Bharath
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Declared as Deemed-to-be University under section 3 of UGC Act, 1956)
(Vide Notification No. F.9-5/2000 - U.3, Ministry of Human Resource Development, Govt. of India, dated 4th July 2002)
Accredited by NAAC
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL
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173, Agaram Road, Selaiyur, Tambaram,
Chennai - 600 073. Tamil Nadu.

Ref. No.SMS-2015-O-09

Date: 27.02.2018

TO

Ms. T. Mohanalakshmi
Associate Professor/Microbiology
BIHER.

Thro: Concern Head of the Department

Greetings!!!

We are happy to announce that the Research Advisory Committee has approved your proposal for Seed Money Scheme-2015 which was presented by you. You are requested to complete the proposal and send the progress report to the Dean Research in the prescribed time period.

Title of the Project: Lp(A) Levels In Diabetes And Metabolic Syndrome

Seed Money Amount: Rs.1, 00,000/- (Rupees One Lakh Only)

Approved on: 21.02.2018

Payment details:

Voucher No.44 **Dated: 02.03.2018**

With Regards

Dean-Research

Bharath University

SELAIYUR, CHENNAI - 600 073, TAMIL NADU, INDIA.

CASH / PAYMENT VOUCHER

Date 02/03/2018

V.No. 44

Debit _____ Amount

Rs.

PAID TO Dr. T. Mohanalakshmi

RUPEES One Lakh only

TOWARDS Seed Money Scheme -2018

BHARATH UNIVERSITY CHENNAI 600 073 INDIA

Authorised by

Finance Manager

Cashier/Accountant

Payee's Signature

PROPOSAL SUBMISSION

1. **Details of Principal Investigator**

Name	: Dr. T. Mohanalakshmi
Designation	: Associate Professor
Highest Qualifications	: Ph.D.
Department	: Microbiology
E-mail	: drpebyreddy@yahoo.com
Contact no	: 9849616163
Date of Joining	: 10.06.2014

2. **Details of Principal Investigator**

Name	: Dr. R. Sri Kumar
Designation	: Associate Professor
Highest Qualifications	: Ph.D.
Department	: Microbiology
E-mail	: rsrikumar_2003@yahoo.in
Contact no	: 9442500300
Date of Joining	: 02.01.2012

Technical details

1. Introduction:

The metabolic syndrome is a cluster of metabolic and cardiovascular symptoms that are strongly associated with type II diabetes mellitus. In this kind of diabetes, rather than prolonged high levels of glycemia, there is insulin resistance with secondary hyperinsulinemia, both very frequently associated with, hypertension, dyslipemia, atherosclerosis, and, most importantly, obesity Diabetes Mellitus (DM) is a disorder characterized by persistent hyperglycemia due to insulin resistance. Insulin is a pleiotropic hormone which signals a number of cellular processes such as glucoregulation, lipid metabolism, and protein synthesis in multiple tissues. In patients with DM, these actions of insulin are reduced. Consequently, there is an increase in free fatty acids which promote oxidative stress, endothelial dysfunction, vascular damage, and atheroma formation. The clinical results are high BP, HDL suppression, and high triglycerides (TGL) additionally, DM is associated with macrovascular (myocardial infarction, stroke) and microvascular (retinopathy, neuropathy, renal disease) problems which interfere with blood and nutrient delivery to multiple tissues throughout the body. DM is a crucial factor in Metabolic Syndrome (MetS) and is highly predictive of Cardiovascular Disease (CVD) risk. Much of our knowledge of the relationship between lipids, lipoprotein metabolism and the development of atherosclerosis and cardiovascular disease is based on characterizing metabolic markers. Lipoprotein (a) Lp(a) consists of an LDL-like particle and the specific apolipoprotein(a) apo (a), which is covalently bound to the apo B of the LDL like particle [1]. Elevated levels of Lipoprotein a Lp (a) are found to be independent risk factors for coronary heart disease. The structure of Lp (a) resembles LDL and its atherogenic properties can be explained by its binding glycosaminoglycans and inhibition of fibrinolysis. The atherogenic properties of Lp(a) are expressed over 30 mg/dL serum concentration [2]. Some reports on serum Lp (a) levels in subjects with type 2 DM show that Lp (a) levels are higher in this group of patients compared with non diabetic healthy controls [3, 4]. Patients with type 2 DM have defects in insulin secretion in response to a glucose load and resistance to insulin action [5, 6]. Insulin resistance best correlates with metabolic abnormalities and is linked to the development of cardiovascular disease in patients with type 2 diabetes [7]. Hyperinsulinemia and insulin resistance have been associated with coronary artery disease (CAD), type 2 DM, dyslipidemia and hypertension [8]. Lp(a) has been reported to be an independent risk factor for premature CAD and other thromboembolic disorders [9]. Many studies have reported that Lp(a) is elevated in type 2 DM. Moreover, the frequency of high risk levels has been reported to be much higher in type 2 diabetics [10, 11]. The present study aimed to study the lipids and lipoprotein (a) concentrations and association in patients with type 2 diabetes mellitus and metabolic syndrome.

