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Rehabilitación
Centro de Memoria & Envejecimiento

Possibility of Development of Emerging Biomarkers in Latin America

Prof. Ricardo F. Allegri, MD., PhD.

Disclosure

1. FLENI Fondation
2. CONICET (PICT 2015/1011; PIP 2017; PI 2017)
3. University of Buenos Aires
4. NIH – DIAN
5. Fogarty UDS Spanish – Univ Pensylvania

AD Clinical Trials (on going)

1. Novartis
2. EISAI

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Possibility of Development of Emerging Biomarkers in Latin America

1. Why do we need to develop BM?
2. Why do we need to evaluate BM in LA?
3. Some words about our experience…
4. Are there BM resources availables in LA?
5. What is the challenge?

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Biomarkers

Dopa
- F-dopa PET
- Troda SPECT

Amyloid
- Aβ42 in CSF
- Amyloid PET (PIB, AV45 etc)

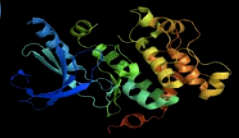
Tau
- p-Tau in CSF
- tau PET (Flortaucipir, etc)

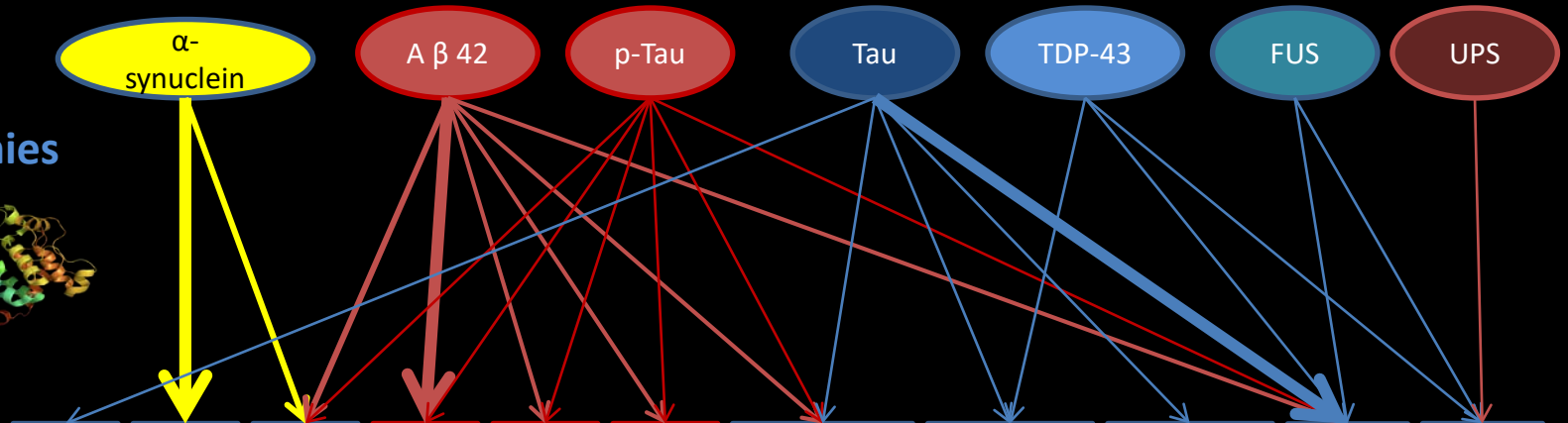
(N) degeneration
- MRI scan
- T-Tau in CSF
- FDG –PET

Gene
- APOE
- TREM2
- APP/PS1/PS2
- MAPT
- C9ORF72/GRN

Molecular Pathology

Proteinopathies (2019)





Neuro Degenerative Diseases (1900)

