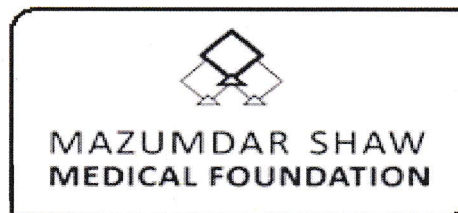




VIGNAN'S
Foundation for Science, Technology & Research
(Deemed to be UNIVERSITY)
-Estd. u/s 3 of UGC Act 1956



Memorandum of Understanding

Between

MAZUMDAR SHAW MEDICAL FOUNDATION

8th Floor, A-Block

No.258/A, Anekal Taluk, Hosur Road,

Bommasandra Industrial Area, Bangalore – 560099

and

VIGNAN'S FOUNDATION FOR SCIENCE, TECHNOLOGY & RESEARCH

(Deemed to be University)

Vadlamudi - 522 213, Guntur, Andhra Pradesh

MISSION:

In accordance with the mutual interest to enhance academia-research interaction and promote knowledge sharing, Mazumdar Shaw Medical Foundation and VFSTR University enter into this formal statement of collaboration in the form of Memorandum of Understanding (MoU) for a duration of **FIVE** years with the objective of targeted discovery of active anti-fibrotic phyto-chemicals.

AIM:

Identification and characterization of potential active compound/s of plant origin with therapeutic properties to delay, or inhibit fibrosis or recovery from fibrosis in human.

OBJECTIVES:

A. Computational:

- a. Identification of medicinal herbs/plants with indication of traditional practice in lung, liver and skin ailments.
- b. Development of database on medicinal herbs and secondary metabolites of medicinal plants with anti-fibrosis properties.
- c. Computational validation and drug likeliness of secondary metabolites.



B. Experimental:

- a. Extraction and identification of plant derived compounds
- b. Enhanced production of active compounds using micropropagation technique.
- c. Characterization of the lead molecules of plant origin.
- d. *In vitro* and *in vivo* analyses of anti-fibrotic efficacy of the characterized phytochemicals.

C. Pharmacophore efficacy testing:

- a. AMDE and pKD studies of characterized compounds (individual/combinatorial).
- b. Toxicological analysis as per the Indian pharmacopeia.

KEY CONTACT PERSONALS

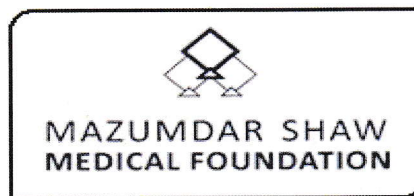
<p>1. Prof.S.Krupanidhi , HOD, Department of Biotechnology VFSTR Deemed to be University Vadlamudi – 522 213 Guntur , Andhra Pradesh Ph.9440984668 Email: hodbt@vignan.ac.in</p> <p>Dr. Avinash Rasalkar: Subject expert</p>	<p>1. Dr. Paul C Salins, Medical Director Mazumdar Shaw Medical Center No.258/A, Anekal Taluk, Hosur Road, Bommasandra Industrial Area, Bangalore - 560099 Email: drpaul.salins@gmail.com,</p>
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Responsibility from VFSTR Deemed to be University

1. Department of Biotechnology at VFSTR identifies the key person for mutual contact.
2. VFSTR assigns at least **five** Ph.D. research scholars to work on the identified topic of MOU viz., Fibrosis **with stipend**.
3. VFSTR involves research scholars and research guides to isolate phyto-chemicals from the chosen medicinal plants (grown in the campus), induce fibrosis in rat/mouse models (animal house in the campus) and study the recovery/relapse of induced fibrosis in models.



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4. VFSTR organizes scientific gathering on the topic of Fibrosis at least once in two years during the duration of the MOU seeking the help of **MSMF** to identify the best speakers.
5. VFSTR allows the technical staff and junior scientists of **MSMF** to enroll for Ph.D. admission with a **fee waiver**.
6. VFSTR takes up the *in-vivo* testing of the lead polyherbals/phytochemicals identified at VFSTR and as a prerequisite for pre-clinical testing to be performed at **MSMF**.

