



CENTRAL RESEARCH LABORATORY

RAJAS MEDICAL INSTITUTIONS

(RESEARCH UNIT AT RAJAS DENTAL COLLEGE & HOSPITAL)

Kavalkinaru Junction - 627 105, Tirunelveli District



Prof. Dr. Jacob Raja, M.D.S., F.I.D.A.
Chairman, Rajas Medical Institutions



SARDAR DESAI RAJU
RAJAS GROUP OF COLLEGES

PREFACE

Central Research Laboratory (CRL) was established at Rajas Dental College & Hospital campus by our honourable chairman Dr. Jacob Raja, with views to contribute multidisciplinary R & D activities and offer a platform to researchers to avail such lab facilities. CRL functions as the flagship enterprise of Rajas Medical Institutions with a dedicated team of experienced clinicians, academicians, scientists, and public health researchers. CRL is committed to link the bench-to-bedside gap by reaching the benefits of research to patients through the energetic teamwork of clinicians and scientists. CRL is devoted towards translational research in the area of clinical dentistry and life sciences. CRL is well-equipped with advanced instrument facilities, and state of the art technologies. CRL has separate labs viz. animal cell culture facility for in vitro studies, biochemistry facility for salivary biomarker studies, molecular biology facility for genomic studies, microbiology and pharmacology facilities for alternative and complementary medicine studies.

CRL is the pivotal hub with S.A. Raja Pharmacy College's Committee for Control and Supervision of Experiments on Animals (CCSEA) in undertaking approved animal research using the animal house facility for in vivo preclinical, toxicology and histopathology experiments. Clinical studies conducted at CRL undergo Institutional Review Board approval and Institutional Ethical Clearance before their execution. CRL assists extramural and intramural research projects / dissertations / internship training / short studies of undergraduate, post graduate students and PhD scholars and also undertakes contract research.





CHAIRMAN SIR'S MESSAGE

The Central Research Laboratory (CRL) was envisaged to be the crucible of ideas and the crux of all research work of Rajas Medical Institutions. A corpus of INR 10 Lakhs was demarcated as a core fund for invigorating and bolstering the research temper of our students and faculty alike during their quest for a PhD thesis or MDS dissertations or even a Short Term Study (STS) undertaken by our undergraduates.

The CRL endeavors to provide a congenial environment for translating the fruits of research to the common man's bedside / chairside. The research facilities of the CRL is intended to instill the spirit of scientific investigation and foster innovation in our talented Faculty and thus guide them to rediscover their own potential and realize their dreams.

The CRL has partnered with elite and premier bodies such as the Indian Council for Medical Research (ICMR) and the Tamilnadu State Council for Science and Technology (TNSCST) in the conduct of several symposia or workshops and research projects for which we have received several grants.

We hope that we could reach out and partner with likeminded and research oriented Institutions, Universities and Individuals to further foster this outlook of inquisition and enterprise, and in doing so, may arrive at the goals of newer advances, discovery and invention in concert.

Best Wishes

Prof. Dr. Jacob Raja MDS. FIDA

FACILITIES AND DIVISION OF CRL

Dental Research

- Development of new oral hygiene products like mouthwash, toothpaste and gel.
- Development of new markers in disease pathology and its therapeutics.
- Development of novel biomarkers in saliva and serum.
- Genotoxic markers of oral health.
- Corrosion susceptibility of orthodontic brackets.
- Molecular screening of endodontic and periodontal pathogens.
- Microbiological and molecular evaluation of pathogens during fixed orthodontic treatment.

Phytochemical - Herbal Research

- Discovery of new drugs and its phytochemical evaluation to assess various bioactive compounds present in it.

Nanotechnology

- Synthesis and evaluation of nanoparticles for the drug discovery and development research.

Molecular and Cell Line Studies

- In vitro cell line studies to analyze the various mechanisms and also to develop novel diagnostic markers and methods.
- Evaluating clinical samples using recent techniques for the molecular level analysis of the disease diagnosis and prognosis with pharmacological and surgical therapy.

In vivo Animal Studies

- Evaluation of newly synthesized or developed drugs to know their potency, efficacy and toxicity in living animal model.

