

BrainDTech Spa

Biomarkers for brain diseases
via liquid biopsy

- **400 different brain diseases**
- **1/3 of European citizens have a brain disease**
- **+30% of health care costs in industrialized countries.**



Early diagnosis

Biomarkers that predict brain diseases prior to symptoms



Treatment monitoring

Biomarkers that quantitatively evaluate therapy efficacy



Disease staging

Biomarkers for more efficient patient group clustering

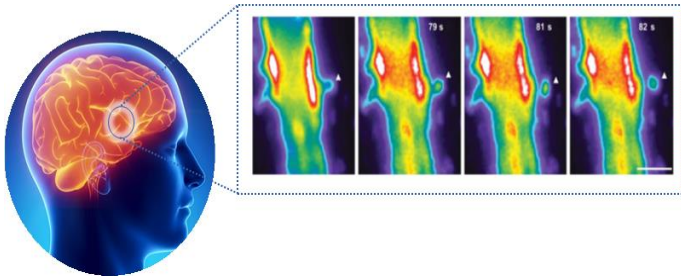


Target identification

Biomarkers for downstream ID of novel drug targets.

Biological discovery

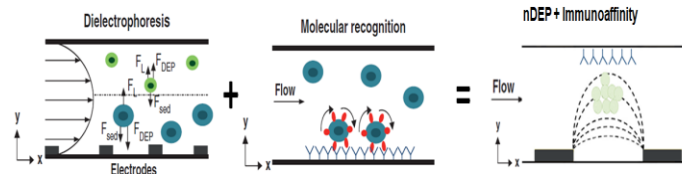
BDT has developed a **method** for identifying **biomarkers** for neurodegenerative diseases from **liquid biopsy based on miRNA from microglia microvesicles (MVs)**



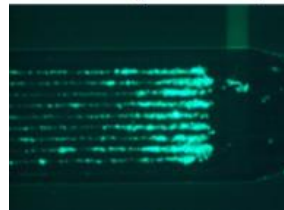
Partner	Cinical Centers
Biopsy	CSF, plasma, tear
Current Standard	circulating/exosome miRNA
BrainDTech Approach	miRNA from microglia MVs

Unique technology

BDT, has developed a **unique technology** to isolate cell-specific microvesicles from a **mixed liquid biopsy**



With microglia antibody



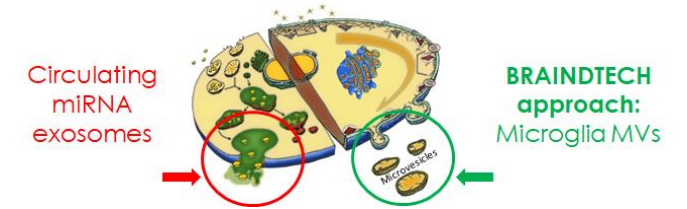
No microglia antibody



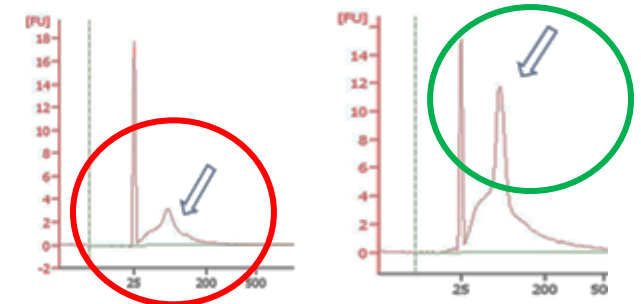
Partner	IBM Precision Diagnostics Lab
Biopsy	CSF, plasma, tear
Current Standard	3 hours for isolation (Exosomes)
BrainDTech Approach	20 min isolation (MVs) Volume (20 ml)

Competitive advantage

Only **cell-specific, plasma membrane derived MVs** are isolated, increasing significantly the **specificity** of data obtained.



