons of corresponding status employed in the institute/university or as per the Ministry of Science & Technology guidelines.
4. Necessary provision for the scheme/project will be made in the Institute/ University/ Organization budget in anticipation of the sanction of the scheme/project.
5. If the project involves the utilization of genetically engineered organisms, we agree to submit an application through our Institutional Bio safety Committee. We also declare that while conducting experiments, the Bio safety Guidelines of the Government of India would be adhered to.
6. If the project involves field trials/experiments on animals or humans/exchange of human specimens, etc. we will ensure that ethical clearances would be taken from concerned ethical Committees/ competent authorities and the same would be conveyed to SreePVF before implementing the project.
7. If the Project requires any statutory permission(s) for any authority to carry out the project, the same would be obtained and intimated to Sree PVF before taking up research activities.
8. It is agreed that any research outcome or intellectual property right(s) on the invention(s) arising out of the project shall be taken in consultation with SreePVF.
9. We agree to accept the terms and conditions of SreePVF.
10. The institute/university agrees that the equipment, other basic facilities and such other administrative facilities as per terms and conditions of the grant will be extended to investigator(s) throughout the duration of the project.

ATTESTED  


Dr. Anagadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

**Sree Padmavathy Venkateswara Foundation (SreePVF)**

11. The Principal Investigator(s) involved in the project has sufficient service duration to carry out the project. In case his tenure get expire before completion of project necessary provision would be made to allow him to complete the project for its logical conclusion.
12. The Institute assumes to undertake the financial and other management responsibilities of the project.
13. The details & information given in the Project proposal are true & factual.



**Signature of Project Coordinator**

(applicable only for multi-institutional projects)

**Date :** 9/9/2020



**Signature of Executive Authority  
of Institute/University with seal**

**Date :** 10/09/2020

Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018

**T.S. Keshava Prasad, Ph.D.**  
Professor and Deputy Director  
Center for Systems Biology and Molecular Medicine  
Yenepoya (Deemed to be University)  
Mangalore - 575 018, India



**Signature of Principal Investigator :**

**Date :** 9/9/2020

**T.S. Keshava Prasad, Ph.D.**  
Professor and Deputy Director  
Center for Systems Biology and Molecular Medicine  
Yenepoya (Deemed to be University)  
Mangalore - 575 018, India

**ATTESTED**

**Dr. Gangadhara Somayaji KS**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

11. The Principal Investigator(s) involved in the project has sufficient service duration to carry out the project. In case his tenure get expire before completion of project necessary provision would be made to allow him to complete the project for its logical conclusion.
12. The Institute assumes to undertake the financial and other management responsibilities of the project.
13. The details & information given in the Project proposal are true & factual.



Signature of Project Coordinator

(applicable only for multi-institutional projects)

Date: 11/09/2020


**T.S. Keshava Prasad, Ph.D.**  
Professor and Deputy Director  
Center for Systems Biology and Molecular Medicine  
Yenepoya (Deemed to be University)  
Mangalore - 575018, India



Signature of Principal Investigator

Date :

**Dr. Anita Mahadevan, M.D.**  
Professor, Dept. of Neuropathology  
NIMHANS, Bangalore - 560 029  
Tel: 080-26995137  
Email: mahadevananita@gmail.com



Signature of Co-principal Investigator

Date :

11-9-2020

**Dr. MADHU. N**  
Additional Professor  
Department of Neurology  
NIMHANS, Bengaluru-29  
KMC No: TMN20040000803KTK

Signature of Co-principal Investigator

Date :

11-9-2020

**Dr. REETA S. MANI, MD**  
Additional Professor  
Department of Neurovirology  
NIMHANS  
Bangalore-560 029, India.



Signature of Executive Authority

of Institute/University with seal

Date : **Dr. B. N. Gangadhar**

Date :

Director  
National Institute of  
Mental Health & Neuro Sciences  
Bengaluru - 560 029

ATTESTED



**Dr. Gangadhara Somayaji K S**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Doralakatte  
Mangalore 575 018, Karnataka.

Sree Padmavathy Venkateswara Foundation (SreePVF)

11. The Principal Investigator(s) involved in the project has sufficient service duration to carry out the project. In case his tenure get expire before completion of project necessary provision would be made to allow him to complete the project for its logical conclusion.
12. The Institute assumes to undertake the financial and other management responsibilities of the project.
13. The details & information given in the Project proposal are true & factual.

Bhat Bio-Tech India (p) Ltd  
Dr. Shama Bhat, Managing Director

*Shama Bhat*



Signature of co-principal investigator

Date : Sept 9, 2020

Signature of Executive Authority  
of Institute/University with seal

Date :

ATTESTED  
*[Signature]*

Dr. Rangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.



