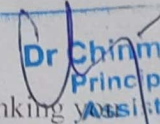# DEPARTMENT OF ZOOLOGY
UNIVERSITY OF JAMMU

Ref. no.: JU/ZOOL/24/CM 49
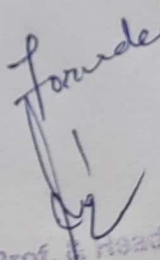
Dated: 18/10/24

To,

The Dean Research Studies (DRS)

University of Jammu

Jammu

Subject: Submission of Utilization Certificate (UC) of research project between 2018-2023.

Respected Madam,

     With reference to the circular regarding the Utilization Certificate of the projects completed between the period 2018-2023, please find the documents as attached of the two projects, that is, Research and Seed grant- RA/23/7140-47 (Annexure-I) and Seed grant- RA/23/5056-66 (Annexure-II).

Thanking you,

Dr. Chinmoyee Maharana

Department of Zoology

Dr Chinmoyee Maharana
Principal Investigator
Assistant Professor
Department of Zoology
University of Jammu
Jammu 180006

forwarded

Prof. & Head
Department of Zoology
University of Jammu
JAMMU

DEPARTMENT OF ZOOLOGY
UNIVERSITY OF JAMMU

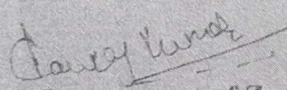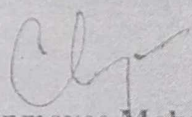Ref. No. :- JU/ZOOL/24/CM 37

Dated : 30/4/24

To.

The Joint Registrar (Finance)

University of Jammu,

Jammu

Sub: Utilization Certificate of Research and Seed Grant
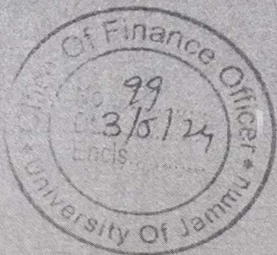
(Through DR Finance)

Respected Madam,

With reference to grant allocation under Research and Seed Grant under the Head 'Quality Assurance Fund (DIQA)' for Dr. Chinmoyee Maharana as per order no. RA/23/7140-47 dated 23/1/2023 it is certified that out of Rs. 2,00,000/- (Two Lakh rupees) of grant sanctioned during the year 2023-2024, Rs. 1,94,338.02/- has been utilized for which it has been sanctioned and in accordance with term and conditions attached to the grants.

Head, Department of Zoology

University of Jammu,

Jammu

Dr. Chinmoyee Maharana

Dr Chinmoyee Maharana
Principal Investigator
Assistant Professor
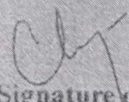Department Zoology
Unive ammu
Jammu 180006

UTILIZATION REPORT

Project File Reference No. _____ RA/23/7140-47 _____

1. Title of the project: Unravelling roles of miRNAs in understanding Alzheimer's diseases

2. Name and Designation of Principal Investigator: Dr Chinmoyee Maharana

3. Duration of the project: 1 year
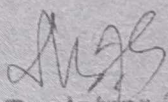
4. Sanctioned grant: INR 2,00,000

Details of utilized grant from current research project grant under various budget heads

Sl.No.	Budget Heads	Grant	Utilized	Balance
	Hiring services/Honorarium	40000	40000	NIL
	Equipment (Repair)	---	---	---
	Purchase of Minor Equipment	40000	40000	NIL
	AMC of existing Equipment	---	---	---
	Consumables/Chemicals/Glassware etc.	90000	89990	10
	Contingency	20000	19343	657
	Field Work	10000	10000	NIL
Total		200000	199333	667

Remaining Unutilized = 200000 – 199333 = 667

Signature of PI

Dr Chinmoyee Maharana
Principal Investigator
Assistant Professor
Department of Zoology
University of Jammu
Jammu 180006

Deputy Registrar (Grants)
Signature of Deputy Registrar
(Grants)
3/5/24

Finance Officer
Signature of Joint Registrar
(Finance)
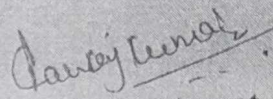
Details of Consumable and non-consumables (including equipment) material procured from current research project grant
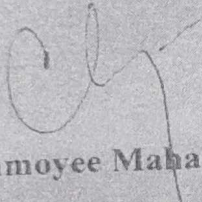
S.No.	Consumable	Non-consumables
1.	Whole Genome Sequencing	MEPL Multifunctional Machine
2.	PCR Master Mix	Domestic Microwave (volume 20L)
3.	Travel	MDT Swing out rotor centrifuge
4	-	Magnetic Stirrer
5	-	Micropipette

Dr. Chinmoyee Maharana

PI

Dr. ~~...~~
~~Princi... ...nior...~~
~~Assistant professor~~
~~Depart... of Zoology~~
~~Univer... Jammu~~
~~Jamm... ...04~~

Head of Department

DEPARTMENT OF ZOOLOGY
UNIVERSITY OF JAMMU

Ref. No. :- JU/ZOOL/24/CM/44

Dated : 14/5/2024

To.