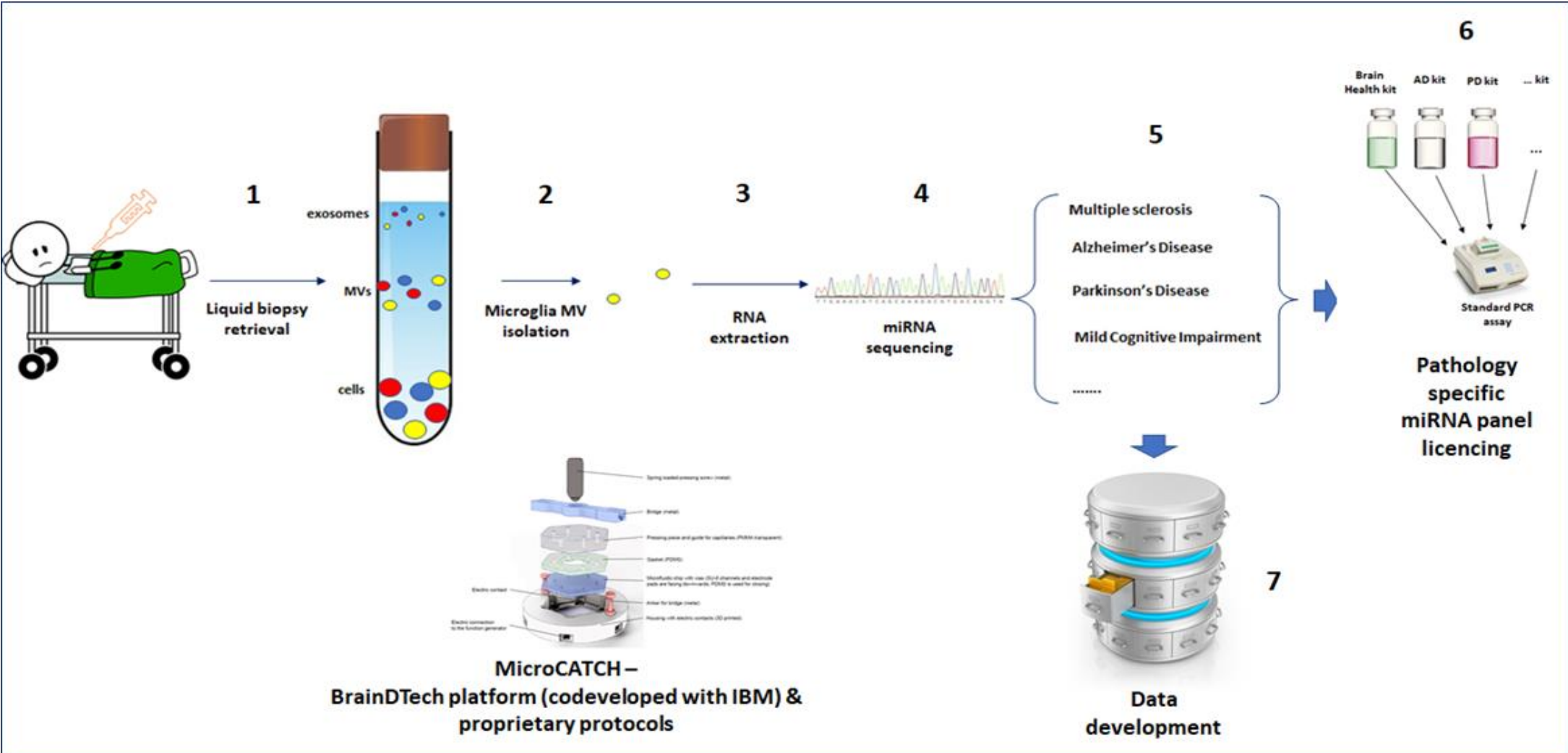
Proprietary protocols enable **miRNA processing optimization** from very small quantities



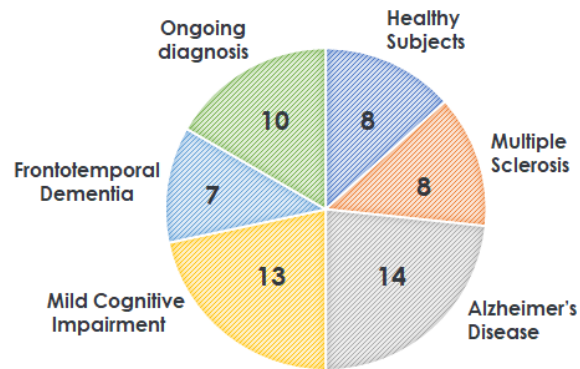
How does it work?



BrainD Tech technology enables isolation of microglia specific MVs from a liquid biopsy to be then sequenced for miRNA profiling.