सत्यमेव जयते

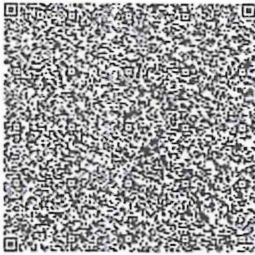
**INDIA NON JUDICIAL**  
**Government of Karnataka**

**e-Stamp**

Certificate No. : IN-KA39966269560072P  
Certificate Issued Date : 30-Nov-2017 03:56 PM  
Account Reference : NONACC (FI)/ kaksfcl08/ HAMPANKATTA/ KA-DK  
Unique Doc. Reference : SUBIN-KAKAKSFCL0831886156911236P  
Purchased by : YENEOYA UNIVERSITY  
Description of Document : Article 12 Bond  
Description : AGREEMENT  
Consideration Price (Rs.) : 0  
(Zero)  
First Party : YENEOYA UNIVERSITY  
Second Party : BHAT BIO TECH INDIA PVT INDIA  
Stamp Duty Paid By : YENEOYA UNIVERSITY  
Stamp Duty Amount(Rs.) : 100  
(One Hundred only)

For ST. MILAGRES CREDIT SOUARDHA CO. LTD  
LTD KARWAR, Br. Hampankatta, MANGALURU

AUTHORISED SIGNATORIES



-----Please write or type below this line-----

**MEMORANDUM OF UNDERSTANDING**

**Yenepoya University, Mangalore, India**

*And*

**Bhat Bio-Tech India Pvt. Ltd**

**ATTESTED**

*ll*  
**Dr. Gadghara Somayaji K.S**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Derlakatte  
Mangalore 575 018, Karnataka.

**Statutory Alert:**

1. The authenticity of this Stamp Certificate should be verified at "www.shcilestamp.com". Any discrepancy in the details on this Certificate and as available on the website renders it invalid.
2. The onus of checking the legitimacy is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority.

**On**  
**Support In Skilling Activities**

Date: 02.12.2017 |Mangaluru | India

**MEMORANDUM OF UNDERSTANDING**

**BETWEEN**

**Yenepoya University, Mangalore, India**

Contact	T. S. Keshava Prasad, Ph.D.
Position	BiSEP Course Coordinator
Phone No.	9972250102
E-mail	keshav@yenepoya.edu.in; tskprasad@gmail.com

**AND**

**Bhat Bio-tech India Pvt. Ltd**

Company Contact	Dr. Shama Bhat
Position	Chairman And Managing Director
Phone No.	080 33194009, Board:080 33194000
E-mail	bhatbiotech@gmail.com

**Background**

**Yenepoya University, Mangalore, India**

Yenepoya University is the first deemed to be private university in the district of Dakshina Kannada, recognized under Section 3(A) of the UGC Act 1956 and accredited recently by NAAC with 'A' grade. The professional courses offered by the university include M.B.B.S & B.D.S., M.S /M.D/M.D.S., and skill based courses like Masters in Hospital Administration among others. Yenepoya Research Centre (YRC), Yenepoya University is engaged in high quality research that integrates both basic and translational research across multiple disciplines, driving towards therapeutics of human health. The centre has state-of the art facilities to support high quality research in interdisciplinary/ multidisciplinary areas to meet the contemporary challenges.

**ATTESTED**

Dr. Gangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
Bhat Road, Deralakatte  
Mangalore 575 016, Karnataka.



The Center for Systems Biology and Molecular Medicine (CSBMM; <http://csbmm.yenepoya.edu.in/>) is a new centre in the Yenepoya Research Centre, Yenepoya University, which is established to carry out research and development and manpower training in the area of genomics, proteomics and metabolomics with an integrated OMICS approach. The Center is equipped with high resolution mass spectrometers including Orbitrap Fusion Tribrid and QTRAP 6500. CSBMM also hosts faculties with immense experience in multiomics analysis. Recently, investigators from CSBMM and YRC have been awarded "Biotechnology Skill Enhancement Programme" by the Department of IT, BT and S&T, Government of Karnataka to impart training to a selected set of students in multiomics technologies including genomics, proteomics and metabolomics. In addition, Yenepoya University will also consider this program as a PG Diploma course in MultiOMICS Technology. The students undertaking the course will be trained in cutting-edge areas of genomics, proteomics and metabolomics.