Dean Research Studies

University of Jammu,

Jammu

Sub: Submission of Project Completion Report

<div align="center">(Through Head of the Department)</div>

Respected Madam,

With reference to grant allocation under Research and Seed Grant under the Head 'Quality Assurance Fund (DIQA)' for Dr. Chinmoyee Maharana as per order no. RA/23/7140-47 dated 23/1/2023. Please find attached herewith a detailed report of my project along with Utilisation certificate (UC) duly signed by Joint Registrar (Finance) and Deputy Registrar (Grants).
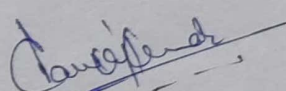
This is for your kind consideration and further necessary action at your end.

Thanking You

Yours sincerely

Dr. Chinmoyee Maharana Maharana
Principal Investigator

PI　　　Assistant Professor
Department of Zoology
University of Jammu
Jammu 180006

Head of the Department

Head
Deptt. of Zoology
University of Jammu

QUALITY ASSURANCE FUND (DIQA)

Form-V

PROJECT COMPLETION REPORT

(Submit in duplicate)

1. **Title of the project** : Unravelling roles of miRNAs in understanding Alzheimer's disease

2. **Name & Designation of Principal Investigator** : Dr. Chinmoyee Maharana, Assistant Professor

3. **Name & Designation of Principal Co-Investigator** : NA

4. **Duration of the project** : 1 year (extended for 1 month)

5. **Sanctioned grant** : Rs. 200,000/- (Two Lakhs)

6. **Date of Initiation of the project** : 23rd January 2023

7. **Date of closure of the project** : 28th February 2024

8. **Whether the Utilisation certificate and statement of expenditure has been submitted** : Yes (Copy attached)

9. **Approved objectives** : To understand the interplay of differentially expressing miRNAs in various neurodegenerative diseases. This will include generating repository, screening the candidate miRNAs, evaluation and

10. **Title of the research paper published from out of the current project work (if any, attached print copy)** : Under preparation

11. **Title of the research paper accepted for publication from out of the current research work (if any,** : Nil

attached copy of accepted
letter)

12. **Report of the completed** : Copy attached (ANNEXURE -A)
research project
highlighting the
deliverables (Attached
document Min. 2000 words)

13. **Detail of the Consumable** : Copy Attached
non-consumable material
(including equipment)
material procured from
current research work

14. **Has the non-consumable** : No, the equipment purchased in the project is
material (including being put to use for the conduct of research
equipment) been handed activities
over to the concerned
department? Yes/No (If Yes.
Attached a certificate issued
by concerned HOD in this
regard) (If no reason
thereof)

15. **Has the stock register** : No, the stock register for consumables and non-
carrying entries of consumables has been made and all purchase has
consumable/ non- been entered
consumable (including
equipment) handed over to
the concerned department?
Yes/No (If Yes. Attached a
certificate issued by
concerned HOD in this
regard)

(If no reason thereof)

16. **Was power point** : Yes
presentation of current
research work made before
DRPMC by PI/Co-PI?
Yes/No (If Yes. Attached a
certificate issued by
concerned Dean/ HOD in
this regard) (If no reason
thereof)

A. Comments of the concerned DRPMC

On the basis of progress report presentation made before RPMC the work undertaken in the project is as per the objective and satisfactory.
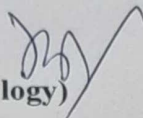
B. Members of the Concerned DRPMC
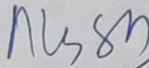
1.

(Convenor)

2. **Prof. Jyoti Vakhlu**
   (Professor, School of Biotechnology)
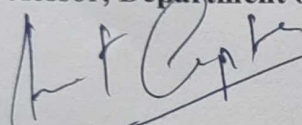
3. **Prof. Namrata Sharma**
   (Professor, Department of Botany)

4.

(Next senior most Faculty, Department of Zoology)

Head of the Department
Head
Deptt. of Zoology
University of Jammu

DEPARTMENT OF ZOOLOGY
UNIVERSITY OF JAMMU
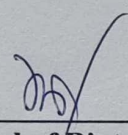
Ref. No. :- JU/ZOOL/24/CM 45

Dated : 14/5/2024

To
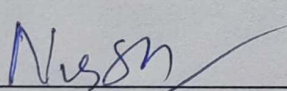
Dean Research Studies

University of Jammu

Jammu
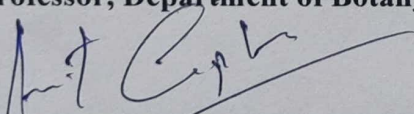
Respected Madam,

With reference to your letter no. RA/23/7140-47 dated 23/1/2023, kindly find attached herewith the detailed progress report (2 copies) for the project allocated under the research and seed grant to the faculty member through departmental Research Project Monitoring Committee (Annexure-A).