- Parkinson & Parkinsonism
- Alzheimer´s Disease
- Frontotemporal Dementia

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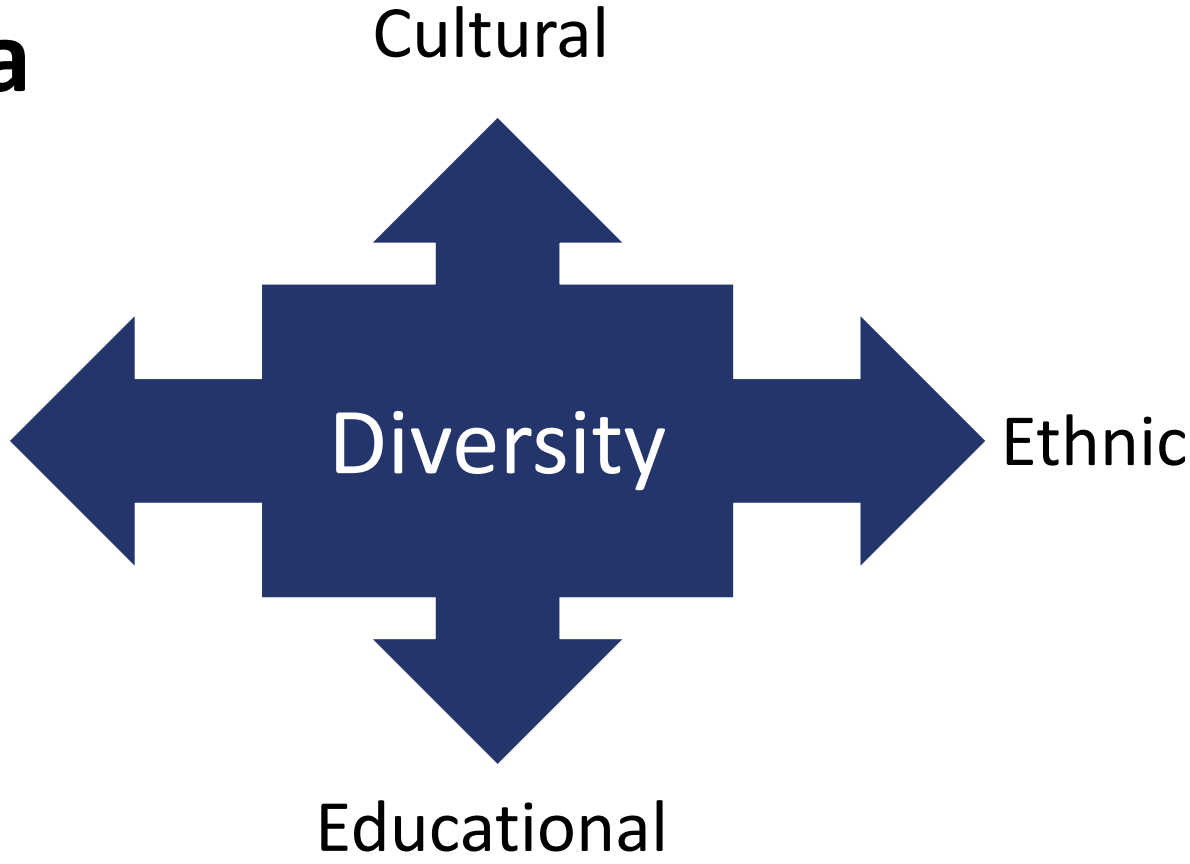
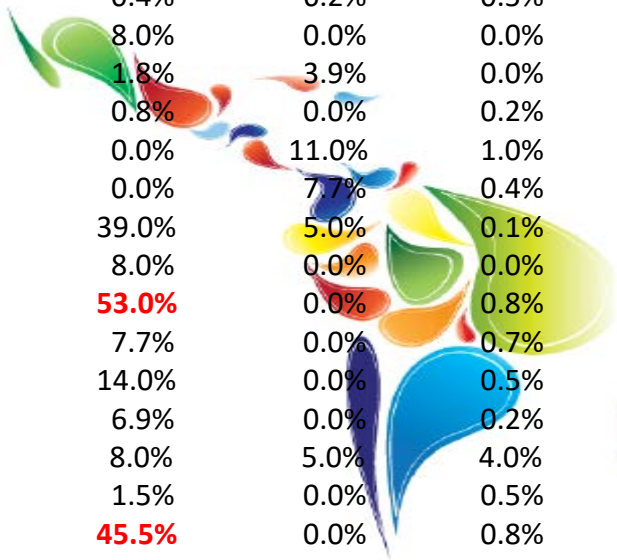
Latin America



Ethnic Diversity in Latin America

(F. Lizcano Fernandez (Univ. Mexico), data 2014)

Country	Population	Whites	Mestizos	Mulattoes	Amerind.	Blacks	Asians	Creoles
Argentina	41,769,726	**85.0%**	11.1%	0.0%	1.0%	0.0%	2.9%	0.0%
Bolivia	10,118,683	15.0%	28.0%	2.0%	**55.0%**	0.0%	0.0%	0.0%
Brazil	203,429,773	**53.8%**	0.0%	39.1%	0.4%	6.2%	0.5%	0.0%
Chile	16,888,760	**52.7%**	39.3%	0.0%	8.0%	0.0%	0.0%	0.0%
Colombia	44,725,543	20.0%	**53.2%**	21.0%	1.8%	3.9%	0.0%	0.1%
Costa Rica	4,576,562	**82.0%**	15.0%	0.0%	0.8%	0.0%	0.2%	2.0%
Cuba	11,087,330	37.0%	0.0%	**51.0%**	0.0%	11.0%	1.0%	0.0%
Do.Rep	9,956,648	14.6%	0.0%	**75.0%**	0.0%	7.7%	0.4%	2.3%
Ecuador	15,007,343	9.9%	**42.0%**	5.0%	39.0%	5.0%	0.1%	0.0%
El Salvador	6,071,774	1.0%	**91.0%**	0.0%	8.0%	0.0%	0.0%	0.0%
Guatemala	13,824,463	4.0%	42.0%	0.0%	**53.0%**	0.0%	0.8%	0.2%
Honduras	8,143,564	1.0%	**85.6%**	1.7%	7.7%	0.0%	0.7%	3.3%
Mexico	121,724,226	15.0%	**70.0%**	0.5%	14.0%	0.0%	0.5%	0.0%
Nicaragua	5,666,301	14.0%	**78.3%**	0.0%	6.9%	0.0%	0.2%	0.6%
Panama	3,460,462	10.0%	**32.0%**	27.0%	8.0%	5.0%	4.0%	14.0%
Paraguay	6,759,058	20.0%	**74.5%**	3.5%	1.5%	0.0%	0.5%	0.0%
Perú	30,814,175	12.0%	32.0%	9.7%	**45.5%**	0.0%	0.8%	0.0%
Puerto Rico	3,989,133	**74.8%**	0.0%	10.0%	0.0%	15.0%	0.2%	0.0%
Uruguay	3,308,535	**88.0%**	8.0%	4.0%	0.0%	0.0%	0.0%	0.0%
Venezuela	27,635,743	16.9%	37.7%	37.7%	2.7%	2.8%	2.2%	0.0%
Total	**579,092,570**	**36.1%**	**30.3%**	**20.3%**	**9.2%**	**3.2%**	**0.7%**	**0.2%**



