

DiamiR develops minimally invasive tests for early detection and monitoring of Alzheimer's and other brain diseases to enable earlier intervention and better planning for care



Targeted Diagnostics for Brain Health

April 2025



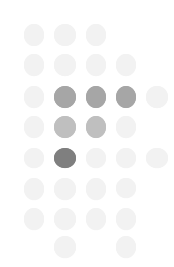
Forward-Looking Statements

This material has been prepared for informational purposes only; it is not intended to provide and should not be relied upon for accounting, legal, or tax advice

Certain statements contained in this presentation may contain “forward-looking statements”

Actual results and performance could differ materially from those projected in the forward-looking statements, which are based on management’s current expectations and involve risks and uncertainties, such as our ability to obtain necessary funding to further the development of our product candidates, the success of any of our ongoing and planned clinical trials for our product candidates, as well as whether or not we will have the ability to commercially develop any product candidate





Introduction to Diamir





DiamiR Highlights

- **Building comprehensive portfolio of blood-based tests for diagnosis and monitoring of Alzheimer's** and other neurodegenerative diseases with established and novel biomarkers – a critical and unique resource to help stem the tide of the Alzheimer's epidemic.
- **Leader in microRNA (miRNA) technology.** Robust IP portfolio with 50+ issued patents worldwide. Multiple partnerships with brain health centers and disease foundations. Awarded ~\$10M in highly competitive grants.
- **Experienced Leadership Team** has extensive assay development, commercialization, reimbursement, regulatory, and corporate expertise.
- **Clinical Lab:** CLIA certified, CAP accredited, NY State licensed.
- **Additional programs** in Rett syndrome, glioblastoma, and GI and lung disorders.
- **Cost-efficient execution business model** includes near-term partnerships and clinical services.



Diamir Biosciences | Experienced leadership team



Alidad Mireskandari, Ph.D., MBA, CEO

- Chief Development Officer, Interpace Biosciences (Nasdaq: IDGX)
- President & CEO, JS Genetics
- Hedge Fund Manager, Nomura Securities
- Hedge Fund Manager, BNP Paribas
- Life Sciences Consultant PRTM



Kira Sheinerman, Ph.D., MBA, Director & Co-Founder

- Managing Director, HC Wainwright & Co.
- Board Member, Boyce Thompson Institute
- Sr. Strategic Advisor, Aptorum Group (Nasdaq: APM)
- Co-chair of Alzheimer's Association Business Consortium



Gyanendra Kumar, Ph.D., VP Assay Development

- VP Assay Development, Interpace Biosciences (Nasdaq: IDGX)
- Led R&D efforts for the development of whole genome amplification (WGA) technologies, Molecular Staging and GE Healthcare
- Associate Professor of Molecular biology and Genetics, Wayne State University School of Medicine



Sydney Finkelstein, MD, Medical Director

- CSO and Medical Director, Interpace Biosciences (IDGX)
- Adjunct Professor of Pathology, Drexel University
- Founder/CSO of RedPath Integrated Pathology



Gary Anthony, CPA, Acting CFO

- Consultant/Controller – pre-IPO and Smaller Reporting Companies
 - Heat Biologics, Forian, Spar, IPKeys, others
- CAO – Majesco Entertainment
- CFO – Axion International
- CFO – Algos Pharmaceutical



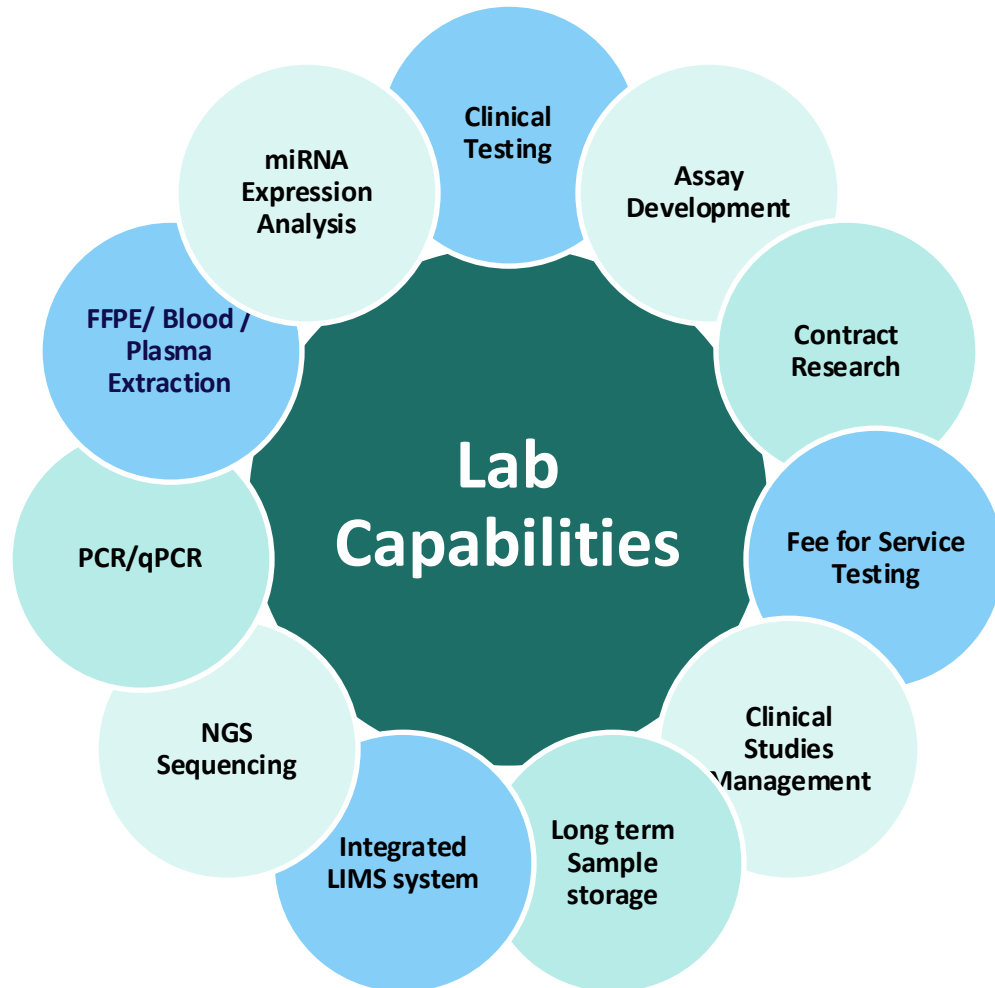
Kenny K. Ablordeppey, MS, Lab Supervisor and Project Manager

- Project Manager for Assay Development at Interpace Biosciences
- MSc in Molecular and Cellular Biology and BSc in Biochemistry and Molecular Biology from U of Mass, Amherst



DiamiR Biosciences | Laboratory overview

CLIA / CAP Laboratory licensed in 50 States, located in New Haven, CT, on Yale University's campus



DiamiR Patent Protection | 50+ patents worldwide since 2014



IP for small RNA for diagnosis and monitoring of neurodegenerative diseases



IP for miRNA-based universal screening



IP for using miRNA for early detection and monitoring of mild cognitive impairment (MCI) and Alzheimer's disease (AD)



IP for using miRNAs for detection and monitoring of Parkinson's disease



IP for using miRNAs for monitoring of aging



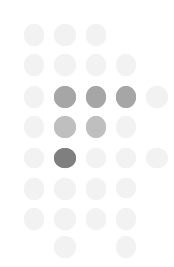
IP for using miRNA for differentiation of neurodegenerative diseases



IP for using miRNA for neurodevelopmental diseases

1st patent issued in 2014. Latest US patent issued in 2024.