Microbiological and Immunological Studies

- Microbiological identification and analysis of various microorganisms in the clinical samples using standard techniques.
- Evaluation of antimicrobial activity of various drugs through in vitro experiments.

Hematological and biochemical analysis

- Estimation and validation of various hematological parameters along with biochemical assays for the clinical samples.

Histopathological and image analysis

- Histopathological evaluation of human-dental and animal samples to analyse the various pathological features.

RAJAS MEDICAL INSTITUTIONS



**Rajas Dental
College and Hospital,
Kavalkinaru Jn.**



**S.A. Raja Pharmacy
College,
Vadakkankulam**



**Sardar Rajas
College of Nursing,
Kavalkinaru Jn.**



**Rajas Institute of
Allied Health Sciences,
Vadakkankulam**



**Sardar Raja Arts
and Science College,
Vadakkankulam**



**Rajas Institute of
Laboratory Medicine,
Kavalkinaru Jn.**

COLLABORATION AND MOU WITH INSTITUTES

- Research collaboration and students exchange programme Lincoln University College, Malaysia
- Central Animal House Facility, S.A. Raja Pharmacy College, Vadakkankulam
- Herbal Garden - Indian Agriculture College, Radhapuram.
- Education and Research - Kalasalingam Academy of Research and Education, Krishnankoil.
- Research and Outreach Programme - Department of Zoology, Holy Cross College, Nagercoil.
- Research Collaboration - Centre for Research on Molecular and Applied Science (CRMAS), Thiruvananthapuram - 695006.
- Education & Research - Bishop Heber College, Trichy.

INSTRUMENT FACILITIES IN CRL

S.No.	Major Instruments Available in CRL	Make	Model
1	Analytical balance (d = 0.1 mg)	SHIMADZU	AUX220
2	Autoclave (vertical)	HOSPITAL	VERTICAL
3	Blood Cell Counter (8 digits)	JAYNA	MANUAL
4	Trinocular microscope with Image capturing Software	MAGNUS	CH20ITR
5	CO2 Incubator	HIMEDIA	AI006HS
6	Cooling Centrifuges(6000 BPM)	REMI	CM-8PLUS
7	Colony Counter	DEEP VISION	363
8	CRYOCHILL - 20oC Mini Cooler	TARSONS	525030
9	-20oC PCR Mini Cooler	TARSONS	525110
10	Doctor Centrifuges	REMI	C852
11	Deep Freezer (-16oC to -24oC)	REMI	RFV -245
12	Gel Electrophoresis (submarine)	MEDOX	MX-1250-01
13	Gel electrophoresis system with image capturing software	BIOTECH YERCAUD	HIGH-END MODEL
14	Homogenizer	REMI	RQ127A
15	Heating mantle	HASTHAS	BASIC
16	Hot air oven	ROTEK	RHO-14
17	Inverted microscope with image capturing Software	MAGNUS	INVI-LED
18	Incubators (Microbiology and Routine)	MOTRI	2050
19	Laminar air flow chamber (Microbiology and cell culture)	KLEANZONE	BS 1350

INSTRUMENT FACILITIES IN CRL

S.No.	Major Instruments Available in CRL	Make	Model
20	Binocular Microscopes	ALMICRO	BM 6BI
21	Mini Spin Centrifuge	REMI	RM-02 PLUS
22	Magnetic Stirrer	REMI	2MLH
23	Menbrane Filter / All flask Filter Assembly	RIVIERA	73200 544
24	Neubaur's Chamber	ROHEM INDIA	BS748
25	Liquid Nitrogen Container	INOX	IX35
26	pH meter	SYSTRONICS	361
27	Colorimeter	SEAGUL	A-4
28	PCR (thermal Cycler)	BIO-RAD	T200 Tm
29	UV- VIS-spectrophotometer	SYSTRONICS	au 2702
30	Vertex Mixer	REMI	CM101 PLUS
31	Water bath	LABTEC	LTWBD1
32	Weigh balance (0.01 gm)	WENSAR	PGB-600
33	Dissection Microscope	WESWOX OPTIC	DM-2
34	Refrigerators (Microbiology and Routine)	SAMSUNG	RR24T282Y58
35	Slide Warming Table	GUNA	BASIC
36	Soxhlet Apparatus	BOROSIL	SINGLE
37	Vaccum Pump	DEEP VISION	TID 25-5