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

Lipoprotein (a) as a predictor of coronary heart disease: the PRIME Study. Luc G, Bard JM, Arveiler D, Ferrieres J, Evans A, Amouyel P, Fruchart JC, Ducimetiere P, PRIME Study Group. Atherosclerosis. 2002 Aug; 163(2):377-84.

Clinical interest in Lp(a) has grown exponentially in recent times, as an assortment of epidemiological studies has pinpointed the link between plasma Lp(a) concentrations (reported as ≥300 mg/L or ≥30 mg/dL) and the risk of suffering coronary events, peripheral artery disease, cerebrovascular disease, and the early development of atherosclerosis in children and adolescents [13, 14]. Despite this prominence, the interpretation and application of Lp(a) levels in clinical scenarios remain a controversial issue, since no guidelines have been suggested outlining the profiles of patients whose Lp(a) concentration should be quantified. As a result, experimental studies are required for the clarification of its role as a CVD risk factor, as well as epidemiological studies evaluating the behavior of its plasma levels regarding other CVD risk factors across different latitudes in order to effectively direct genetic studies focused on highlighting the true role of the genetic intricacies underlying the greater variations reported among demographics [15].

2.1. International Status:

Lp(a) was initially isolated from human plasma by Berg in 1963, constituted by the association of an LDL-C particle covalently bound to a large glycoprotein, apolipoprotein(a) [Apo(a)] to apolipoprotein B by a disulfide bridge [9]. The Apo(a) chain contains five cysteine-rich domains known as "kringles", which are coded by a gene localized in the long arm of chromosome 6 (6q26-27) and is subject to multiple polymorphisms, particularly regarding the size of kringle IV [10, 11]. In turn, this feature characterizes the different isoforms of Lp(a) and is inversely associated with plasma Lp(a) levels. These variations are outstandingly marked among races, as illustrated by the remarkably higher plasma Lp(a) concentrations in Afrodescendants [12].

2.2. National Status:

NIL

3. Progress/ achievement so far, if any

a). Reference papers was collected.
b). Literature survey was studied.
c). Materials and methods were designed.

4. Work plan

4.1 Methodology

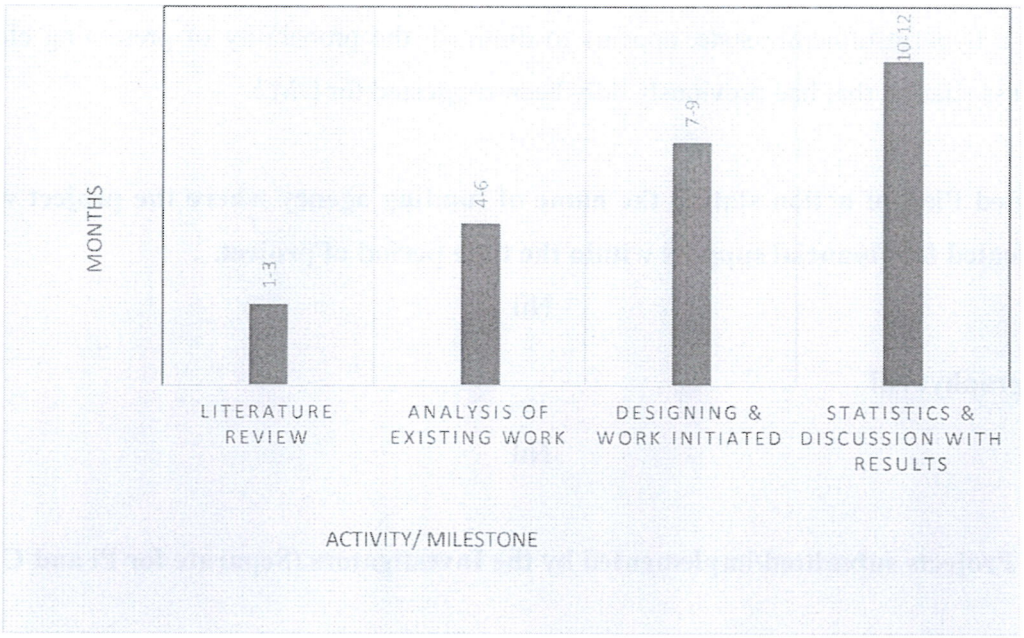
The Present study was carried out in the department of Biochemistry, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry. In this study total number of patients divided in to 3 different groups. The distributions of subjects in the study were as follows Study group: Group I- Metabolic syndrome- 220 subjects Group II- Diabetes mellitus- 220 subjects Group III- Control group – 220 subjects The study was approved by the institutional ethical committee of Sri Lakhsmi Naryana Institute of Medical Sciences, Puducherry according Helsiniki 1975 human ethical guidelines. All the data were collected in a prescribed perform and obtained informed consent form. 5ml of the blood samples which were taken for analysis were obtained from the antecubital vein. 5 ml of venous blood samples were collected from patients and controls. Blood samples were centrifuged and plasma was separated. The samples were then centrifuged at 3000 rpm for 15 minutes. The plasma separated and Samples were analyzed Lipoprotein (a)-estimated through the turbidometic method and serum Triglycerides(TGL), Cholesterol, LDL, HDL, plasma glucose, HbA1c were evaluated by using enzymatic kits on Siemens fully automated analyzer.