Alzheimer's Market:

Unmet need in testing for neurodegenerative diseases



The Alzheimer's Epidemic | An overview of a significant health crisis

Estimated 7M Americans age 65+ diagnosed with AD in 2024, and expected to increase to 13M by 2050

The only leading cause of death that cannot be prevented or cured, 6th leading cause of death in the US¹

3 FDA-approved disease-modifying therapies to date

- **135+ agents in clinical trials in 2022²**
- FDA approved therapies are not curative and are unable to prevent, arrest or reverse clinical symptoms

- About 1 in 9 people (10.7%) age 65 and older has Alzheimer's dementia. This percentage increases with age¹:

- 5.0% of people age 65 to 74
- 13.1% of people age 75 to 84
- 33.2% of people age 85 and older

- **Alzheimer's is projected to cripple America's healthcare system³**

- Average per-person Medicare payments for services to beneficiaries age 65+ with AD or other dementias are almost 3x as great as payments for beneficiaries without these conditions, Medicaid payments are more than 22x as great³

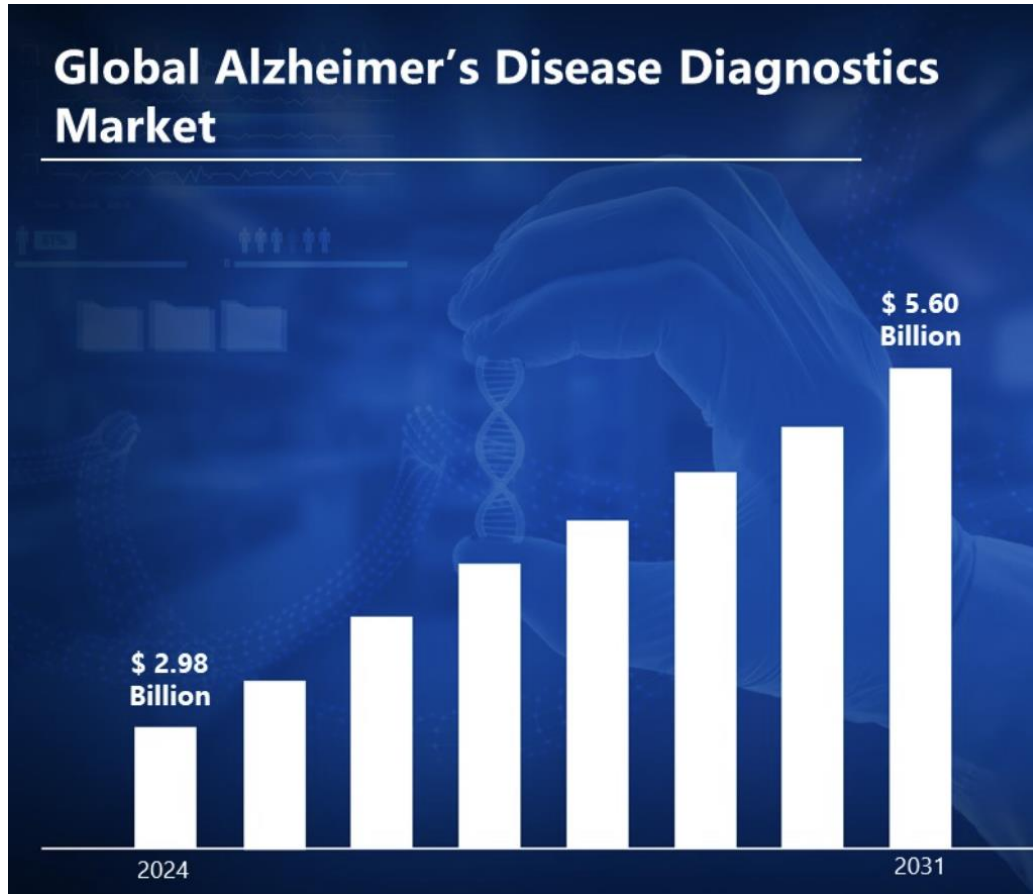
\$321B: Annual cost of healthcare services for Alzheimer's disease and other dementia in the US in 2022, estimated to approach ~\$1 trillion by 2050¹

1. <https://www.alz.org/alzheimers-dementia/facts-figures>, *Cummings et al. (2022) Alzheimer's & Dementia;

2. www.clinicaltrials.gov

3. Alzheimers Dement. 2024 May;20(5):3708-3821. doi: 10.1002/alz.13809. Epub 2024 Apr 30. 2024 Alzheimer's disease facts and figures

Alzheimer's Disease Diagnostics | A large addressable market⁴



Alzheimer's Disease Diagnostics Market opportunity was estimated at \$2.98 Billion in 2024 and is projected to reach **\$5.60 Billion by 2031**, growing at a **CAGR of 8.19%** during the forecast period 2024-2031

Growth in demand for Alzheimer's Disease diagnostics is driven by:

- Aging Population
- Growing Disease Prevalence
- Technological Developments
- Increasing Awareness
- Government Initiatives
- Growing Healthcare Expenditure
- Drug Discovery Pipeline Successes

AD testing is estimated to grow to \$5.60B addressable market by 2031

⁴<https://www.verifiedmarketresearch.com/product/alzheimers-diagnostics-market/>

Early MCI/AD Detection | Why is it important?

Better outcomes

Early detection can help individuals access available treatments that can help slow down the progression of the disease and can help individuals better understand their symptoms and what they can do to manage them

Improved quality of life

Individuals with Alzheimer's disease who are diagnosed early can benefit from lifestyle changes, such as exercise and a healthy diet, that can improve their overall quality of life

Differential diagnosis

Testing for Alzheimer's disease can help ensure an accurate diagnosis, ruling out other conditions that may have similar symptoms. Accurate diagnosis can help individuals receive appropriate medical care and support

Planning for the future

Individuals with Alzheimer's disease can plan for their future care needs, such as financial and legal planning, when they are diagnosed early. This can help improve their quality of life and reduce the impact that the disease has on their daily activities

Support for caregivers

Caregivers of individuals with Alzheimer's disease can benefit from early diagnosis, as they can access support and resources that can help them manage the caregiving role