MAJOR INSTRUMENTS AVAILABLE IN CRL

**WEIGH BALANCE (0.01GM),
WENSAR, PGB-600**



**ANALYTICAL BALANCE
(D = 0.1MG)
SHIMADZU, AUX220**

HOT AIR OVEN



**TRINOCULAR MICROSCOPE
WITH IMAGE CAPTURING
SYSTEM, MAGNUS, CH201TR**

**CO2 INCUBATOR,
HIMEDIA, AI006HS**



**COOLING CENTRIFUGES
(6000 RPM), REMI, CM8PLUS**

**DEEP FREEZER (-16oC TO -24oC)
REMI, RFV-245**



MAJOR INSTRUMENTS AVAILABLE IN CRL

LAMINAR AIR FLOW CHAMBERS
(MICROBIOLOGY AND CELL
CULTURE), KLEANZONE, BS1350



MAGNETIC STIRRER,
REMI, 2MLH

pH METER, SYSTRONICS, 361



PCR (THERMAL CYCLER),
BIO-RAD, T100TM

UV-VIS-SPECTROPHOTOMETER,
SYSTRONICS, AU-2702



GEL DOCUMENTATION
SYSTEM, BIOTECH, YERCAUD

EXPERIMENTS AND ASSAYS

S.No.	Experiments
Phytochemical analysis and herbal research	
1	Herbal Plant extraction (polar and non polar solvents)
2	Preliminary phytochemical analysis (alkaloid, flavonoid, tannin, saponin, protein, glycosides, carbohydrate, sterols)
3	Advanced phytochemical analysis - HPLC, HPTLC, GC-MS, NMR, IR
4	Estimation of total flavonoids
5	Estimation of total phenols
Antioxidant assays	
6	In vitro Antioxidant assay - DPPH, nitric oxide, hydrogen peroxide scavenging activity
7	Enzymatic antioxidant assay - GSH, GPX, Catalase
In-vitro pharmacological assay	
8	In vitro anti inflammatory activity
	1) HRBC membrane stabilization activity
	2) Protein denaturation inhibitory assay
	3) Protease inhibition assay
9	In vitro anti proteinase assay
	1) Anti collagenase assay
	2) Anti elastase assay
Nanotechnology	
10	Synthesis of Nanoparticles from natural products (Extract)

EXPERIMENTS AND ASSAYS

S.No.	Experiments
Molecular and Cell line studies	
11	Genotyping analysis by PCR
12	Protein separation and quantification using Gel electrophoresis
13	In vitro MTT assay (cytotoxicity assay)
14	In vitro genotoxicity assay
15	In vitro animal cell culture studies
In vivo animal studies	
16	In vivo acute toxicity studies in animals and Pharmacological evaluation
17	In vivo anti inflammatory study
18	In vivo analgesic activity
19	In vivo learning and memory & anti Alzheimer studies
20	In vivo hepatoprotective study
21	In vivo anti- diabetic studies
Microbiological and Immunological studies	
22	Anaerobic culture
23	Immunological studies
	Cytokine markers using ELISA (IL1, IL2, IL6, TNF alpha)
24	Antimicrobial activity
	a) Disc diffusion method
	b) Agar dilution method
	c) E - test
	d Minimum Inhibitory concentration determination (MIC)

EXPERIMENTS AND ASSAYS

S.No.	Experiments
Hematological and biochemical analysis	
25	Hematological studies - Complete Blood Count (CBC)
26	Erythrocyte Sedimentation Rate (ESR)
27	Serum analysis - SGOT, SGPT and ALP
28	Vitamin - D (ELISA method)
29	Serum Phosphorus estimation
30	C - Reactive Protein (semi quantitative method)
31	Lymphocyte culture
Histopathological and image analysis	
32	Immunohistochemistry assay
33	Histopathological evaluation
34	SEM, TEM analysis

STATISTICAL CONSULTING SERVICES

WE HAVE IN HOUSE STATISTICA ANALYSIS CENTRE TO VALIDATE THE DATA FOR THE REFINEMENT OF THE RESEARCH STUDY

- Research Design
- Sample size Calculation
- Data tabulation
- Data analysis and comparison using new statistical post-hoc tests.
- Graphical representation of data
- Questionnaire analysis

TRAINING AND INTERNSHIP FACILITY

Professionally-competent experts provide assistance in scientific presentation in conference, seminars and continuing dental/medical education (CDE/CME) programs. CRL enriches research activities by organizing training programs, CDE, symposia, workshops, seminars and conferences regularly.

