



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)



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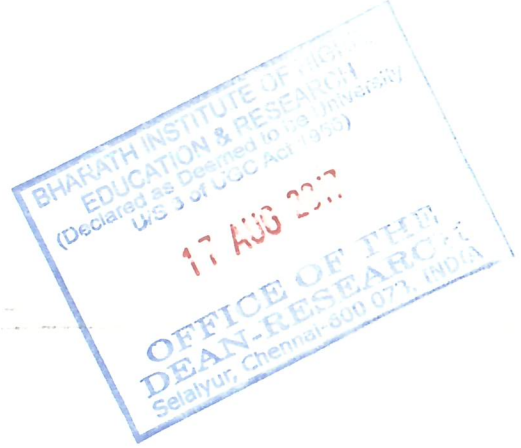
173, Agaram Road, Selaiyur, Tambaram,
Chennai - 600 073. Tamil Nadu.

Ref. No.SMS-2015-O-01

Date: 17.08.2017

TO

Mr. R. Srikumar
Assoc. 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: High-Level Mupirocin Resistance in Staphylococcus spp. among Health Care Workers in a Tertiary Care Hospital

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

Approved on: 02.08.2017

Payment details:

Voucher No.36

Dated: 30.08.2017

With Regards

Dean-Research

Bharath University

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

CASH / PAYMENT VOUCHER

Date 30/08/2017

V.No. 36

Debit _____ Amount _____

Rs. 1,00,000/-

PAID TO Dr. R. Sri Kumar

RUPEES One Lakh only

TOWARDS Seed Money Scheme - 2015



[Signature]

[Signature]

Authorised by

Finance Manager

Cashier/Accountant

Payee's Signature

PROPOSAL SUBMISSION

1. 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

2. Details of Co-Principal Investigator

Name : Dr. E. Kavitha
Designation : Assistant Professor
Highest Qualifications : M.Sc
Department : Microbiology
E-mail : kavimicro23@gmail.com
Contact No : 9944961466
Date of Joining : 04.10.2014

Technical details

1. Introduction:

Nasal colonization with *Staphylococcus* spp. is commonly observed among the health care workers. Mupirocin, a topical antibiotic is considered to be an effective antibiotic for the elimination of nasal colonizers [1]. Nasal colonizers play a substantial role in the disease transmission and also in the spread of antibiotic resistance [2]. All *staphylococcus* colonization is mostly the endogenous type of infection, which further acts as a risk factor for the subsequent infection [3]. Since, there is an increase in the spread of nosocomial infections and antibiotic resistance strains; eradication of such colonization is very essential [4]. Mupirocin is available as an antimicrobial agent in nasal formulation for the treatment of nasal colonization. Though its usage is highly recommended, the emergence of resistance has to be addressed simultaneously. Health care workers are closely associated with the patient care and management, so they should be treated in order to reduce the risk of infection among high-risk patients for the acquisition of multidrug-resistant infections [5]. Based on the susceptibility pattern for mupirocin, persons or carriers can be grouped as susceptible to mupirocin, showing low-level resistance to mupirocin and highlevel resistance to mupirocin. As per standard guidelines, low-level mupirocin resistance has minimum inhibitory concentration (MIC), which is $64 \mu\text{g/mL}$ and high-level resistance to mupirocin is taken as $\text{MIC} \geq 512 \mu\text{g/mL}$ [6]. Since there are no standard methods to interpret the susceptibility, methods like MIC determination by E test and polymerase chain reaction are followed to detect the resistant genes. Mupirocin can be used on the anterior nares of patients identified as carriers to eliminate such pathogens from health care workers, since they have a significant role in the spread of infections in a hospital setting [7]. Mupirocin resistance is both mutational change as well as transferable resistance mediated by the acquisition of resistance gene called mup A gene [8, 9]. As the high-level mupirocin resistance is plasmid mediated, which can spread clonally as well as horizontally, even the spread of genes can occur between the different species of staphylococci [10]. Since hospital represents a unique setting of acquiring new and multi-drug resistant infections, periodic screening among health care workers is mandatory. Our study aimed to detect the high-level mupirocin resistance strains of *Staphylococcus* spp. among the health care workers of a tertiary care hospital. The following objectives were framed for the study:

1. To isolate and to identify *Staphylococcus aureus* from the nasal swabs of the health care workers.
2. To screen for the high-level mupirocin resistance among the isolated *Staphylococcus* strains by Kirby Bauer disk diffusion method.

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

Hurdle JG, O'Neill AJ, Mody L, Chopra I, Bradley SF. In vivo transfer of high-level mupirocin resistance from *Staphylococcus epidermidis* to methicillin-resistant *Staphylococcus*

aureus associated with failure of mupirocin prophylaxis. J Antimicrob Chemother. 2005; 56(6):1166-8.