Contributing to research

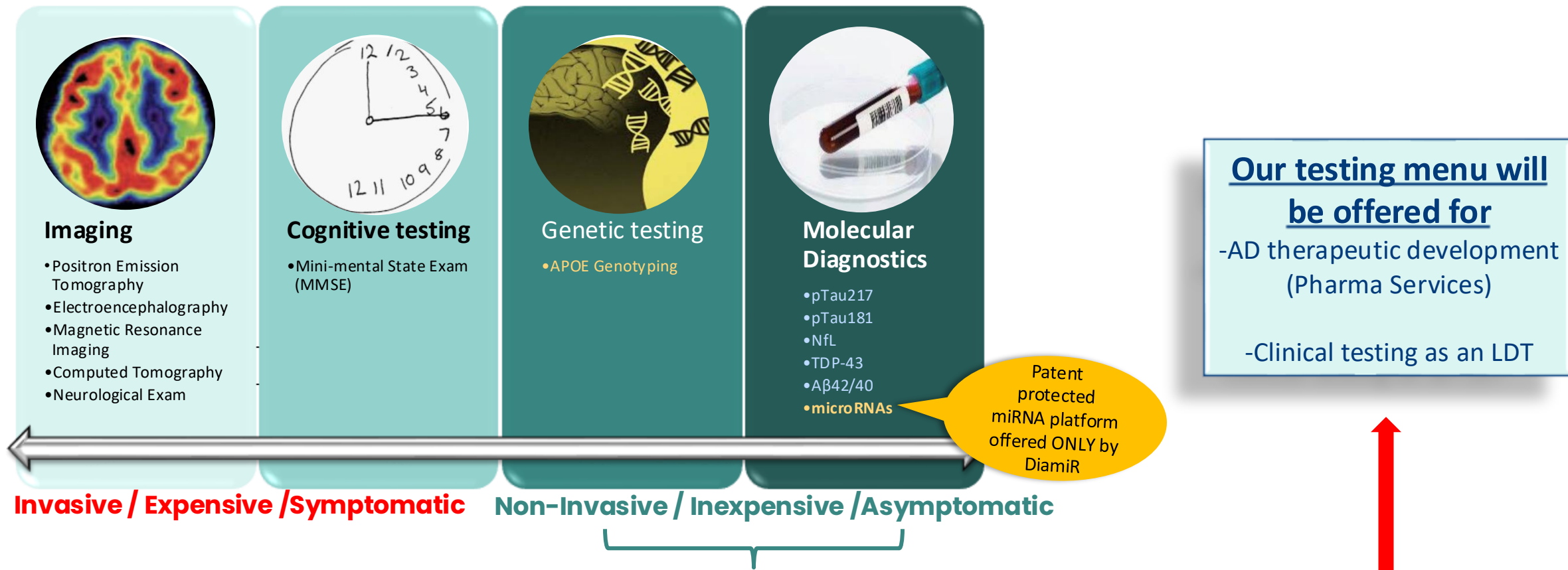
By getting tested for Alzheimer's, individuals may be eligible to participate in clinical trials for new treatments that are being developed. Participating in clinical trials can help advance medical research and may provide individuals with access to promising new treatments

Increased awareness

Testing for Alzheimer's can help increase awareness of the disease and the importance of early detection. This can lead to greater public support for research and development of new treatments, as well as increased funding for Alzheimer's-related programs and services



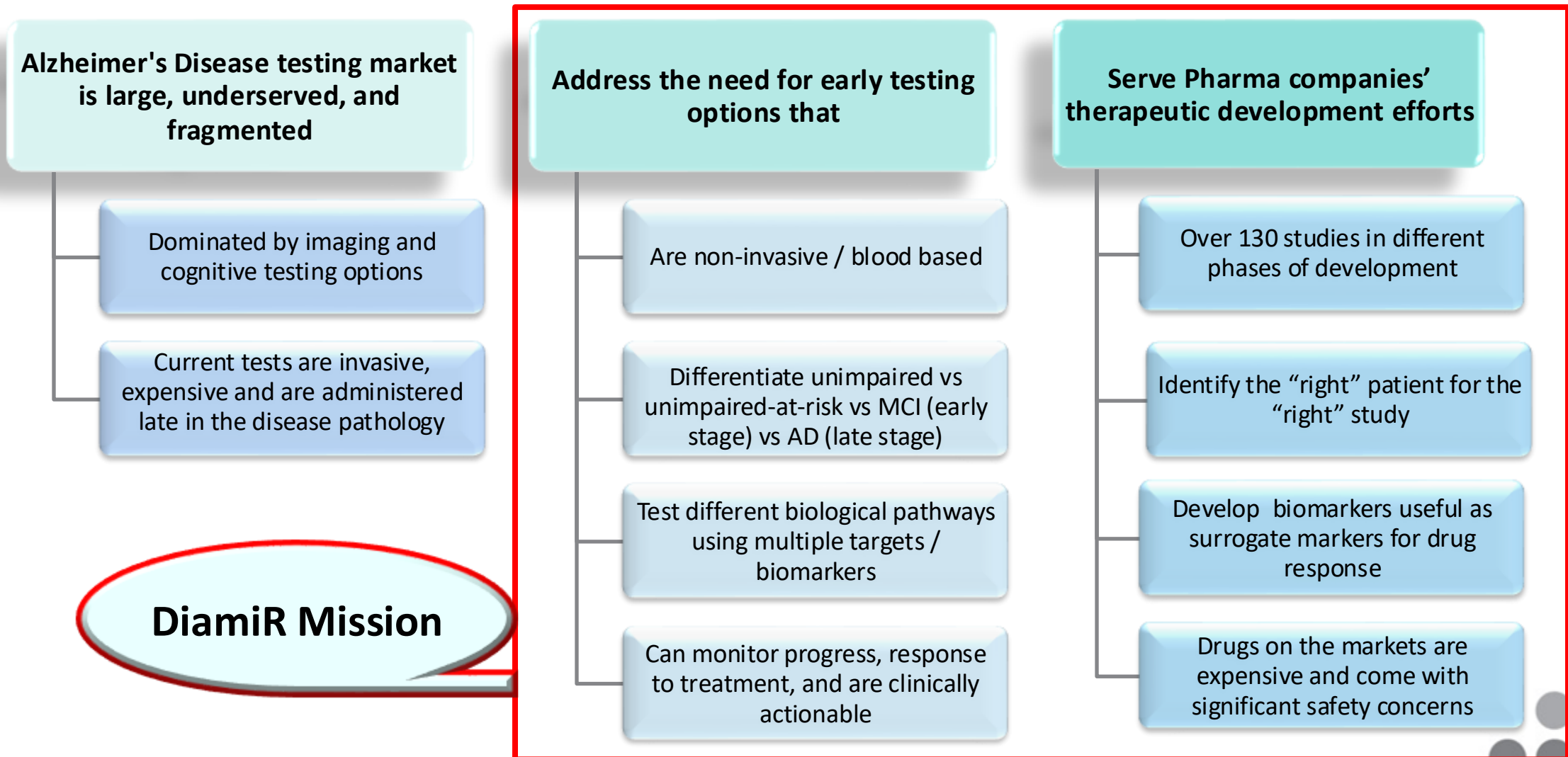
Diagnostic Overview for Alzheimer's Disease | Current and future state

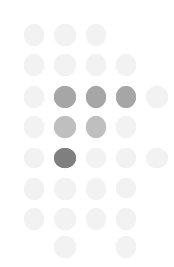


Our Goal: To offer comprehensive non-invasive Alzheimer's Diagnostics menu of biomarker testing options



Addressing the AD Problem | Can't fix what you can't measure





Our microRNA Platform: An Overview



microRNAs | Dynamic epigenetic biomarkers detectable in blood

miRNAs are short, non-coding, regulatory molecules whose expression **levels change in disease**