Responsibility from MAZUMDAR SHAW MEDICAL FOUNDATION (MSMF)

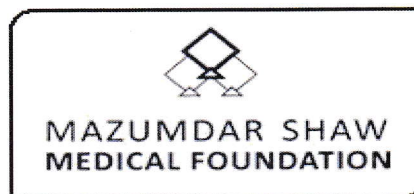
1. **MSMF** identifies key person for mutual contacts.
2. **MSMF** offers subject knowledge and intricacies of the chosen topic of MOU viz., Fibrosis to PhD. Scholars and students.
3. **MSMF** analyzes phytochemicals through the LCMS, HPLC etc., prepared at VFSTR.
4. **MSMF** offers training/internship to students/research scholars of VFSTR University in the above mentioned R&D activities.
5. **MSMF** takes up confirmation studies on the pre-clinical investigations of the lead (pharmacophores) polyherbals/phytochemicals which pass the AMDE and *in-vitro* and *in-vivo* toxicological studies conducted at VFSTR.

RESEARCH PUBLICATIONS AND PATENTS

- VFSTR University and Mazumdar Shaw Medical Foundation shall promote active interaction among their staff and explore possibilities for undertaking commercial or public funded joint research and development projects. Scientists of both institutions will be encouraged to apply for sponsored or funded projects keeping in view the interests and philosophies of the respective institutions.
- Research findings from a collaborative research project published by either party will give credit to other party's contribution including authorship, but the party publishing them will be entirely responsible for conclusions and interpretations reported.



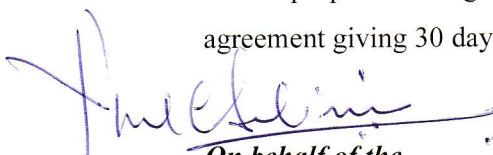
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- The right or proprietorship for any patents, products, technology development or other innovations, jointly developed by VFSTR University and Mazumdar Shaw Medical Foundation shall be jointly owned as per agreement to be signed by both parties on a case to case basis.
- Otherwise, both VFSTR University and Mazumdar Shaw Medical Foundation agree that any patents, products, technology development or other innovations produced by either VFSTR University or Mazumdar Shaw Medical Foundation during the period of MoU, where there are no technical contributions from either VFSTR University or Mazumdar Shaw Medical Foundation human resources, shall be the sole property of the respective institution.

DURATION OF MoU

- The Agreement shall be valid for a period of 5 years from the date of execution. The agreement may be renewed based on the performance and on mutually agreed terms and conditions.
- The agreement may be terminated in the event of either party having breached the terms and conditions mentioned above. In such a case, however the students already enrolled for the internship or undergoing internship at Mazumdar Shaw Medical Foundation or employees registered as PhD student at VFSTR University shall continue and complete the internship/degree as per the provision of this agreement for which purpose the agreement shall be operative. Either party can terminate the agreement giving 30 days of notice.


On behalf of the 22/10/2019
Mazumdar Shaw Medical Foundation




On behalf of the 22/10/19
Vignan's Foundation for Science,
Technology & Research (VFSTR)
Prof. S. KRUPANIDHI, Ph.D
Head of The Department
Department of Biotechnology
VFSTR UNIVERSITY
Vadlamudi - 522 213, Guntur Dt A.P India



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**MAZUMDAR SHAW
MEDICAL FOUNDATION**

Tentative Timeline and work flow:-

First 6 months	1 st year	1.5 year	2 nd year	3 rd year	4 th year	5 th year
(1a).Taxonomic identification of medicinal herbs.						
	(1b) Cultivation of Medicinal herbs / or procurement of plant product					
		(2) Extraction and characterization & purification of plant derived compounds		(2b) Experimental studies using the model specimens with the approval of IAEC.		
(3) Development of database on medicinal herbs and secondary metabolites of medicinal plants with anti-fibrosis properties						
		(4) Computational validation and drug likeliness of secondary metabolites.				
			(5) Characterization of the lead molecules of plant origin.			
			(6) Evaluation of Pharmacophore leads as potential anti-fibrosis drug. Experimental validations			