In recent years, nosocomial outbreaks of MRSA have become a major infection control problem. MRSA strains may spread readily in hospitals from colonized or infected persons. Colonized employees are generally asymptomatic, although they are a potential reservoir of infections acquired by patients. Colonized or infected hospital personnel (HCWs) may serve as reservoir and disseminator of MRSA in hospitals. [9] Detection and differentiation of both types has important clinical implications. The presence of high-level mupirocin resistance (MuH) excludes its clinical use, however low-level mupirocin resistance (MuL) can be overcome by recommending higher than usual dosage.

2.1. International Status:

In recent years, nosocomial outbreaks of MRSA have become a major infection control problem. MRSA strains may spread readily in hospitals from colonized or infected persons. Colonized employees are generally asymptomatic, although they are a potential reservoir of infections acquired by patients.[8] Colonized or infected hospital personnel (HCWs) may serve as reservoir and disseminator of MRSA in hospitals.[9] Nasal carriage of *Staphylococcus aureus* is very common among health care workers, and treatment with mupirocin is one of the choicest antibiotics available. But with the rampant usage of mupirocin like other antibiotics, the emergence of mupirocin resistance is also on rise. This resistance is both low level as well as high level among the isolated strains.

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

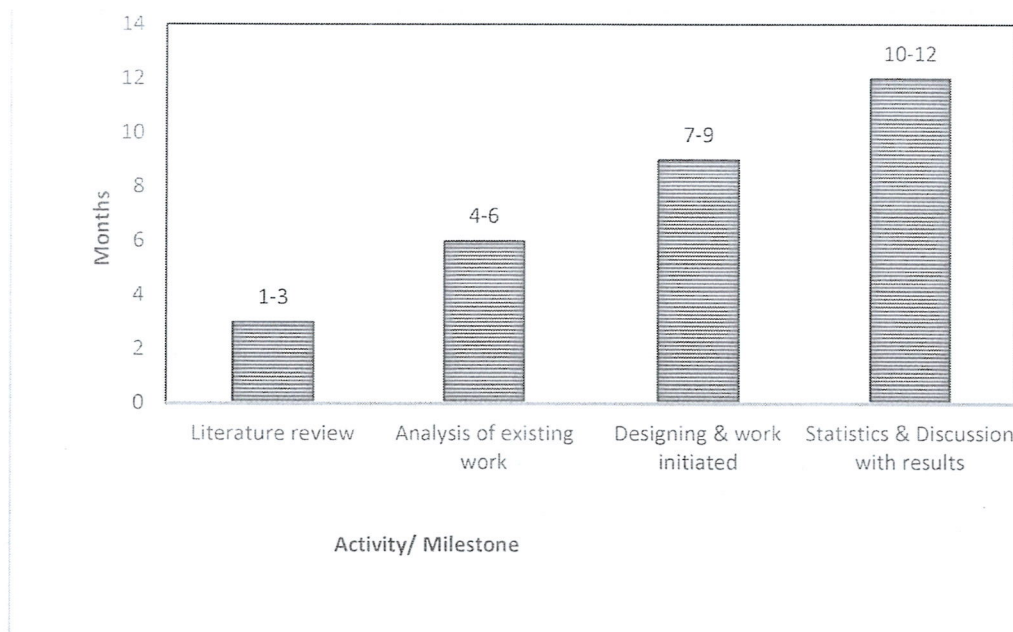
4.1 Methodology

The study was a cross-sectional type of study, which was carried out in the department of microbiology for a period of 4 months between July and October 2017. Collection of swabs was done after getting clearance from Institutional research and Ethics Committee. A total of 200 nasal swabs were collected from the health care workers, which included doctors, lab technicians, staff nurses, medical students, and laboratory attenders. Consent was obtained from

the health care worker prior to the collection of swabs from them. With the help of sterile pre-moistened cotton swabs, samples were collected from all the health care workers, which were immediately culture on Blood agar and MacConkey agar plates. All the plates were kept for incubation at 37 ° C for 24 h. Gram staining of the colonies was performed on the subsequent day and was tested for catalase and coagulase test. Coagulase test was done by both the slide and tube method, wherein the tube coagulase method was taken as the confirmatory result. All the grown isolates were subjected for antibiotic susceptibility testing by Kirby Bauer disk diffusion method. Methicillin resistance was identified by using ceftiofur 30 μ g disc, whereas to detect mupirocin resistance, Mupirocin 5 and 200 μ g were placed on Muller Hinton agar after the lawn culture inoculation of the test organism. All the plates were incubated at 37 ° C for overnight. The zone of inhibition was measured and interpreted as sensitive or resistance. The zone of inhibition of ≤ 21 mm was considered methicillin resistant for ceftiofur and ≥ 22 mm were considered methicillin sensitive as per the Clinical and Laboratory Standards Institute guidelines 2015. For mupirocin, if the zone was formed, it was considered sensitive and in resistant strains and no zone formation was observed.