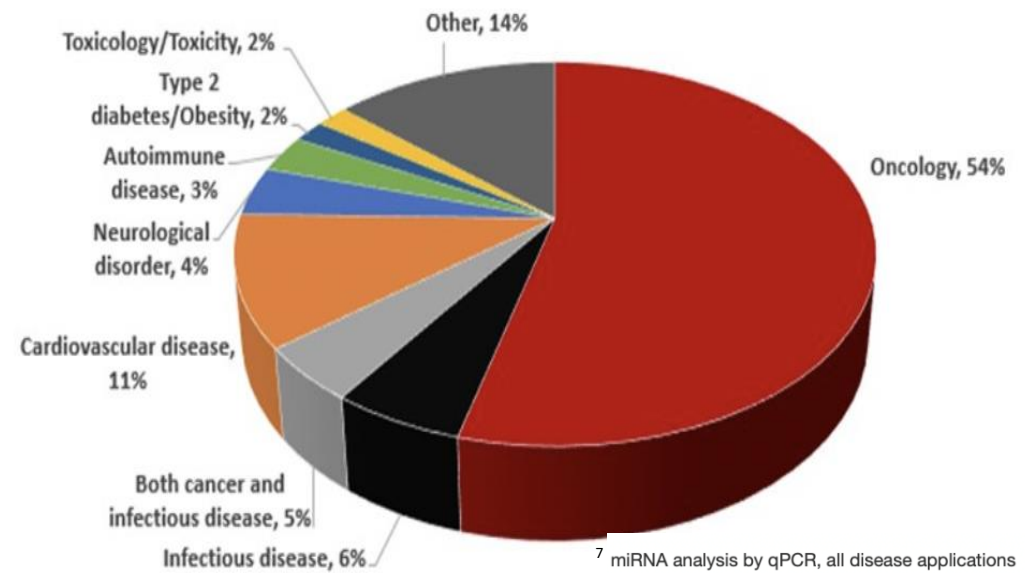
miRNAs are **master regulators** of protein synthesis and cellular processes such as growth, inflammation, survival, and death

miRNAs cross organ barriers, are stable in circulation, and are **conserved across species**

Certain miRNAs are **enriched in the brain** (cortex, midbrain, hippocampus) and other organs

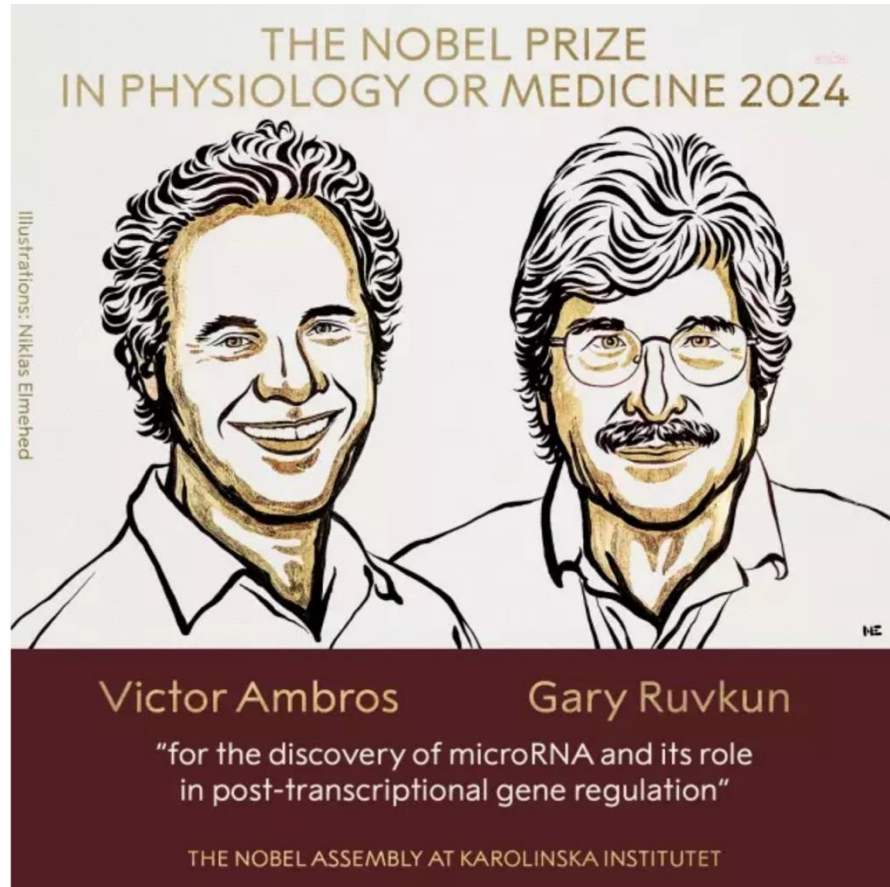
miRNAs can be **multiplexed** (i.e. can detect different pathophysiological processes in one test)

miRNA-based tests are being **used in oncology** clinical practice



⁷<https://www.thermofisher.com/us/en/home/life-science/pcr/real-time-pcr/real-time-pcr-applications/microma-noncoding-rna-with-real-time-pcr/mirna-profiling.html>

microRNA Biology | 2024 Nobel prize in medicine



The Nobel assembly said in a statement that the laureates discovered the new class of tiny RNA molecules, which play a crucial role in gene regulation.

"Their groundbreaking discovery revealed a completely new principle of gene regulation that turned out to be essential for multicellular organisms, including humans," the assembly said.

Their work helped explain how cells specialize and develop into different types, such as muscle and nerve cells, even though all the cells in an individual contain the same set of genes and instructions for growing and staying alive.*

*<https://www.reuters.com/world/nobel-prize-2024-live-updates-medicine-award-be-announced-2024-10-07/>

miRNAs and Brain Health | Growing body of evidence



MOLECULAR MEDICINE REPORTS 18: 2373-2380 2018

MicroRNA-125b regulates Alzheimer's disease through SphK1 regulation

YAN JIN^{1,2}, QIYUN TU^{1,2} and MIN LIU^{1,2}

RESEARCH ARTICLE

Open Access

Deregulation of neuronal miRNAs induced by amyloid- β or TAU pathology

Annerieke Sierksma^{1,2}, Ashley Lu^{1,2}, Evgenia Salta^{1,2}, Elke Vanden Eynden^{1,2}, Zsuzsanna Callaerts-Vegh³, Rudi D'Hooge³, David Blum⁴, Luc Buée⁴, Mark Fliers^{1,2*} and Bart De Strooper^{1,2,5*}



diagnostics



Article

Analytical Validation of a Novel MicroRNA Panel for Risk Stratification of Cognitive Impairment

Arzu Kunwar[†], Kenny Kwabena Ablordeppay[†], Alidad Mireskandari, Kira Sheinerman, Michael Kiefer, Samuil Umansky and Gyanendra Kumar^{*†}

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† These authors contributed equally to this work.