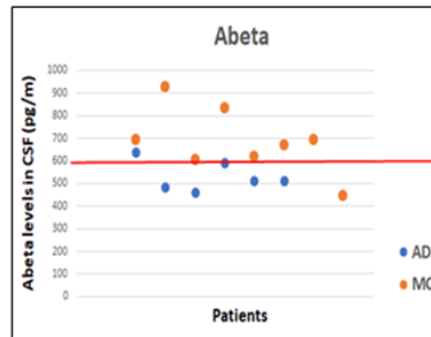
Microglial MVs were isolated from the CSF of a group of patients



Achievements:

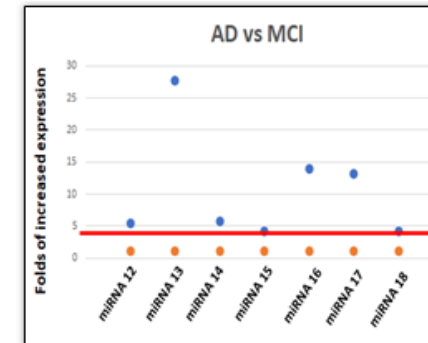
- ✓ Healthy controls **lack microglia MVs**
- ✓ Frozen samples **maintain MV integrity**: we can access profiled biobanks

Standard approach:

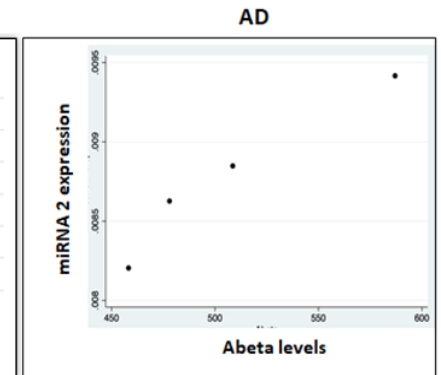


Score parameters from hospital are reported for AD/MCI patients.
Many times, scores overlap

BrainDTech approach:



Selected miRNAs are **differentially expressed** in AD/MCI patients



Selected **miRNAs correlate** with specific biomarkers (i.e. Abeta levels)

Clinical study on MS: Discovery phase results

Comparison of miRNA profiles of microglia microvesicles in different neurological conditions

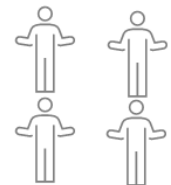
Clinical partner:



- Primary Objective:**



To define miRNA panels in microglia MVs from plasma and CSF, characterizing patients affected by MS and by its different clinical forms.



- Discovery Phase**

CSF samples from 60 MS patients analyzed through next generation sequencing (NGS).

Achievements:

All MS patients tested express 6 common miRNAs



Chronic RRMS

Acute RRMS

Biomarker		Consensus percentage	
Feature ID	p-value	RRMS_chronic	RRMS_acute
• BDT-0009	2,78E-02	100,00%	100,00%
• BDT-0016	4,24E-02	100,00%	100,00%
• BDT-0018	2,65E-03	100,00%	100,00%
• BDT-0176	1,66E-02	100,00%	100,00%
• BDT-0180	3,94E-02	100,00%	100,00%
• BDT-0242	2,48E-02	100,00%	100,00%

Several miRNAs are modulated between acute and chronic RRMS



Chronic RRMS

Acute RRMS

Biomarker		Consensus percentage	
Feature ID	p-value	RRMS_chronic	RRMS_acute
• BDT-0260	4,37E-02	55,86%	93,51%
• BDT-0386	4,62E-02	14,71%	0,00%
• BDT-1993	1,47E-02	0,00%	21,41%
• BDT-2110	4,37E-02	17,86%	82,79%
...

Development plan: Business Lines

Business line 1: Research and Service

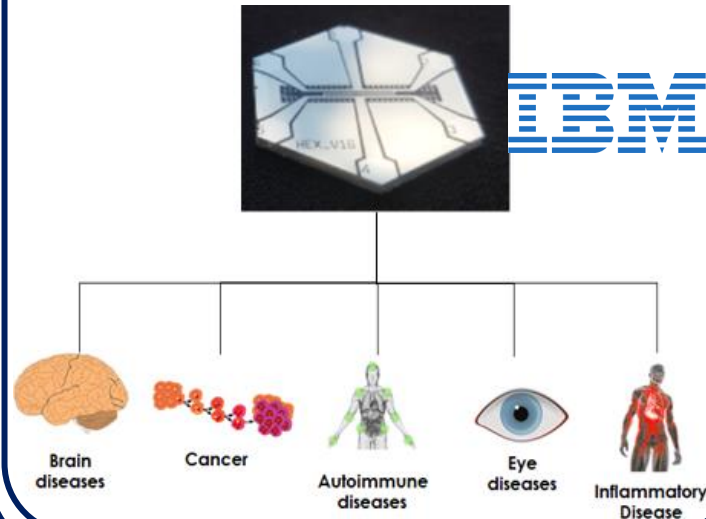
Identification and Licencing
of pathology specific miRNA patterns
as **biomarkers for clinical studies**