## Background

### Bhat Bio-Tech India Pvt. Ltd :

Bhat Bio-tech India Pvt. Ltd is dedicated to the manufacturing of kits for various types of applications such as pregnancy, HIV, hepatitis, malaria, dengue, chikungunya, swine Flu (H1N1), syphilis, TB, cardiac markers, dry chemistry, bio-chemistry, haematology & immunology. Apart from these kits with diagnostic applications, the company also manufactures and provide life Science related products and market genomics (DNA, RNA), proteomics, teaching kits, lab instruments, dehydrated culture media, animal studies, contract research and drug discovery services and kits. Sensor devices for water testing, soil testing and milk testing are also developed and sold by this company

### 1. Purpose of this Agreement


- Both the parties have come together to provide an ecosystem for skilling / up-skilling of fresh / existing talent. The 'Yenepoya University, Mangalore, India' shall conduct the LSSSDC approved courses and Bhat Bio-tech India Pvt. Ltd shall provide infrastructure to fulfil the need of practical part of the course.
- This is a non monetary agreement. No party has monetary obligation on other party towards sharing of resources.

### 2. Roles

#### A. Yenepoya University, Mangalore, India

1. All the infrastructure support required by 'Yenepoya University, Mangalore, India' is defined in Annexure I of this MoU. Both the parties have discussed and have mutual consent over Annexure 1.
2. Shall conduct only practical sessions in the company premises.

ATTESTED

  
Dr. Gangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 010, Karnataka

3. Once a batch is formed 'Yenepoya University, Mangalore, India' shall send a list of students / trainees to company and seek permission for the given list at least a month prior to the proposed date of commencement of practical session.
4. Shall obtain a formal written approval from the company.
5. Shall provide the schedule of the training, i.e. TDP (Training Development Plan)
6. Yenepoya University, Mangalore, India shall nominate a person to supervise the conduct and working of the set of trainees thus sent for the practical purposes.
7. Supervisor (in co-ordination with company representative) shall be responsible to implement and monitor the agreed schedule.
8. He / She shall be in contact of the company representative on daily basis to monitor the progress of the trainees.
9. Only on receipt of "Letter of Completion of Practical Session" from the company, shall the training be considered as complete.
10. It will be 'Yenepoya University, Mangalore, India' responsibility to get the due diligence done of the company and it shall provide all the support required for the same.

#### **B. Bhat Bio-tech India Pvt. Ltd**

1. Company has approved the requirement of 'Yenepoya University, Mangalore, India' as stated in the "Annexure 1" of this MoU. Both the parties have discussed and have mutual consent over Annexure 1.
2. Shall revert within 10 days of receipt of list of candidates from 'Yenepoya University, Mangalore, India'.
3. Shall nominate a representative to co- ordinate activity with Supervisor from 'Yenepoya University, Mangalore, India'
4. Shall abide by the TDP provided by the 'Yenepoya University, Mangalore, India'
5. One guide per trainee(s) shall be nominated for guidance and coaching.
6. He / She shall regularly communicate with Trainee's supervisor regarding their progress.
7. Company shall maintain an authentic attendance record of the trainees. This record must display number hour spent by each trainee on each day during the training period at the company.
8. The company shall not engage the trainee in any other activity apart from the curriculum.
9. At the end of the Practical session, a "letter of completion of practical session" duly signed by the guide of that trainee, shall be issued. Without which the training shall not be considered as complete.
10. Company agrees to get the infrastructure inspected by the accreditation assessor, as directed by 'Yenepoya University, Mangalore, India'
11. Company agrees to support the audits as and when required by the LSSSDC.

ATTESTED

Dr. Gangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

### 3. Term

This MoU shall commence on the date of signature and shall endure for a period of **five** years.

It may be terminated by either party upon giving no less than three months notice in writing.

This Memorandum of Understanding is a document of good faith and Implementation of the MoU would be monitored on a six monthly basis.

### 4. Communication

Both parties agree to:-

- Communicate regularly – telephonically or via emails.
- Meet formally at least once a month to review progress.
- Update their respective Senior Managers/Heads of progress.

### 5. Status

5.1 Notwithstanding the terms of any other provisions of this MoU, this MoU is not legal binding and nothing contained in this MoU shall impose any legal obligations on either party whatsoever.

5.2 This MoU may be amended by agreement of both parties in writing.

5.3 No change can be made to this MoU without written consent and duly signed by both the parties. Additions, deletions and/or alterations to this MoU may be effected with the written agreement of both the parties to this MoU concerning the changes. Documents containing such additions, deletions and/or alterations and signed by both the Parties shall form addenda to this MoU, and be deemed to be part of this MoU.

5.4 Any changes must be brought in notice of LSSSDC within 7 days

### 6. Force Majeure:

Neither party shall be liable to the other for failure or delay in the performance of any of its obligations under this MOU for the time and to the extent such failure or delay is caused due to acts of God, natural disaster, fire, floods, explosions or earthquake, epidemic or quarantine restrictions, serious accidents, war, insurrection or riots, strikes, legal necessity or labour troubles, or any other cause beyond the affected party's reasonable control, provided that sufficient notice of such occurrence of force majeure is communicated to the other party.