Possibility of Development of Emerging Biomarkers in Latin America

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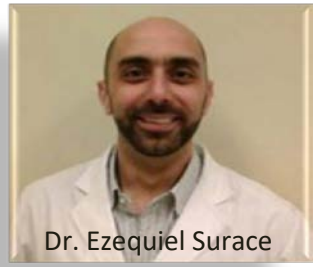
LATIN AMERICAN EXPERIENCE WITH ALZHEIMER'S DISEASE CEREBROSPINAL FLUID BIOMARKERS



Dr. Ezequiel Surace

2005

CSF x Lumbar Puncture

Table 1. Results

Marker	Mild Cognitive Impairment: Progressed to AD, n = 5 (Mean ± SD)	Mild Cognitive Impairment: Did Not Progress to AD, n = 5 (Mean ± SD)	P-Value	AD, n = 7 (Mean ± SD)	Frontotemporal Dementia, n = 3 (Mean ± SD)
Amyloid-beta 42, pg/mL	355 ± 88	800 ± 345	.02	443.6 ± 65.8	855 ± 270
Total tau, pg/mL	304 ± 242	189.6 ± 113	.21	358.6 ± 218	108.3 ± 45
Hyperphosphorylated tau, pg/mL	66.2 ± 52.1	35.8 ± 18.5	.30	42.8	18.3
Amyloid- beta 42/hyperphosphorylated tau	12.7 ± 12.8	30.6 ± 22.1	.11	11.8 ± 5.7	48.5 ± 6.9
Cerebrospinal fluid biomarkers for AD profile	0.68 ± 0.41	1.9 ± 1.17	.02	0.75 ± 0.32	2.3 ± 0.50

AD = Alzheimer's disease; SD = standard deviation.

points for the group with AD, and 22 for the group with FTD. CDR was 0.5 for the group with MCI and 1 for the other groups. RAVLT mean results were 31 points for the group with MCI, 20 for the group with AD, and 15 for the group with FTD.

$A\beta_{42}$, t-tau, and p-tau were quantified in CSF using an enzyme-linked immunosorbent assay. Ratios of Aβ-42 to p-tau and CSF AD profile ($A\beta42/(240 + [1.18 \times \text{t-tau}])$)[10] were calculated. (A CSF ratio <1.3 was considered suggestive of AD pathology.) The Mann-Whitney one-tailed test was used to determine the difference between groups.

Mean clinical follow-up was 4.7 years (range 1–8 years). As expected, functional status and overall cognitive tests deteriorated over time for individuals with AD and FTD. CDR was 2 for the groups with AD and FTD. For the group with MCI, participants were classified based on clinical and cognitive evolution into a group that progressed to AD (n = 5), with a mean MMSE score of 24 and CDR of 1, and a group that did not (n = 5), with MMSE and CDR scores that did not change from baseline.

The mean value of biomarkers and the ratios were not significantly different in the three main groups (AD, MCI, FTD) because of the high dispersion observed in the MCI

clusions of this study should be taken cautiously because of the small sample size and lack of confirmatory pathological examination, but active patient recruitment is underway to strengthen these observations. Overall, this first AD biomarker study in Latin America supports that combined analysis of all three core AD biomarkers represent a powerful tool in clinical setting.