1. _____
   (Convenor)

2. _____
   (Professor, School of Biotechnology)

3. _____
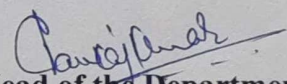   **(Professor, Department of Botany)**

4. _____
   (Next senior most Faculty, Department of Zoology)

DEPARTMENT OF ZOOLOGY
UNIVERSITY OF JAMMU

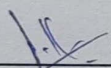Ref. No. :- JU/ZOOL/24/CM 37

Dated : 30/4/24

To,

The Joint Registrar (Finance)

University of Jammu,

Jammu

Sub: Utilization Certificate of Research and Seed Grant

(Through DR Finance)

Respected Madam,

    With reference to grant allocation under Research and Seed Grant under the Head 'Quality Assurance Fund (DIQA)' for Dr. Chinmoyee Maharana as per order no. <u>RA/23/7140-47</u> dated 23/1/2023 it is certified that out of Rs. 2,00,000/- (Two Lakh rupees) of grant sanctioned during the year 2023-2024, Rs. 1,94,338.02/- has been utilized for which it has been sanctioned and in accordance with term and conditions attached to the grants.

Head, Department of Zoology

University of Jammu,

Jammu

Dr. Chinmoyee Maharana

Dr Chinmoyee Maharana
Principal Investigator
Assistant Professor
Depart   Zoology
Unive   Jammu
Jammu 180006

No. 99
Dt 3/5/24
Encls

UTILIZATION REPORT

Project File Reference No. _____ RA/23/7140-47 _____

1. Title of the project: Unravelling roles of miRNAs in understanding Alzheimer's diseases

2. Name and Designation of Principal Investigator: Dr Chinmoyee Maharana

3. Duration of the project: 1 year

4. Sanctioned grant: INR 2,00,000

Details of utilized grant from current research project grant under various budget heads

Sl.No.	Budget Heads	Grant	Utilized	Balance
	Hiring services/Honorarium	40000	40000	NIL
	Equipment (Repair)	---	---	---
	Purchase of Minor Equipment	40000	40000	NIL
	AMC of existing Equipment	---	---	---
	Consumables/Chemicals/Glassware etc.	90000	89990	10
	Contingency	20000	19343	657
	Field Work	10000	10000	NIL
Total		200000	199333	667

Remaining Unutilized = 200000 – 199333 = 667

Signature of PI

Dr Chinmoyee Maharana
Principal Investigator
Assistant Professor
Department of Zoology
University of Jammu
Jammu 180006

Deputy Registrar (Grants)
University of Jammu
Signature of Deputy Registrar
(Grants)

Finance Officer
University of Jammu
Signature of Joint Registrar
(Finance)

Details of Consumable and non-consumables (including equipment) material procured from current research project grant

S.No.	Consumable	Non-consumables
1.	Whole Genome Sequencing	MEPL Multifunctional Machine
2.	PCR Master Mix	Domestic Microwave (volume 20L)
3.	Travel	MDT Swing out rotor centrifuge
4.	-	Magnetic Stirrer
5.	-	Micropipette

Dr. Chinmoyee Maharana

PI

Dr.
Princi...
Assistant Professor
Department of Zoology
University of Jammu
Jammu-180006

Head of Department

nexure I

Summary: Neurodegenerative diseases (NDDs) affect millions every year. Alzheimer's disease (impaired memory and mental function), Parkinson's disease (affects movement, include tremors), Prion disease (also called spongiform encephalopathy with marked neuronal loss and inflammation), Motor neuron disease (degenerating motor system), Huntington's disease (affecting movement, cognition and psychiatric symptoms) and amyloid lateral sclerosis (ALS, affecting brain and spinal cord affecting motor control) etc. are list of some progressive neurodegenerative diseases affecting primarily the neurons or the nerve cells in the brain and its nervous system. These debilitating conditions are even incurable and are result of progressive degeneration and eventually death of the nerve cells affecting ability of the patients to move, speak, think and even breath, severely affecting day today life. Currently as such no cure is available but symptomatic relieving medications are known for some of them, therefore early detection and proper diagnosis can help affected patients in providing focused treatment to relieve the symptoms.

The symptoms can vary in many of these diseases, but they can have common or differential underlying molecular mechanism, for example microRNA (miR) deregulation as recently discovered in various disease from cancer to neurodegenerative diseases. Further miRNA can also be potential biomarkers throughout the disease course, starting from its initial pathogenesis of many proteins involved. Reported miRNAs in circulatory or peripheral blood are known along with brain regions like amygdala, prefrontal cortex and cingulate gyrus, etc. MiRNAs can thus be not only potential biomarkers but also potential therapeutic targets.

Further, not many research studies are done focused to neurodegenerative diseases specially in Jammu and Kashmir and none spotlighting miRNAs.