Altered microRNAs related to synaptic function as potential plasma biomarkers for Alzheimer's disease

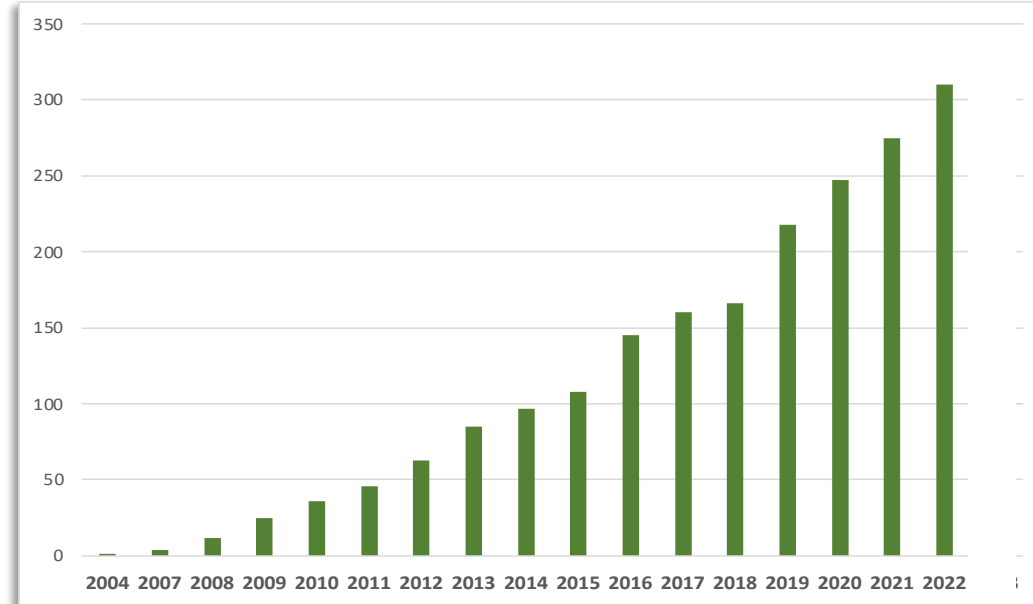
Dolores Siedlecki-Wullich^{1,2}, Judit Català-Solsona^{1,2}, Cristina Fábregas^{1,2}, Isabel Hernández³, Jordi Clarimon^{2,4}, Alberto Lleó^{2,4}, Merce Boada^{2,3}, Carlos A. Saura^{1,2}, José Rodríguez-Álvarez^{1,2,5*} and Alfredo J. Miñano-Molina^{1,2*}



Journal of Alzheimer's Disease xx (2020) 1-xx
DOI: 10.3233/JAD-200296
IOS Press

Performance of Validated MicroRNA Biomarkers for Alzheimer's Disease in Mild Cognitive Impairment

Ursula S. Sandaa^{1,1}, Jack T. Wiedrick^{1,1}, Sierra J. Smith⁴, Trevor J. McFarland⁴, Theresa A. Lusard⁶, Babet Lind⁴, Christina A. Harrington⁴, Jodi A. Lapidus⁴, Douglas R. Galasko⁶, Joseph F. Quinn^{1,1} and Julie A. Saugstad^{1,1}



<https://pubmed.ncbi.nlm.nih.gov/?term=microRNA%2C+Alzheimer&sort=>

Sheinerman et al. *Alzheimer's Research & Therapy* (2017) 9:89
DOI 10.1186/s13195-017-0316-0

Alzheimer's Research & Therapy

RESEARCH

Open Access

Circulating brain-enriched microRNAs as novel biomarkers for detection and differentiation of neurodegenerative diseases

Kira S. Sheinerman^{1*}, Jon B. Toledo^{2,3}, Vladimir G. Tsvinsky¹, David Irwin², Murray Grossman², Daniel Weintraub³, Howard I. Hurtig², Alice Chen-Plotkin², David A. Wolk², Leo F. McCluskey², Lauren B. Elman², John Q. Trojanowski⁴ and Samuil R. Umansky¹

Papers published by Diamir

CogniMIR[®] | Brain-enriched miRNAs as diagnostic targets

Allow non-invasive sample collection

- Simple blood draw
- Plasma testing

Drive lab work flow efficiency

- Stable targets-reduce failure rates
- Multiplexable
- Short Turn-Around-Time (TAT)
- Analytical costs are relatively low compared to next-generation sequencing (NGS)

Can be integrated with multiple testing platforms

- Protein biomarkers
- DNA mutations
- Gene expression analysis

Results in clinically actionable reports

- Pre-symptomatic / early symptomatic (MCI) Risk Score
- Monitoring progression

Support clinical studies

- Right patient for right study
- Therapy target selection
- Companion diagnostics

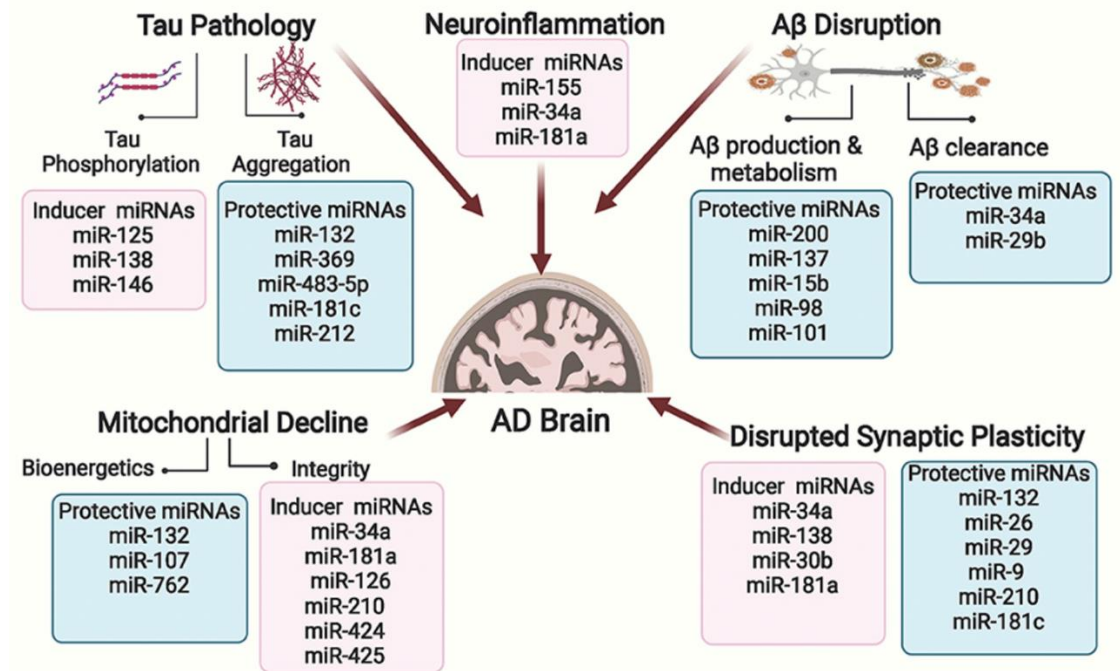
DiamiR's Approach | Early detection of neurodegeneration

Synaptic dysfunction precedes loss of cognition and executive function due to mild cognitive impairment and Alzheimer's disease/dementia by an average of 10+ years

Synaptic dysfunction occurs prior to the onset of MCI and Alzheimer's/dementia

When synaptic dysfunction occurs, brain-enriched miRNAs are released into the blood stream