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

S. No	Activity/ milestone	1 st Year			
		1-3 month	4-6 month	7-9 month	10-12 month
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

Nasal carriage of MRSA acts as an important cause and spread of nosocomial infections among health care workers in a hospital setting. The prevalence of *S. aureus* among nasal carriage of health care workers in our study was found to be 13% as compared to the study conducted by Loveleena Agarwal, which showed about 48% of prevalence of *S. aureus* [11]. Prevalence of 27.14% of *S. aureus* in our study was comparable as reported from studies in India. Our study highlights a prevalence of low-level and highlevel mupirocin resistance among the Staphylococcal isolates. Hence, it is mandatory to do regular screening for nasal carriage among health care workers to avoid its transmission in the community. Persons found to be nasal carriers should be rightfully advised for the timely treatment with the antibiotics. Repeat swabs should be collected to confirm the absence of colonization. The use of chlorhexidine and neomycin could be suggested if repeat culture shows the growth and resistance toward mupirocin. The authors declare that they have no competing interest to disclose.

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

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

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.	Geethavani Babu, Balamuruganvelu S, Saleel VMaulingkar, R Srikumar , Sreenivasalu Reddy V, Senthamizhan VS	Incidence Rate and Antibiotic Susceptibility Pattern of Listeria Species in High Risk Groups	National Journal of Laboratory Medicine	6(2)	MO11-MO15	2017
2.	Naveen Kumar C1, Ponniah M2, Srikumar R3* , Vijayakumar R4, Chidambaram R4, Jayalakshmi G1, Prabhakar Reddy E5, Manoharan A6, Sai Ravi Kiran B5	Incidence of Dengue Fever in Febrile Patients and Co-Infection with Typhoid Fever in South India	Annals of Medical and Health Sciences Research	7:	111-113	2017
3.	S Latha, R Venkataramanan, R Srikumar , RV Kumar	Effect of Triphala on noise stress induced alteration in glucocorticoid and carbohydrate metabolism.	International Journal of Pharma and Bio Sciences	6(2)	1-15	2015

9. Budget

SI. No	Head	Amount (Rs.)
1	BP Apparatus, Stethoscopes, Body weight weighing machine, SPSS version 16 Chicago, IL, USA, ECG machine	45000
2	Consumables (gels bottles, cotton, sprit, testing charges, tools, etc.)	10000
3	Travel support for the purpose of research work.	10000
4	Contingency	25000
5	Others consumables	10000
	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:

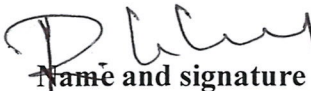
1. Dr. Dr. G. Muthu Research Scientist, ICMR, Thirunelveli Mobile No: 98843 04202 E-mail id: gopalmuthukrishnan@gmail.com	2. Dr. Manikandan Associate Professor in Physiology Tagore Medical College and Hospital, Chennai Mobile No: 9444434725 E-mail id: manikandanphysio@gmail.com
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CERTIFICATE FROM THE INVESTIGATOR

Project Title: High-Level Mupirocin Resistance in *Staphylococcus* spp. among Health Care Workers in a Tertiary Care Hospital

It is certified that

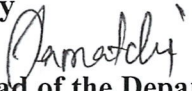
1. I do hereby agree to submit a complete proposal for financial support to the external funding agency within the time period of SMS-2015.
2. I undertake that spare time on equipment procured in the project will be made available to other users.
3. I agree to submit a certificate from Institutional 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-2015, BIHER, and Chennai.


Name and signature of
Principal Investigator



Name and signature of
Co-Principal Investigator

Date: 03.07.2017

Place: Pondicherry


Forwarded by Head of the Department

Signature of the Head


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

PROJECT EVALUATION FORMAT

Recommendation sheet

Name of the Principal Investigator	Dr.R.Srikumar
Name of the Principal Investigator	Dr. E. Kavitha
Name of the Department	Microbiology
Title of project	High-Level Mupirocin Resistance in <i>Staphylococcus</i> spp. among Health Care Workers in a Tertiary Care Hospital
Recommendation of the evaluation committee (Recommended/Revision/Not Recommended)	<i>Recommended</i>
Financial allocation recommended	<i>Rs. 1000000/-</i>

SI. No.	Head	Amount
1	BP Apparatus, Stethoscopes, Body weight weighing machine, SPSS version 16 Chicago, IL, USA, ECG machine	45000
2	Consumables- Gel bottles, cotton, sprit, testing charges, tools, etc.	10000
3	Travel support for the purpose of research work.	10000
4	Contingency	25000
5	Others consumables	10000
	Total	1,00,000

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



[Signature]
(Dr. G. Jayalalitha)