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Gabriela Cohen, MD
Horacio Martinetto, PhD
Patricio ChremMendez, MD
Eugenia Martín, PhD
Elisa Smyth, PhD
Griselda Russo, MD
Alejandra Amengual, MD
Ricardo Allegri, MD
Ramón Leiguarda, MD
Gustavo Sevlever, MD
Jorge Campos, MD
Fundación para la Lucha contra las Enfermedades Neurológicas de la Infancia, Instituto de Investigaciones Neurológicas Raúl Carrea, Buenos Aires, Argentina

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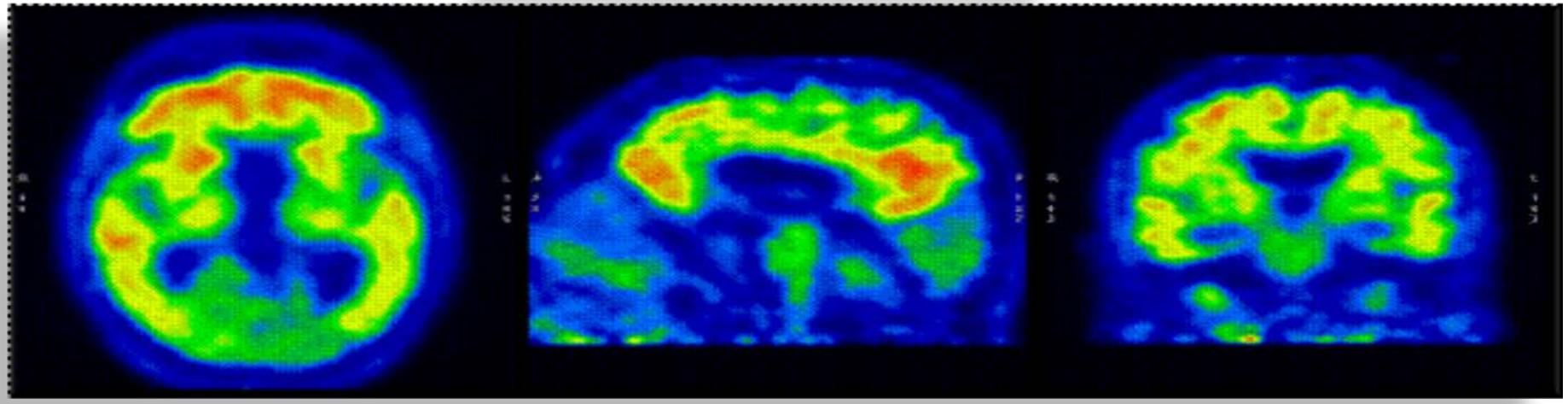

11^{C}-PiB PET Scan 04/10/2012

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ELSEVIER

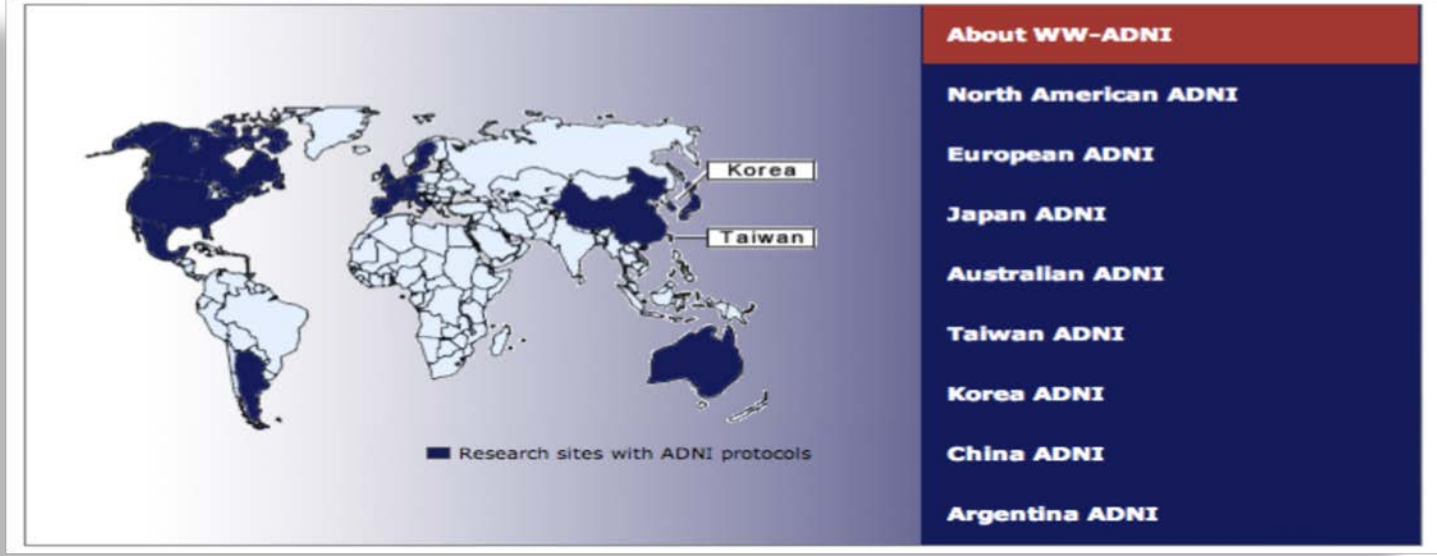
Alzheimer's & Dementia 8 (2012) S1–S68

Alzheimer's & Dementia

Review Article

The Alzheimer's Disease Neuroimaging Initiative: A review of papers published since its inception