Brain-enriched miRNAs can be detected efficiently through simple blood draws

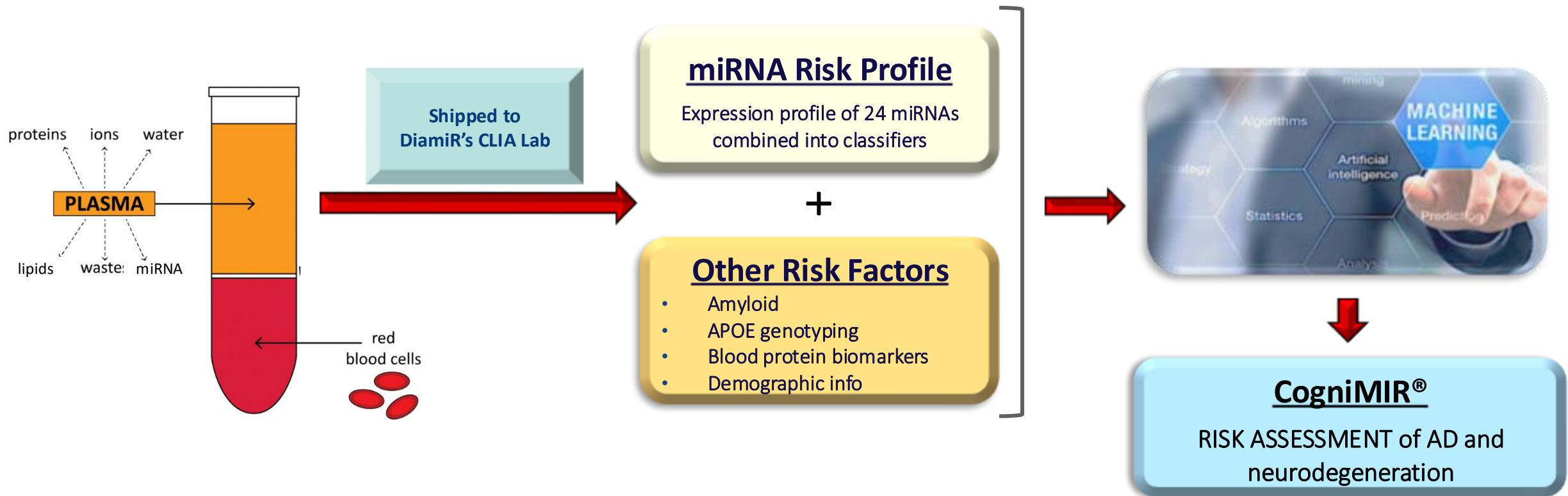


Early detection of neurodegeneration will be valuable in pharma services and clinical setting

⁸Alzheimer's Association. 2022 Alzheimer's Disease Facts and Figures. Alzheimer's Dementia 2022;18

(Front. Aging Neurosci., 11 October 2021. Sec. Alzheimer's Disease and Related Dementias Volume 13 - 2021 | <https://doi.org/10.3389/fnagi.2021.743573>)

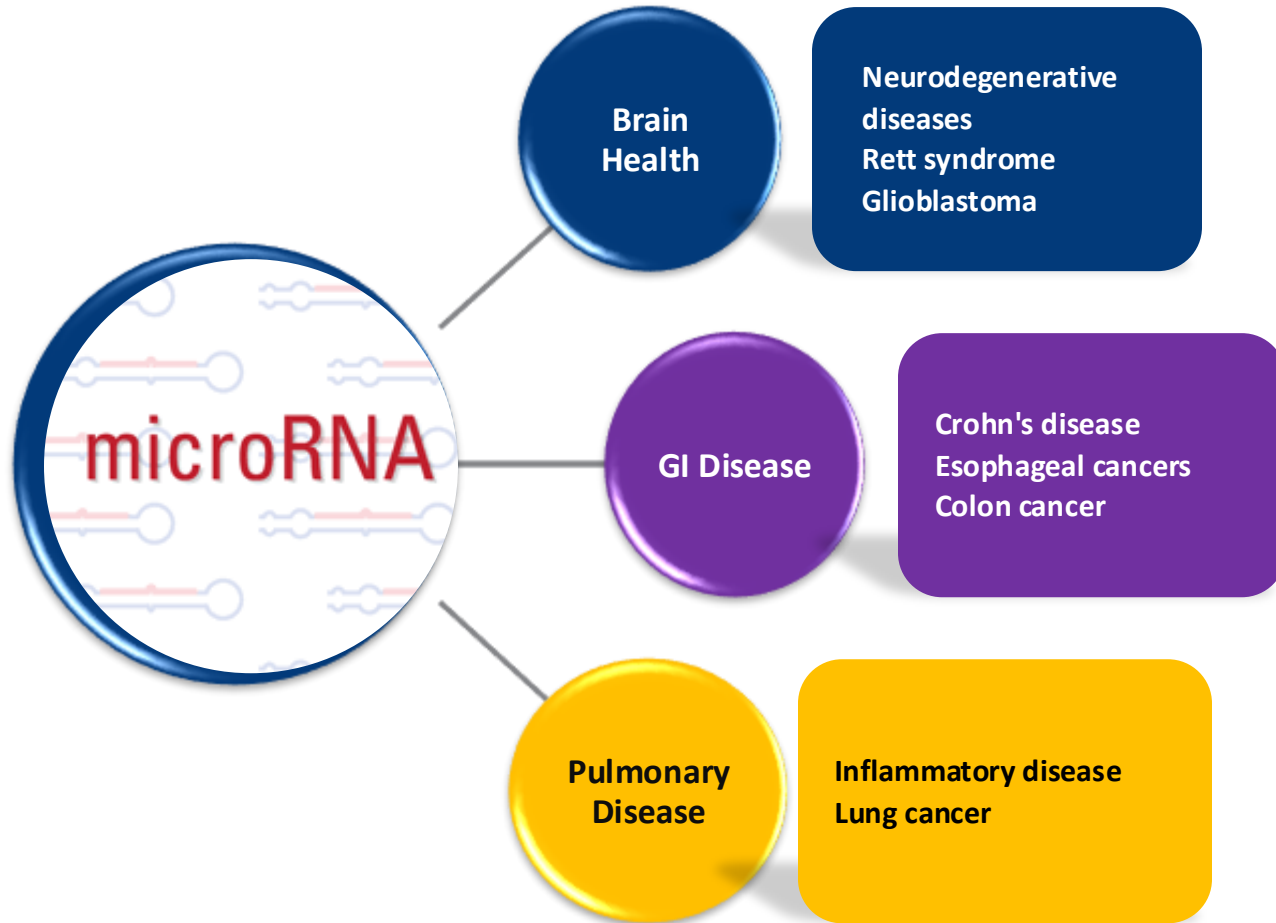
CogniMIR[®] microRNA Panel for Alzheimer's Disease | Overview of a novel, proprietary, multiplatform risk-assessment tool



CogniMIR[®]: A non-invasive, blood plasma-based test for risk of Alzheimer's Disease



miRNA Platform Technology | Opportunities beyond brain health

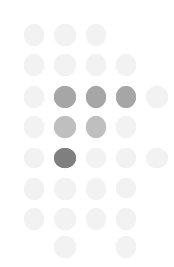


Framework

- Identify individual baseline levels of organ-enriched miRNA biomarkers circulating in plasma
- Deviations indicate pathology – follow with more specific/expensive/invasive diagnostic tests

Advantages

- Diverse diseases, incl. orphan, detected early, before symptoms
- Earlier treatment typically leads to improved health outcomes
- Step-by-step implementation: neurodegeneration, GI diseases, others