ATTESTED 

**Dr. Gangadhara Somayaji K S**  
Registrar  
Yenepoya .(Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

<p><b>On behalf of Yenepoya University:</b>  <b>Dr. G. Shreekumar Menon</b>  <b>Registrar</b>  Yenepoya University, Mangalore, India</p>	 ..... Signature
	Date : <u>29/12/17</u>
<p><b>On behalf of Bhat Bio-Tech India Pvt. Ltd:</b></p> <p><b>Name: Dr. Shama Bhat</b></p> <p><b>Designation: Managing Director</b></p>	 ..... Signature
	Date : <u>21/12/2017</u>



**ATTESTED**



**Dr. Gangadhara Somayaji K S**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

## Annexure 1

Details of support required from the Company

1. Course Name: PG Diploma in Multiomics Technology


2. Duration of the Course in hours

- Theory: 3 Hours
- Practical: 3 Hours

3. Number of students: 2

Topics to be covered	Learning Objectives	Support required List of equipment must be attached as per the protocol
Company protocols for research, privacy policies, institutional and professional code of ethics and standards of practice, IPR guidelines,	Understanding the essentials of product development	
Working of instruments/apparatus/equipment, biological assays, application of various analytical techniques such as HPLC, capillary electrophoresis including icIEF, FTIR, UV and Fluorescence spectroscopy, ELISAs, enzyme assays and other applicable methods for the testing of biopharmaceuticals, application of microbiological techniques such as air monitoring, water testing, surface monitoring, microbial monitoring, biosafety levels and biosafety hazard	Understanding the essentials of quality control	
Cleaning the work area and equipments, materials and equipments required for cleaning, adequate ventilation for the work area, personal protective equipments, dealing with accidental damage,	Maintaining clean work station	

ATTESTED

  
Dr. Gangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

Guide / Instructor: form the company: \_\_\_\_\_

Contact Details: \_\_\_\_\_

SPOC \_\_\_\_\_ from Yenepoya University, Mangalore,  
India: \_\_\_\_\_

Contact Details: \_\_\_\_\_

Bhat Bio-tech India Pvt. Ltd hereby agrees provide above support to Yenepoya University, Mangalore, India

Signature: Shama Bhat

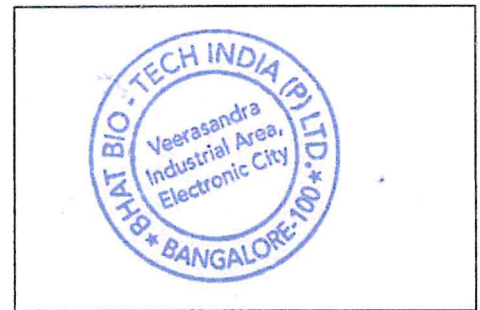
Bhat Bio-Tech India Pvt. Ltd  
Stamp / Seal

Name: DR. SHAMA BHAT

Designation: MANAGING DIRECTOR

Place: BANGALORE

Date: 21/12/2017



Yenepoya University, Mangalore, India hereby agrees to avail above facility for its skilling course mentioned in this document.

Signature: Dr. G. Shree Kumar Menon

Yenepoya University, Mangalore, India  
(Stamp / Seal)

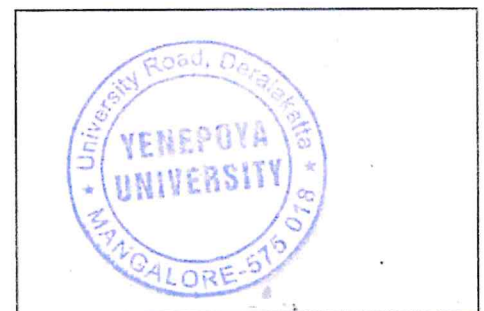
Name: Dr. G. Shree Kumar Menon

Registrar

Designation: Yenepoya University  
Mangaluru - 575 018

Place: \_\_\_\_\_

Date: 29/12/17



ATTESTED

Dr. Gangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

## Annexure 1

Details of support required from the Company

1. Course Name: PG Diploma in Multiomics Technology


2. Duration of the Course in hours

- Theory: 3 Hours
- Practical: 3 Hours

3. Number of students: 3

Topics to be covered	Learning Objectives	Support required List of equipment must be attached as per the protocol
Research initiatives – use new areas of research, techniques and methods, extend research/ product portfolio, creative analysis & interpretation of research data.	Development of problem solving and decision making skills	
Understand work output requirements, company rules, guidelines & policies related to the process flow, identifying and reporting issues requiring intervention, delivery of quality work on time & report any anticipated reasons for the delay, effective interpersonal communication, conflict-resolution techniques, importance of collaborative working, multi-tasking, training the team members, knowledge of project management	Development of interpersonal Skills	

ATTESTED

  
Dr. Gangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.