Michael W. Weiner[a,b,c,d,e,*], Dallas P. Veitch[a], Paul S. Aisen[f], Laurel A. Beckett[g], Nigel J. Cairns[h,i], Robert C. Green[j], Danielle Harvey[g], Clifford R. Jack[k], William Jagust[l], Enchi Liu[m], John C. Morris[f], Ronald C. Petersen[n], Andrew J. Saykin[o,p], Mark E. Schmidt[q], Leslie Shaw[r], Judith A. Siuciak[s], Holly Soares[t], Arthur W. Toga[u], John Q. Trojanowski[v,w,x,y]; Alzheimer's Disease Neuroimaging Initiative



ELSEVIER

Alzheimer's & Dementia 10 (2014) S84–S87

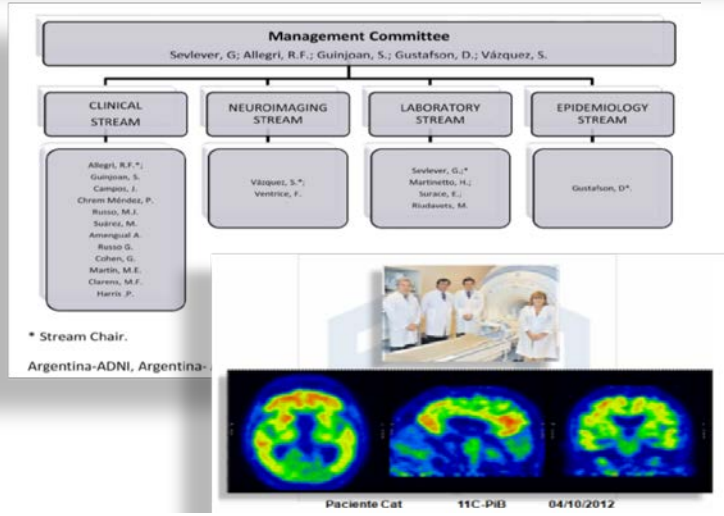
Alzheimer's & Dementia

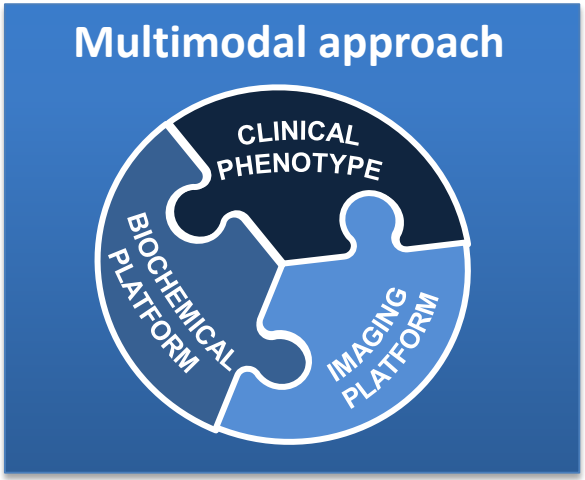
Research News

Creation of the Argentina-Alzheimer's Disease Neuroimaging Initiative

María Julieta Russo[a,*], Deborah Gustafson[b,c], Silvia Vázquez[a], Ezequiel Surace[a], Salvador Guinjoan[a], Ricardo F. Allegri[a], Gustavo Sevlever[a], members of the Argentina-Alzheimer's Disease Neuroimaging Initiative[1]

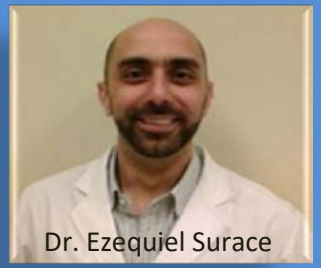
[a]*Aging and Memory Center, Instituto de Investigaciones Neurológicas Raúl Carrea (FLENI), Buenos Aires, Argentina*
[b]*Department of Neurology, State University of New York-Downstate Medical Center, Brooklyn, NY, USA. Neuropsychiatric Epidemiology Unit*
[c]*Institute for Neuroscience and Physiology, University of Gothenburg, Gothenburg, Sweden*





BIOCHEMICAL PLATFORM

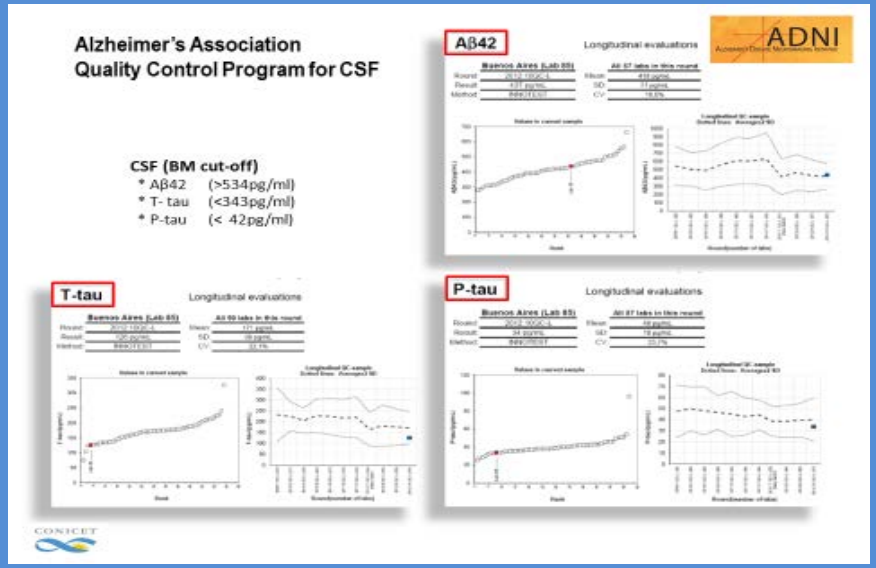
Cerebrospinal fluid:



Dr. Ezequiel Surace

- ✓ Aβ42
- ✓ phosphorylated-tau
- ✓ total Tau
- ✓ α-synuclein
- ✓ Neurofillaments light chain

Lumbar Puncture



Lab Kaj Blennow (Sweden)

THE GERONTOLOGICAL SOCIETY OF AMERICA®

Journals of Gerontology: Biological Sciences
cite as: *J Gerontol A Biol Sci Med Sci*, 2018, Vol. XX, No. XX, 1–4
doi:10.1093/gerona/gly179
Advance Access publication August 10, 2018

OXFORD

Brief Report

Evaluation of Cerebrospinal Fluid Neurofilament Light Chain as a Routine Biomarker in a Memory Clinic

Matías Niikado, MSc,[1] Patricio Chrem-Méndez, MD,[2] Tatiana Itzcovich, MSc,[1] Micaela Barbieri-Kennedy, MSc,[1] Ismael Calandri, MD,[2] Horacio Martinetto, PhD,[1] Mercedes Serra, MD,[3] Jorge Calvar, PhD,[3] Jorge Campos, MD,[2] María Julieta Russo, MD,[2,] Lucía Pertierra, MD,[2] Ricardo Allegri, MD, PhD,[2,4] Gustavo Sevlever, MD, PhD,[1] and Ezequiel I. Surace, PhD[1,4]

[1]Laboratorio de Biología Molecular, Departamento de Neuropatología y Biología Molecular, [2]Centro de Memoria y Envejecimiento, Departamento de Neurología Cognitiva, Neuropsiquiatría y Neuropsicología, and [3]Departamento de Imágenes, Instituto de Investigaciones Neurológicas Dr. Raúl Carrea (FLENI), and [4]Consejo Nacional de Investigaciones

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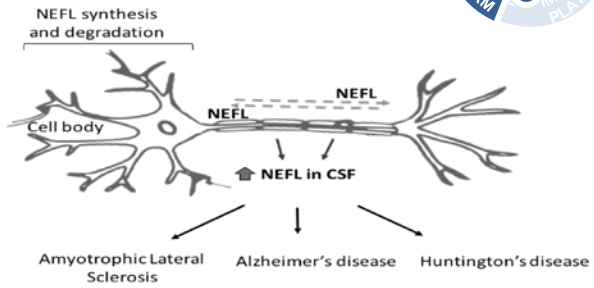
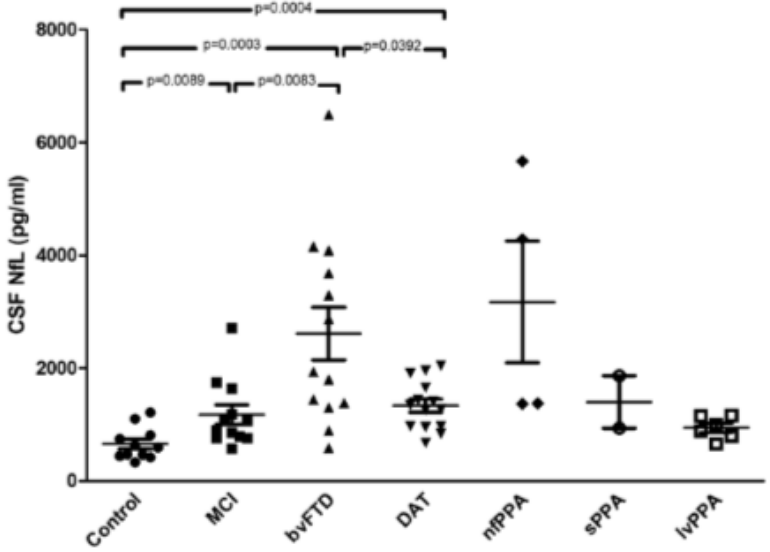
Instituto de Investigaciones Neurológicas Dr. Raúl Carrea (FLENI), Montañeses 2
hotmail.com