Data and Research Partners



Technology Summary | Our accomplishments

2000+

Samples processed and analyzed



13

Peer-reviewed Publications



22

Presentations at scientific meetings



12

Grants awarded (~\$10M)



50+

Patents granted worldwide



On-going Initiatives:

- AI/ML driven analytics
 - Developing proprietary analytical software tool
- Optimized blood collection method
- APOE genotyping test validated and ready for launch
- CongniMIR® analytical validation completed
- Rett syndrome clinical validation ongoing

Key differentiating factors:

- Brain- and other organ-enriched miRNA expertise
- DiamIR has retained worldwide rights to all its products
- Multi-platform testing approach
 - microRNAs
 - Genetic analysis (APOE testing)
 - Blood protein biomarkers

Analytically validated microRNA platform



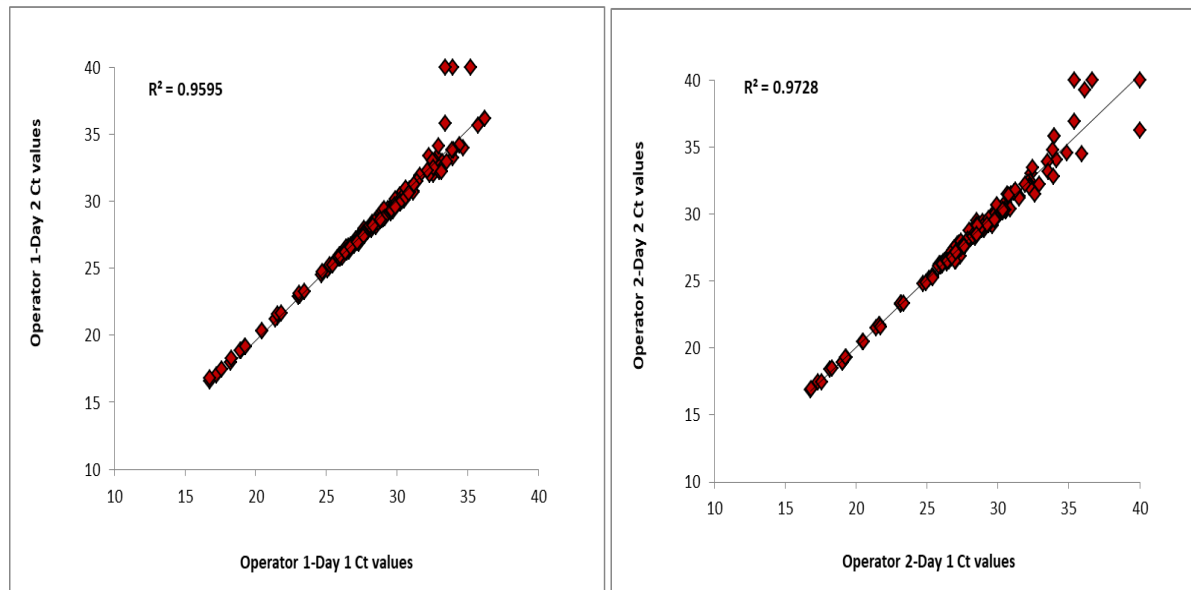
Diagnostics 2023, 13, 2170. <https://doi.org/10.3390/diagnostics13132170>



Article

Analytical Validation of a Novel MicroRNA Panel for Risk Stratification of Cognitive Impairment

Arzu Kunwar [†] , Kenny Kwabena Ablordeppey [†], Alidad Mireskandari, Kira Sheinerman, Michael Kiefer, Samuil Umansky and Gyanendra Kumar ^{*}



Inter-run reproducibility analysis: To demonstrate the repeatability and reproducibility of the detection of 24 miRNA panel, the inter-run study was carried out using 4 plasma samples in 2 replicates tested on 2 days for 24 miRNAs.



License renewed June 24th, 2023



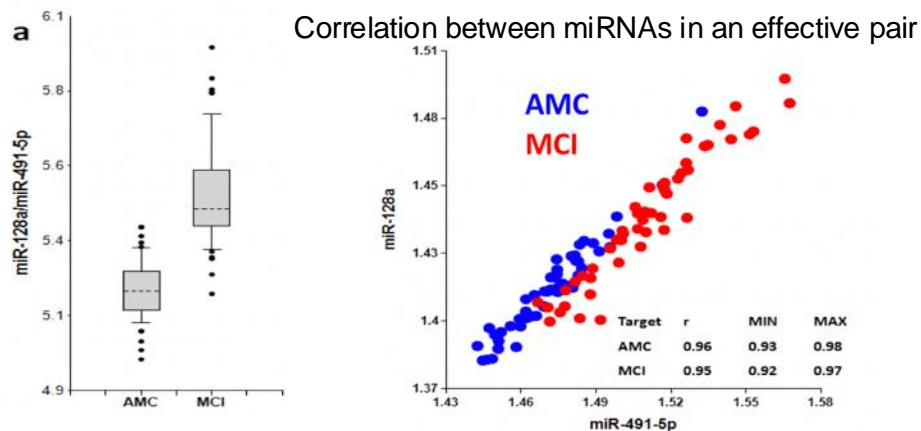
License renewed April 23rd, 2023



CogniMIR[®] Development | Proof-of-concept studies in multiple patient cohorts

Brain-enriched miRNAs detectable in blood plasma hold strong potential as peripheral biomarkers of AD and AD related dementias

DIFFERENTIATION BETWEEN MCI AND AGE-MATCHED CONTROL



AUC = 0.98, P-value = 1.5E-16 Roskamp Institute cohort

DIFFERENTIATION OF AD FROM OTHER NEURODEGENERATIVE DISEASES

Participants	AUC	P-value
FTD vs AD	0.87	5.60E-10
PD vs AD	0.85	3.40E-09
ALS vs AD	0.98	1.10E-16

NDs: neurodegenerative diseases; FTD: frontotemporal degeneration; PD: Parkinson's disease; ALS: amyotrophic lateral sclerosis; UPenn cohort

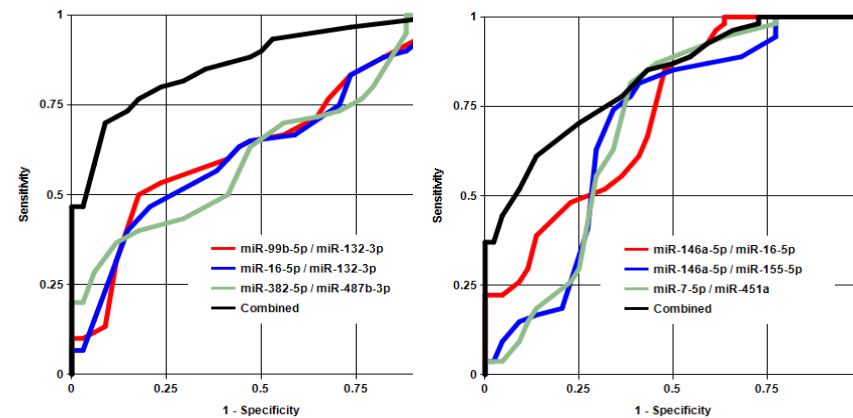
PREDICTION OF PROGRESSION IN SEX-STRATIFIED GROUPS ON AVERAGE 6 YEARS PRIOR TO CLINICAL SYMPTOMS