Disesease	Partners	Sample		
		Collectio n	Process	Data analysis
MS				
MCI	 MRC - The Neuroimaging Consortium Janssen-Cilag			
AD	 DEMENTIA UK Platform 			
Migraine	 PÉCSI TUDOMÁNYEGYETEM UNIVERSITY OF PÉCS			
Dry Eye	 Dompé			

Business line 2: Product development

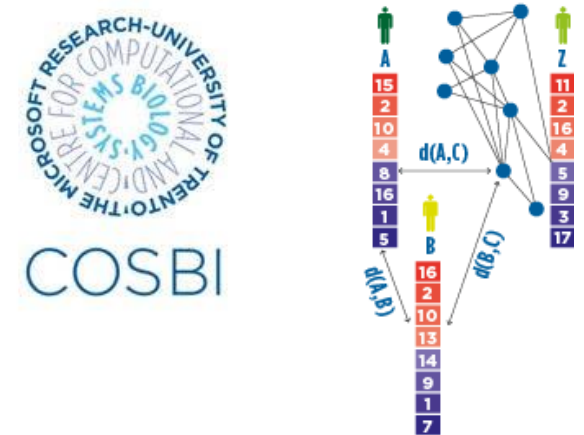
Diagnostic products

Transversal platforms for **data accumulation**,
to be used for
diagnostic tool development



Therapeutical products

Novel therapeutical target ID
from selected miRNA signatures





Founding date: 27/07/2016



Capital f.p. : € 641.266,00



Shareholders:

- ✓ Neurozone srl (31,29%)
- ✓ Bio4Dreams spa (30,00%)
- ✓ IMS srl (15,20 %)
- ✓ Fabio Bianco (11,70%)
- ✓ F3F spa (7,06%)
- ✓ Noemi Tonna (3,90%)
- ✓ Ennio Ongini (0,86%)

Management Team



Dr. **Pietro Conti**, MD – *President*

- Medicine degree
- Founder/CEO several startups
- Director Health Int'l Projects @UN
- Board Member



Dr. **Fabio Bianco**, PhD – *Chief Executive Officer*

- Medical Biotech, Pharmacology
- President/CSO @NeuroZone
- +10yr in Biotech/Pharma
- Board Member



Dr. **Maurizio Loiacono** – *General Manager*

- BSc in BA@ Brunel University – London
- >17 in Health Care – Medical Devices market
- Sales Mgmt, Business Mgmt, Market Access
- Former Market Access Director Johnson&Johnson Medical



Dr. **Noemi Tonna**, PhD – *Chief Scientific Officer*

- Medical Biotech, Pharmacology
- Lab manager @NeuroZone
- +10yr in drug discovery

Board



Dr. **Maurizio Mariani**, MD – *Board Member*

- Economics - Bocconi Univ; MBA, INSEAD
- General Manager of Merck Serono RBM S.p.A.
- Head Exploratory Medicine for the Merck Serono Group
- Head of R&D Advanced Accelerator Applications, now part of Novartis Group



Dr. **Carlo Frati**, MBA – *Board Member*

- Economics - Bocconi Univ; MBA, INSEAD
- McKinsey & Co. (2000-2016): Partner
- Capital Shuttle S.p.A. (2016): CEO
- Banca Consulia (2017-present): CFO



Dr. **Laura Ferro**, MD, MBA – *Board Member*

- Medicine & Psychiatry
- MBA @ Bocconi Univ., Milano
- Top 10 innovative women managers in Italy
- Founder /CEO several biotech (including Gentium, IPO at Nasdaq)



Dr. **Elisabetta Borello** – *Board Member*

- Economics@ Bocconi Univ., Milano
- +30 years in Healthcare Information Management Systems
- Founder /Board Member several biotech