There are not many peripheral biomarkers that can detect NDDs very early in its pathogenesis. Research focus on identifying biomarkers for NDDs is of paramount need to diagnose it in early stages and treatment can be given sooner to prevent symptoms associated with the disease.

Following objectives have been achieved.

Objectives

(i) Generating repository for samples for systemic evaluation of miRNAs from patients and healthy control subjects from hospitals specific to neurodegenerative diseases.

(ii) Screening the differentially expressing miRNAs from the collected samples for neurodegenerative diseases.

(iii) Evaluating miRNAs categorically for various neurodegenerative diseases.

(iv) Scope for Investigating specific miRNAs in these neurodegenerative diseases experimentally for diagnostics and therapeutics

Study design

present observation study with case control design was adapted to attempt the identification of the genetic and non-genetic risk factor initially for Neurodegenerative disease in the population of Jammu region.

Inclusion/exclusion criteria for the entry of participants

Inclusion Criteria

- All the participants were in the age group of 50-75 years
- All cases of NDDs as per history and clinical evaluation
- Signed written informed consent.

Exclusion Criteria

People who were unwilling to share their personal information.

Study population and area

1. Collection of blood samples of patients

The present observational study was carried out on __ confirmed cases of various NDDs which belong to different areas of Jammu region of Jammu and Kashmir, Union Territory. All the patients were aged of different age groups and also of control groups belonging to same groups. The patients were enrolled from Out Patient Department of Neurology, Government Super Speciality Hospital, Jammu. The control individual belongs to the different population area of Jammu division, were also collected from the blood bank (GMC, Jammu). For the present study the detailed questionnaire was prepared which was according to the WHO which includes various risk factor associated with NDDs disease.

2. Collection of data

For the data collection, Socio-demographic data were gathered by a pre-designed health questionnaire which include the name, age, gender, dwelling, educational status, clinical profile and detailed family history of patient was taken by interviewing with the patients/ guardian of the patient (in case of child).

3. Blood Collection

Only 1-2 ml of blood was collected in the EDTA coated vials, after having written/ informed consent from them. The vials were sealed (parafilm) and were transferred (ice box) from the hospital to research lab of the Department of Zoology, University of Jammu.

Before collecting any blood samples, ensure that the patients have provided informed consent to participate in the study or medical procedure. This is a fundamental ethical requirement.

Preparations:

The necessary equipment and supplies, including sterile needles, EDTA coated vials, alcohol swabs and adhesive bandages were prepared.

Patient Preparation:

The procedure was explained to the patient, including its purpose and any potential discomfort.

Venipuncture:

An appropriate vein for venipuncture was selected, typically in the arm. The median cubital vein is commonly used. The blood sample was collected by a trained nurse.

The site was cleaned with an alcohol swab.

The needle was inserted into the vein and 2 ml of blood was collected.

Post-Venipuncture Care:

The needle was withdrawn gently and pressure was applied to the puncture site with a sterile cotton ball or gauze pad.

adhesive bandage was applied to the puncture site to stop any bleeding.

It was ensured that the patient was comfortable and experiences no adverse effects. The patient information, sample collection details (date, time, location), and any relevant medical information including all the test reports was accurately clicked by the phone's camera.

Patient Education and Comfort:

An awareness sheet of paper was given to the patients which included any restrictions, myths, facts and recommendations related to physical activity or medication.

Safety and Disposal:

The safety protocols were followed by the nurse for handling and disposing of used needles and biohazardous materials.

The vials were sealed (parafilm) and were transferred (ice box) from the hospital to research lab of the Department of Zoology, University of Jammu.

Sample Storage: The samples were labelled and stored in refrigerator at -20 degrees.