Statistical Analysis

All values were expressed as mean ± standard deviation (SD). Independent samples't' test was used to test the significance of difference in means between study group and controls. For men and women, a student t-test or ANOVA test was used to compare between control and MetS participants normal or non-normal distribution, respectively. A P-value less than 0.05 were considered statistically significant. Statistical analysis was done by using Microsoft Excel and SPSS for windows version 11.5 (SPSS, Inc., Chicago).

4.2 Time Schedule of activities giving milestones through BAR diagram. (Maximum of 1/2 pages)

S. No	Activity/ mile stolen	1st Year			
1	Literature review	**1-3 month**			
2	Analysis of existing work	-	**4-6 month**		
3	Designing & work initiated	-	-	**7-9 month**	
4	Statistics & Discussion with results	-	-	-	**10-12 month**



4.3 Expected outcome within the time period of See Money Scheme

Serum LP (a) is significantly and positively associated with most of the atherogenic profile defining parameters in type 2 DM of which elevated TG is prominent. Type 2 DM is associated with atherogenic lipid disorder and high fasting glucose, Lp(a) levels inversely correlate with glucose levels in type 2 diabetic patients. Lp(a) may be one of the cardiovascular risk factors in type 2 diabetic patients with longer duration of DM. This study may partially explain the higher incidence of cardiovascular problems with the increasing duration of DM. However, long-term prospective studies are needed in diabetic patients to disclose the true mechanistic links to cardiovascular problems. Diabetes and Lp(a) increase severity of atherosclerosis, cardio vascular disorders and those with both conditions have extremely severe atherosclerosis. A high prevalence of this combination is a major contributes to the heart disease among Indians. This analysis demonstrates that MS is yet another disease to consider among disorders involving high Lp(a) levels; future studies are required for discerning whether this relationship represents a state previous to the widely recognized cardiovascular consequences of this molecule, or if they each stand as independent outcomes. Likewise, the presence of MS influences the plasmatic concentration of Lp(a), but this effect is irrespective of the amount of diagnostic criteria. Although these criteria seem to modify levels when they are present, when assessed in conjunction, their effects appear to be attenuated. The only component to show an association

despite several statistical adjustments is impaired fasting glucose, which, by virtue of being related to a hyperinsulinemic state, appears to diminish the probability of presenting elevated Lp(a), an association that had previously only been suggested for DM2.

5. Suggested Plan of action stating the name of funding agency where the project will be communicated for financial support within the time period of project.

Nil

6. Bibliography: Nil

Nil

7. List of Projects submitted/implemented by the Investigators (Separate for Pi and Co-PI)

7.1 Details of Projects submitted to various funding agencies:

S.No	Title	Cost in Lakhs	Month of Submission	Role as PI/Co-PI	Agency	Status
1	NA	NA	NA	NA	NA	NA

7.2 Details of Projects under implementation

Sl. No.	Title	Cost in lakhs	Duration	Role as PI/ Co-PI	Agency
1	NA NA	NA	NA	NA	NA

7.3 Details of Projects completed during the last 5 years

Sl. No.	Title	Cost in lakhs	Duration	Role as PI/ Co-PI	Agency
1	NA	NA NA	NA	NA	NA