We offer various training Programs for Dental, Medical, Life science students and scholars. We also arrange special training programs for the undergraduate, post graduate and research scholars of Dental, Medical, Pharmacy, Nursing and Life science departments on request.



COMPLETED TRAINING WORKSHOPS AND SEMINARS

- “Confront and perspective of Nano research in Healthcare” on 5th January 2019.
- Hands-on Workshop on “Zebrafish a molecular tool box” on 28th & 29th March 2019.
- ICMR sponsored five days national level practicum workshop on “Molecular diagnostic techniques for dental clinic” on 26th-30th December 2022.
- ICMR sponsored five days national level workshop on “Alternatives to animal experiments and in vitro cell culture techniques for dental research” on 17th - 21st April 2023.
- Two days “Extramural training program on molecular biology” for APA college life science students was conducted on 12th & 13th April 2023.

RESEARCH GRANTS RECEIVED FROM GOVT. BODIES

- Department of Science and Technology, Tamilnadu State Council for Science and Technology (TNSCST), Chennai
- Students STS project, Indian Council for Medical Research (ICMR), New Delhi.

INSTITUTIONAL REVIEW BOARD (IRB)

IRB of Rajas Dental College and Hospital is an appropriately constituted group registered with Department of Health Research (DHR), Ministry of Health and Family Welfare, that has been formally designated to review and monitor biomedical research involving human subjects. In accordance with FDA regulations, an IRB has the authority to approve, require modifications in (to secure approval), or disapprove research. This group review serves an important role in the protection of the rights and welfare of human research subjects.

The purpose of IRB review is to assure, both in advance and by periodic review, that appropriate steps are taken to protect the rights and welfare of humans participating as subjects in the research. To accomplish this purpose, IRB uses a group process to review research protocols and related materials (e.g., informed consent documents and investigator brochures) to ensure protection of the rights.

INSTITUTIONAL ETHICAL COMMITTEE (IEC) INSTITUTIONAL HUMAN ETHICAL COMMITTEE

The primary duty of IEC of Rajas is to review and approve all types of research proposals involving Human Related research experimentation before the start of the study. The Committee also monitors research throughout the study and after completion of the study through periodic reports besides regular visits to the research faculty laboratories where the experiments are conducted.

PROTOCOL FOR IRB AND IEC APPROVAL

https://drive.google.com/file/d/iN-_r-Os_FihuYUfmbUOdaQHeeRGgZT/view?up=haring

INSTITUTIONAL ANIMAL ETHICAL COMMITTEE

S.A. RAJA PHARMACY COLLEGE

The Animal House is registered with the Committee for Control and Supervision of Experiments on Animals Committee for Control and Supervision of Experiments on Animals (CCSEA) (Reg. No. 2009/PO/RE/S/18CPCSEA), Ministry of Environment and Forests. Govt. of India and has an established Institutional Animal Ethics Committee (IAEC) that advises the students. Faculties/researchers on facilities, policies and practices concerning the care and use of animals.



FACILITIES AVAILABLE

- Separate mice and rat colony chambers
- Quarantine room
- Feed section
- Bedding material room
- Working platforms for short procedures
- Documentation room
- Cage and bottle storage section
- Cupboards for storing essential drugs
- Separate washing area to avoid contamination

Proper bio-medical waste management guidelines are followed to dispose of the animal house waste.

LIVINGSTON RAJA MEMORIAL ANIMAL HOUSE



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Kavalkinaru Junction - 627 105, Tirunelveli District, Tamilnadu India

Contact us

Ph: **04637 - 232314**

Email ID - crl@rajasdentalcollege.edu.in