Figure 1. Showing CT and MRI scans of patient
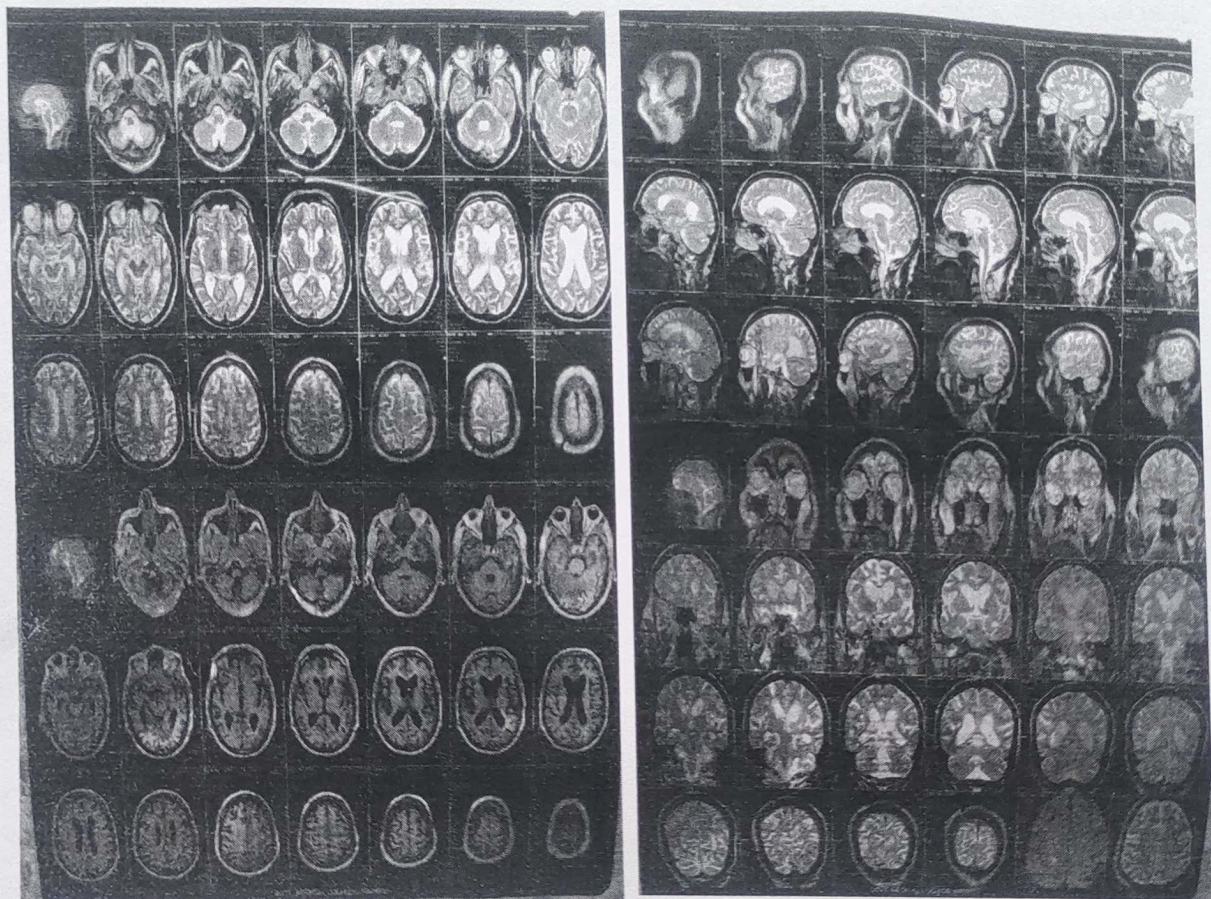
CT Scan   MRI Scan

Figure 2. Showing the work flow

| Screening and identifying differentially expressed miRs | → | Evaluation of the screened miR targets in NDD samples | → | Investigating the evaluated targets for specific miRs |

This research study will be first of its kind in J&K for neurodegenerative diseases and implicates miRs as a molecular diagnostic in the field apart from adding knowledge and value generation to the field of biomarker discovery. It also aims for drug discovery targets and relevant therapeutics.

This study will find specific miRs as biomarkers which could be used for early NDDs diagnosis. Elucidation of cellular and molecular mechanism due to differentially expressing miRs can help to understand the disease progression and pathological phenomenon associated with changes causing the neuropathological outcomes during NDD. Further, the present study will be also give the potential drug targets for therapeutics to manage and ameliorate NDD pathology. This study can pave way for miRs-biomarker discovery and therapeutic validation in various J&K cohorts and India at large in future studies.
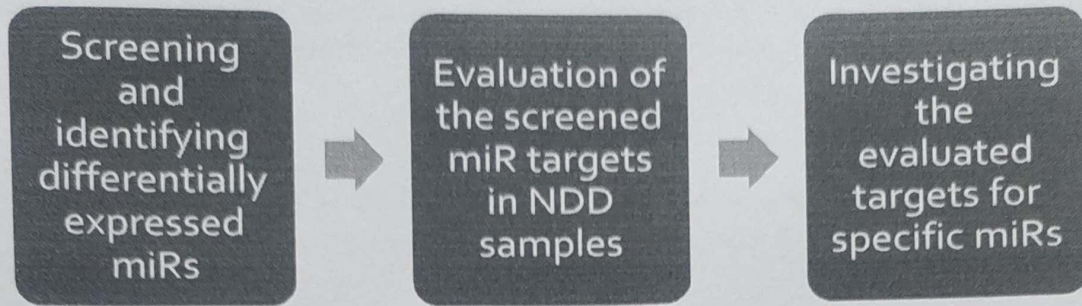
Following concerns were during this study are for various NDDs example of PD patients are shared here:

Motor impairments:
Parkinson's disease often leads to motor impairments, including tremors, rigidity, and bradykinesia. These physical symptoms made it difficult for patients to perform tasks necessary for data collection, such as writing.

Cognitive impairments:
Some patients experience cognitive impairments, like difficulties with memory, attention, and decision-making. This affected their ability to provide accurate and consistent responses during data collection.