8. List of publications published by the Investigators, if any:

a) Principal Investigator

S. No	Author names	Title of paper	Name of Journal	Vol (Issue)	Page No.	Year
1.	E. Prabhakar Reddy, Mahadeo Mane , **T. Mohanalakshmi 1* 2 3**	Triglycerides fasting or non-fasting? Current knowledge in diagnostic values	Asian Journal of Pharmacy and Pharmacology	5(2)	218-226	2019
2.	**T Mohana Lakshmi1*,** BS Ravi Kiran2, P Jayakumar3, R Srikumar4, E Prabhakar Reddy5.	High Sensitive C – Reactive Protein in Hypertension and Metabolic Syndrome.	Research Journal of Pharmaceutical, Biological and Chemical Sciences	7(6)`	2017-2021	2016
3.	**T Mohana Lakshmi 1,** Chidambaram2 , A Vaithialingam3 , and E Prabhakar Reddy4 *	Advantages of Stem Cell Research: Role of Medical therapy in India.	Research Journal of Pharmaceutical, Biological and Chemical Sciences	5(3)	96-99	2014
4.	E Prabhakar Reddy , **T.Mohana Lakshmi** , Shankar Manohar Pawar	Antioxidants Status in Haemodialysis Patients	Int J Biol Med Res.	3(1)	1466-1468	2012

9. Budget

SI. No	Head	Amount (Rs.)
1	BP Apparatus, Stethoscopes, Body weight weighing machine, SPSS version 16 Chicago, IL, USA, ECG machine	50,000/-
2	Consumables (gels bottles, cotton, sprit, testing charges, tools, etc.)	25,000/-
3	Travel support for the purpose of research work.	10,000/-
4	Contingency	10,000/-
5	Others consumables	5,000/-
	Total	**1,00,000/-**

*In case of any joint proposal for purchasing a same equipment, each of the associated PLs is also required to give separate budget (without any clubbing) to avoid any ambiguity, if all the associated projects are not awarded by committee.

10. Name of at least two subject experts from the Institute and one from the outside Institute with their contact details:

1. **Dr. Praveen Kumar. V** Associate Professor in Microbiology, Chalmedha Anand Rao Institute of Medical Sciences, Karimnagar, Telanagana **Mobile No**: 8332063265 **E-mail id:** vpraveenkumar4@gmail.com	2. **Dr. Patta Appa Rao** Professor in Microbiology NRI Medical College, Vishakapattinam **Mobile No**: 9848766293 **E-mail id:** pattaapparao@yahoo.com

CERTIFICATE FROM THE INVESTIGATOR

Project Title: Lp(A) Levels In Diabetes And Metabolic Syndrome

It is certified that

1. I do hereby agree to submit a complete proposal for financial support to the external funding agency within the time period of SMS-2018.
2. I undertake that spare time on equipment procured in the project will be made available to other users.
3. I agree to submit a certificate from Institutional Biosafety Committee, if the project involves the utilization of genetically engineered organisms. I also declare that while conducting experiments, the Biosafety Guidelines of Department of Biotechnology, Department of Health Research, GOI would be followed in to.
4. I agree to submit ethical clearance certificate from the concerned ethical committee, if the project involved field trails/experiments/exchange of specimens, human & animal materials etc.
5. I agree to abide by the terms and conditions of SMS-2018, BIHER, and Chennai.

Name and signature of
Principal Investigator

Name and signature of
Co-Principal Investigator

Date: 22.01.2018
Place: Pondicherry

Forwarded by Head of the Department

Signature of the Head

DEAN
SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
OSUDU, AGARAM VILLAGE,
KOODAPAKKAM POST,
PUDUCHERRY - 605 502

PROJECT EVALUATION FORMAT

Recommendation sheet

Name of the Principal Investigator	Dr. T. Mohanalakshmi
Name of the Co-Principal Investigator	Dr. R. Srikumar
Name of the Department	Microbiology
Title of project	Lp(A) Levels In Diabetes And Metabolic Syndrome
Recommendation of the evaluation committee (Recommended/Revision/Not Recommended)	Recommended
Financial allocation recommended	Rs. 1,00,000/-

SI. No.	Head	Amount
1	BP Apparatus, Stethoscopes, Body weight weighing machine, SPSS version 16 Chicago, IL, USA, ECG machine	50,000/-
2	Consumables- Gel bottles, cotton, sprit, testing charges, tools, etc.	25,000/-
3	Travel support for the purpose of research work.	10,000/-
4	Contingency	10,000/-
5	Others consumables	5,000/-
	Total	**1,00,000/-**

Name and Signature of the Research Advisory Committee members with date.

Internal Quality Assurance Cell IQAC Pondicherry-02 SLIMS

(Dr. A Suganalakshmi)