Received: February 16, 2018; Editorial Decision Date: August 1, 2018

Decision editor: Rozalyn Anderson, PhD





nature medicine

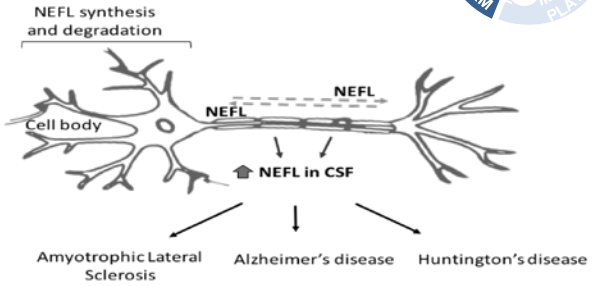
LETTERS

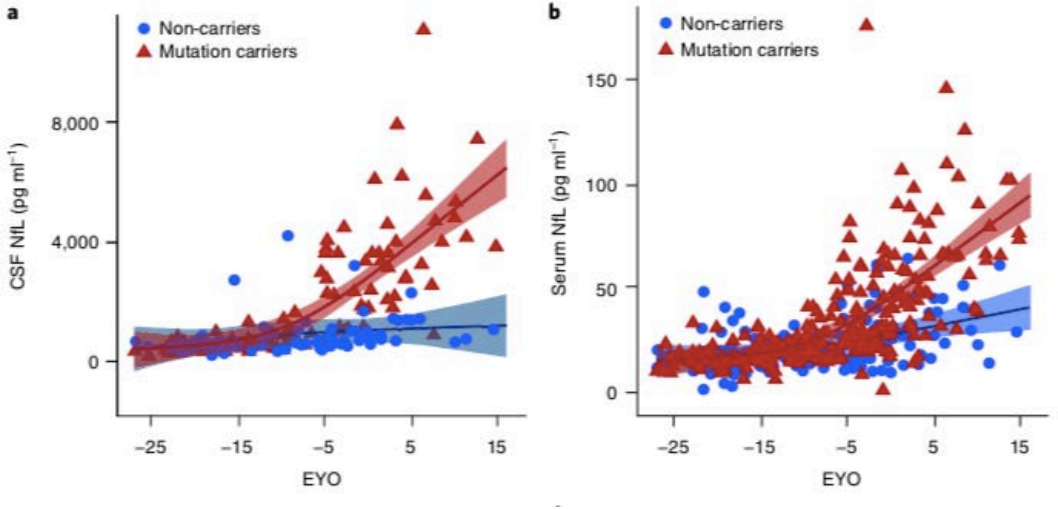
https://doi.org/10.1038/s41591-018-0304-3

Serum neurofilament dynamics predicts neurodegeneration and clinical progression in presymptomatic Alzheimer's disease

Oliver Preische[1,2,21], Stephanie A. Schultz[3,21], Anja Apel[1,2,21], Jens Kuhle[4], Stephan A. Kaeser[1,2], Christian Barro[4], Susanne Gräber[1], Elke Kuder-Buletta[1], Christian LaFougere[1], Christoph Laske[1,2], Jonathan Vöglein[5,6], Johannes Levin[5,6], Colin L. Masters[7], Ralph Martins[8,9], Peter R. Schofield[10,11], Martin N. Rossor[12], Neill R. Graff-Radford[13], Stephen Salloway[14], Bernardino Ghetti[15], John M. Ringman[16], James M. Noble[17], Jasmeer Chhatwal[18], Alison M. Goate[19], Tammie L. S. Benzinger[3], John C. Morris[3], Randall J. Bateman[3], Guoqiao Wang[3], Anne M. Fagan[3], Eric M. McDade[3], Brian A. Gordon[3], Mathias Jucker[1,2]* and Dominantly Inherited Alzheimer Network[20]

Neurofilament light chain (NfL) is a promising fluid biomarker of disease progression for various cerebral proteopathies. Here we leverage the unique characteristics of the Dominantly Inherited Alzheimer Network and ultrasensitive immunoassay technology to demonstrate that NfL levels in the cerebro-



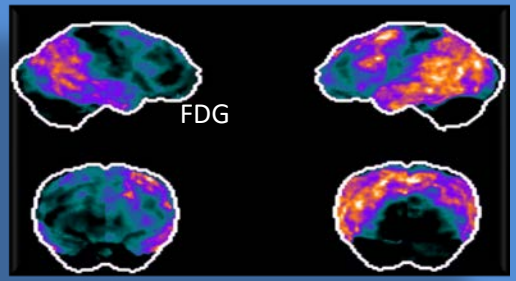


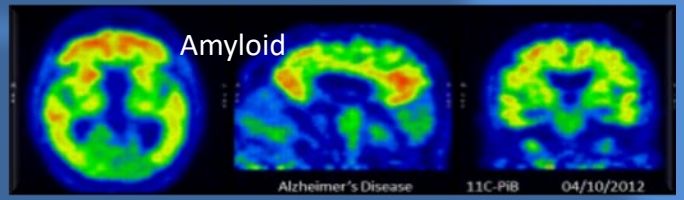
MOLECULAR IMAGING PLATFORM

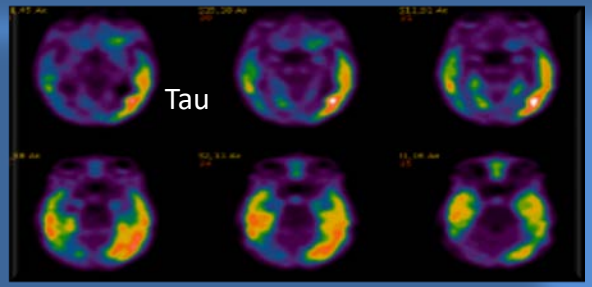
- ✓ **PET scan**
  - ✓ FDG
  - ✓ Amyloid (PiB, AV45)
  - ✓ Tau (AV-1451)
  - ✓ Fluoro-Dopa