Communication difficulties:
Speech difficulties, such as hypophonia which is soft speech and dysarthria which is difficulty articulating words made it challenging for patients to communicate effectively, which hindered the collection of verbal data.

Fatigue:
Fatigue is a common symptom in Parkinson's disease, and patients became tired during data collection sessions, leading to decreased participation and quality of responses.

dication effects:

Medications used to manage Parkinson's disease symptoms can have fluctuating effects throughout the day, which impacted the ability of patients to participate in data collection activities consistently.

Inpatient status:

Patients who were hospitalized for Parkinson's disease-related complications dealt with acute health issues that took precedence over data collection. Their medical condition was not stable for comprehensive data collection.

Difficulty with Fine Motor Skills:

Fine motor skills required for tasks like signing the consent formwas compromised in Parkinson's patients, affecting their ability to complete assessments accurately.

Non-motor Symptoms:

Non-motor symptoms, such as depression, anxiety, and sleep disturbances, affected the patient's mood and cognitive functioning, potentially impacting their engagement and willingness to participate.

Time Constraints:

Some hospitalized patients had limited time and energy due to medical treatments and assessments, which made it challenging to allocate sufficient time for data collection.
There was insufficiency of data such as reports of the patients.
The patients sometimes do not agree to share their information.
The patients sometimes were unwilling to share their blood sampes.

To address these problems, one can consider several strategies:

Flexibility: Be flexible in data collection methods and schedules to accommodate patients' physical and cognitive limitations.

Multidisciplinary Approach: Involve a team of healthcare professionals, including neurologists, nurses, and psychologists, to provide comprehensive care and support during data collection.

Adaptive Technology: Use adaptive technologies and tools designed to assist individuals with motor and cognitive impairments in providing data.

Patient Education: Provide clear instructions and explanations to patients regarding the data collection process and the importance of their participation.

Patient-Centered Care: Tailor data collection methods to each patient's unique needs and capabilities.

sent Procedures: Ensure that informed consent procedures are conducted sensitively and accordance with ethical guidelines.

Collecting data from Parkinson's disease patients in a hospital setting requires careful planning, patience, and a deep understanding of the challenges associated with the disease. Researchers should prioritize the comfort and well-being of patients while striving to obtain accurate and valuable data.

Figure 3. Showing miRNA distribution in brain
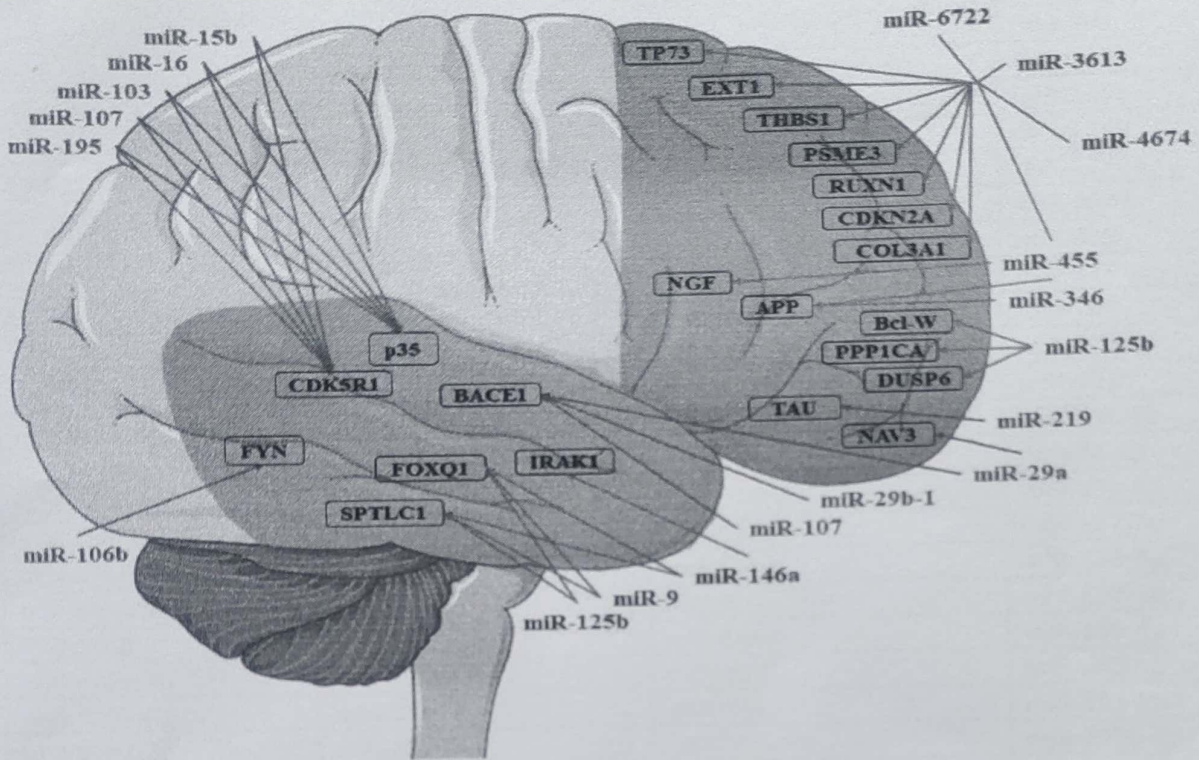
Table 1. showing upregulated and regulated miRNAs in Blood and Brain