Participants	AUC	P-value
Male	0.88	3.30E-04
Female	0.86	4.50E-05

AUC for differentiation of progressors vs non-progressors; WashU cohort

DEFINING CLINICALLY RELEVANT PATIENT GROUPS

APOE4 vs APOE2/3, 3/3 in Aβ+ A4 study participants



MALE: AUC=0.88

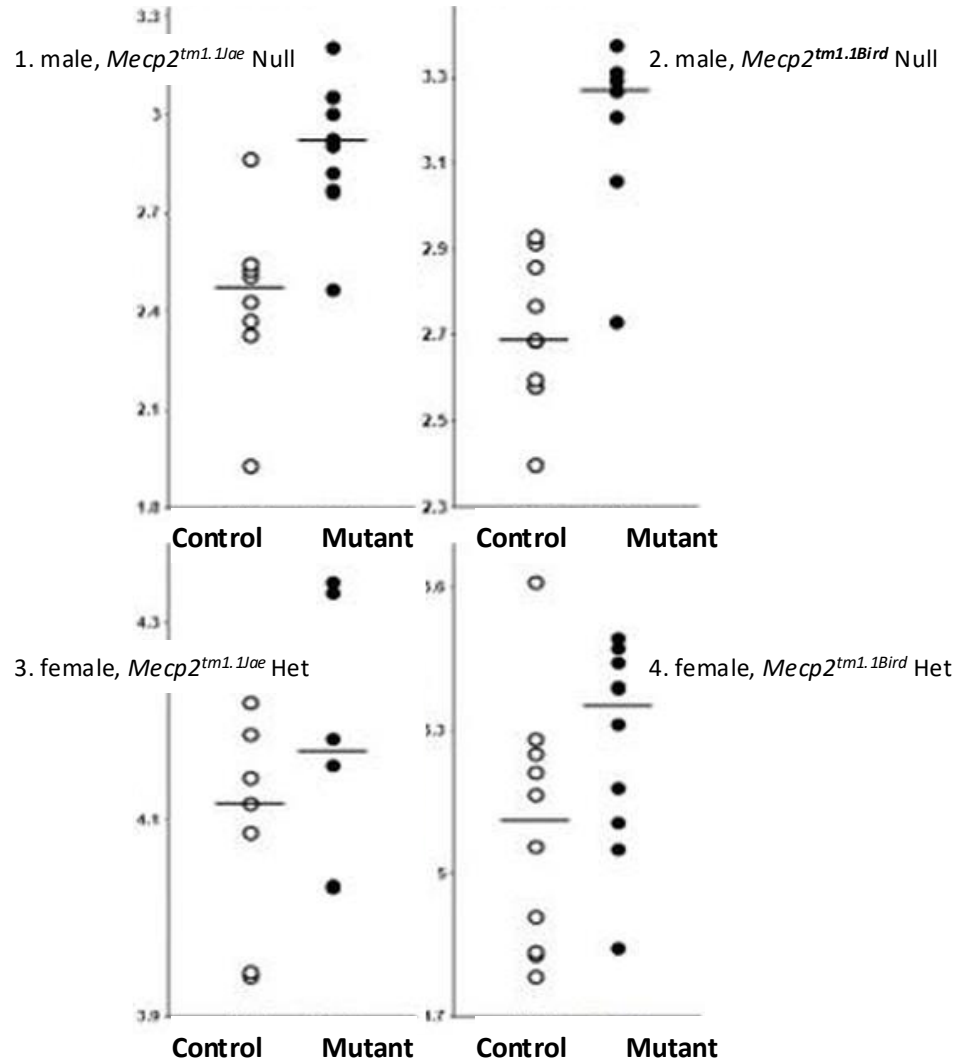
FEMALE: AUC=0.86

References: 1. Aging (Albany NY), 4, 590-605 (2012), PMID: 23001356; 2. Front Cell Neurosci. 7, 150 (2013), PMID: 24058335; 3. Alzheimers Res Ther. 9, 89 (2017), PMID: 29121998; 4. US Patent 9,556,487; 5. CTAD 2017, Boston, November 2017; 6. Aging (Albany NY), 5, 925-938 (2013), PMID: 24368295; 7. 2016 Alzheimer's Association International Conference, Toronto, Canada; 8. AD/PD(TM) 2017, Vienna, Austria; 9. 21st International Conference on Alzheimer's Drug Discovery, 2020, virtual meeting; 10. The Journal of Prevention of Alzheimer's disease, 9, 51 (2022) / CTAD; 11. Alzheimer's & Dementia, 19(Suppl 24) (2023) / AAIC.



microRNAs as Translational Biomarkers | Rett syndrome program

miR-491-5p/miR-335-5p in four mouse models



Areas under the ROC curves (AUC) for select microRNA biomarker pairs (mouse models and human pilot study)

miRNA pairs	Mouse models study				Human RTT study		
	1	2	3	4	2-5 y.o.	6-15 y.o.	>15 y.o.
	n=19	n=18	n=13	n=20	n=17	n=24	n=14
miR-107 / miR-335-5p	0.96	0.99	0.93	0.80	0.72	0.84	
miR-107 / miR-132-3p	0.86	0.98	0.71	0.82	0.85	0.65	
miR-491-5p / miR-335-5p	0.96	0.98	0.79	0.78		0.81	
miR-491-5p / miR-132-3p	0.87	0.99		0.82	0.90	0.67	
miR-411-5p / miR-323-3p	0.77	0.84			0.88	0.71	
miR-16 / miR-323-3p	0.88	0.79	0.73	0.75			0.72
miR-16 / miR-335-5p	0.91	0.98	0.95	0.75			0.80
miR-16 / miR-411-5p	0.76		0.79				0.77
miR-132-3p / miR-335-5p	0.84	0.89	0.96				0.91

microRNA sequences are highly conserved across species

Sheinerman et al. (2019) PLOS ONE



DiamiR Partnerships | Collaborators and key stakeholders



**Weill Cornell
Medicine**



Alzheimer's
**Drug Discovery
Foundation**



UC San Diego

Keck School of
Medicine of **USC**

**Alzheimer's Therapeutic
Research Institute**



National Institute on Aging
NIA Small Business Programs (SBIR & STTR)



Montefiore



 **New York Blood Center**



DiamiR Biosciences | Summary

Molecular Diagnostics Company Focused on Brain Health

- Alzheimer's & other neurodegenerative diseases
- Rett syndrome
- Glioblastoma

Experienced Management

- Product development expertise
- Reimbursement expertise
- Regulatory expertise

Near-term Milestones

- CogniMIR® validation study
- Rett syndrome panel validation study
- Partnerships

Validated Technology Platform

- ~\$10m in NIH and disease foundation grants
- Multiple peer-reviewed publications/presentations
- Collaborations with major brain health centers

50+ Issued Patents Worldwide

- Early detection, monitoring, and differential diagnosis of neuro diseases
- Early detection of cancer and inflammatory diseases (Universal Screening Test)
- Monitoring of healthy aging

CLIA certified, CAP accredited, NY State Licensed Clinical Lab

- Product development expertise
- Clinical study experience
- Leaders in microRNA expression analysis



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