Upregulated in blood	Downregulated in blood	Upregulated in brain	Downregulated in brain
miR-34a	miR-125b	let-7f	miR-10a
miR-181b	miR-181c	miR-105	miR-10b
miR-9	miR-36	miR-125a	miR-126
miR-3158-3p	miR-98-5p	miR-135a	miR-127
miR-27a-3p	miR-885-5p	miR-138	miR-142-5p
miR-26b-3p	miR-485-5p	miR-141	miR-143
miR-151b	miR-483-3p	miR-151	miR-146b
miR-361-5p	miR-342-3p	miR-186	miR-154
miR-30e-5p	miR-30e-5p	miR-191	miR-15b
miR-93-5p	miR-191-5p	miR-197	miR-181a
miR-15a-5p	let-7g-5p	miR-204	miR-181c
miR-143-3p	let-7d-5p	miR-205	miR-194

iR-335-5p	miR-1306-5p	miR-216	miR-195
miR-106b-5p	miR-15b-3p	miR-302b	miR-199a
miR-101-3p	miR-34a	miR-30a-3p	miR-214
miR-424-5p	miR-103a-3p	miR-30a-5p	miR-221
miR-106a-5p	miR-107	miR-30b	miR-338
miR-18b-5p	miR-532-5p	miR-30c	miR-422b
miR-3065-5p	miR-26b-5p	miR-30d	miR-451
miR-20a-5p	let-7f-5p	miR-32	miR-455
miR-582-5p	let-7a-5p	miR-345	miR-497
miR-206	let-7e-5p	miR-362	miR-99a
miR-132	miR-15a-5p	miR-371	miR-146a
miR-29a	miR-17-3p	miR-374	miR-125b
miR-112	miR-29b-3p	miR-375	miR-4449
miR-161	miR-144-5p	miR-380-3p	miR-1274a
let-7d-3p	miR-148a-3p	miR-429	miR-4674
miR-5010-3p	miR-502-3p	miR-448	miR-335
miR-26a-5p	miR-660-5p	miR-449	miR-375
miR-1285-5p	miR-1294	miR-494	miR-708
miR-151a-3p	miR-3200-3p	miR-501	miR-219
miR-28-3p	miR-29	miR-517a	miR-103
miR-30c-5p	miR-223	miR-517b	miR-29c-3p
miR-30d-5p	miR-141-3p	miR-518b	miR-24-3p
miR-148b-5p	miR-342-5p	miR-518f	miR-138-5p
miR-186-5p	miR-4772-3p	miR-520a	miR-127-3p
miR-425-5p	miR-23b-3p	miR-526a	miR-132-3p
miR-550a-5p	miR-24-3p	miR-9	miR-127-5p
miR-1468	miR-3916	miR-146	miR-136-3p
miR-4781-3p	miR-125b-5p	miR-155	miR-381
miR-5001-3p	miR-338-3p	miR-34a	miR-101-5p
miR-6513-3p	miR-3065-5p	Let-7b	miR-199b-5p
miR-519	miR-139-5p	miR-222	miR-136-5p
miR-185-5p	miR-152-3p	miR-125b	miR-1842
miR-548a-5p	miR-150-5p	miR-378a-3p	miR-181a-5p
miR-138-5p	miR-3613-3p	miR-1291	miR-598
miR-659-5p	miR-149-5p	miR-132-5p	miR-218-5p
miR-590-5p	miR-182-5p	miR-485-5p	miR-9-3p
miR-142-5p	miR-21-5p	miR-597-5p	miR-769-5p
miR-34c	miR-375	miR-29a-3p	miR-953
miR-34b-3p	miR-501-3p	miR-15a	miR-760
miR-219-2-3p	miR-6722	miR-146a	miR-181a-3p
miR-22-5p	miR-122-5p	miR-29b	miR-181b-5p
miR-125b-1-3p	miR-639	miR-100	miR-488-3p
miR-1307-5p	miR-151a-5	miR-505	miR-4953
miR-34c-5p	miR-30b-5p	miR-4467	miR-708-3p
miR-34b-5p	miR-33a-5p	miR-766	miR-874
miR-887	miR-18a-5p	miR-3622b-3p	miR-873-5p
miR-135a-5p	miR-301a-3p	miR-296	miR-129-5p
miR-184	miR-142-3p	miR-29a	miR-181d

iR-30c-2-3p	miR-26a-5p	Let-7i-5p	miR-39-5p
miR-873-3p	miR-181c-3p		miR-3200-3p
miR-125a-3p	miR-126-5p		miR-431-3p
miR-671-3p	miR-22-3p		miR-9-5p
miR-1285-3p	miR-148b-5p		miR-326
miR-3176	miR-9		miR-377-5p
miR-127-3p	miR-29a		miR-4331
Let-7f-5p	miR-29b		miR-323a-3p
miR-26b-5p	miR-137		miR-134
miR-455-3p	Let-7d-5p		miR-3293
miR-4668-5p	Let7g-5p		miR-10a-5p
miR-3613-3p	miR-15b-5p		miR-33b-5p
miR-4674	miR-545-3p		miR-410
miR-5001-5p	miR-193b		miR-708-5p
miR-4741	miR-384		miR-143-3p
miR-128	miR-135a		miR-142-3p
miR-491-5p	miR-200b		miR-328-3p
miR491-5p	miR-210		miR-193a-5p
miR-874	miR-590-3p		miR-30a-3p
miR-134	miR-9-5p		miR-19b-3p
miR-370	miR-106a-5p		miR-30d-5p
miR-323-p	miR-106b-5p		miR-340-5p
miR-382	miR-135b		miR-140-5p
miR-154	miR-29c		miR-125b-5p
miR-27b	miR-43a-5p		miR-26b-5p
miR-200b			miR-16-5p
miR-23a			miR-146a-5p
miR-339			miR-195-5p
miR-425			miR-15b-5p
miR-456-5p			miR-223-3p
miR-483-5p			miR-16-2
miR-320a			miR-331-5p
miR-320b			miR-136-3p
miR-320c			miR-29c
miR-502-3p			miR-146
miR-200a-3p			miR-16
miR-1260a			miR-23a
miR-106b-3p			miR-26b
miR-6119-5p			miR-27a-3p
miR-1246			miR-200b
miR-660-5p			miR-107
miR-17-5p			miR-210

Figure 2. Venn diagram showing the common miRNAs in Alzheimer's

Downregulated in blood · Upregulated in brain · Upregulated in blood · Downregulated in brain

55 · 50 · 10 · 3 · 3 · 76 · 3 · 2 · 73 · 0 · 0 · 10 · 0 · 2 · 11
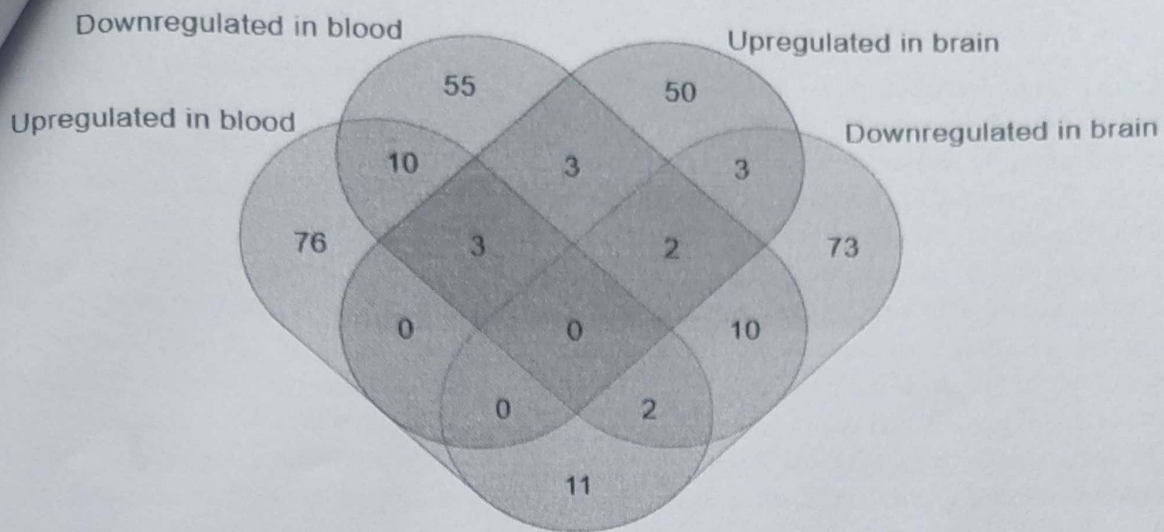
Outcomes:

The current study aimed at screening and validation of microRNA in neurodegenerative diseases apart from adding knowledge and value generation to the field of unique miRNA discovery. Although this is only the beginning and dataset need more and more enrolment in the study but this pilot work helped us develop a preliminary outline for a bigger goal for drug discovery targets and relevant therapeutics in future.

Elucidation of neuropathological outcomes during progression of these neurodegenerative diseases can pave way for miRNAs-biomarker discovery and therapeutic validation in tested samples.