Dr. Silvia Vazquez

2019: > 900 Amyloid PET Scan







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Current Topics in Research

Concordance Between ^{11}C-PIB-PET and Clinical Diagnosis in a Memory Clinic

American Journal of Alzheimer's Disease & Other Dementias®
1-8
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DOI: 10.1177/1533317515576387
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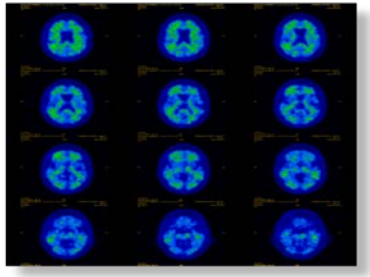
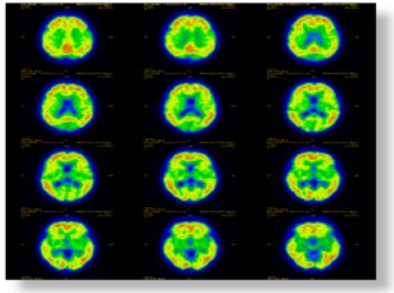
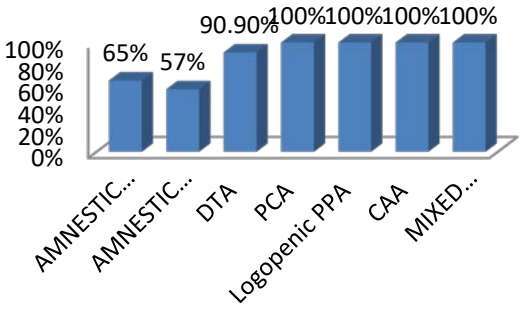
SAGE

Patricio Chrem Méndez, MD[1], Cohen Gabriela, MD[1], María Julieta Russo, MD[1], Fernandez Suarez Marcos, MD[1], Nahas Federico, MD[1], Russo Griselda, MD[1], Claudio R. Wierszylo, BA[1], Santiago Paz, BSc[1], Leonardo Tabaschi, BA[1], Campos Jorge, MD[1], Amengual Alejandra, MD[1], Kremer Janus, MD[1], Guinjoan Salvador, MD[1], Leiguarda Ramón, MD[1], Sevlever Gustavo, MD[1], Vázquez Silvia, MD[1], and Allegri Ricardo, MD[1]

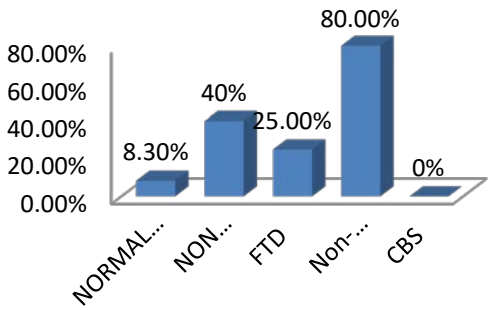




HIGH PRETEST PROBABILITY GROUP



LOW PRETEST PROBABILITY GROUP



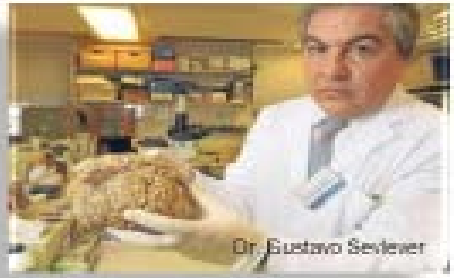
Amyloid PET Leads to Frequent Changes in Management of Cognitively Impaired Patients: the Imaging Dementia—Evidence for Amyloid Scanning (IDEAS) Study

GD Rabinovici,[1] C Gatsonis,[2] C Apgar,[3] K Chaudhary,[1] I Gareen,[2] L Hanna,[2] J Hendrix,[4] BE. Hillner MD,[5] C Olson,[3] O Lesman-Segev,[1] J Romanoff,[2] BA Siegel,[6] RA Whitmer,[7] MC Carrillo[4]

[1] Dept. of Neurology, UCSF; [2] Dept. of Biostatistics, Brown; [3]American College of Radiology; [4]Alzheimer's Association; [5] Dept. of Medicine, VCU; [6] Dept. of Radiology, Washington University; [7]Division of Research, Kaiser Permanente

Rabinovici et al. JAMA 2019 321(13): 1286-1294

BRAIN BANK

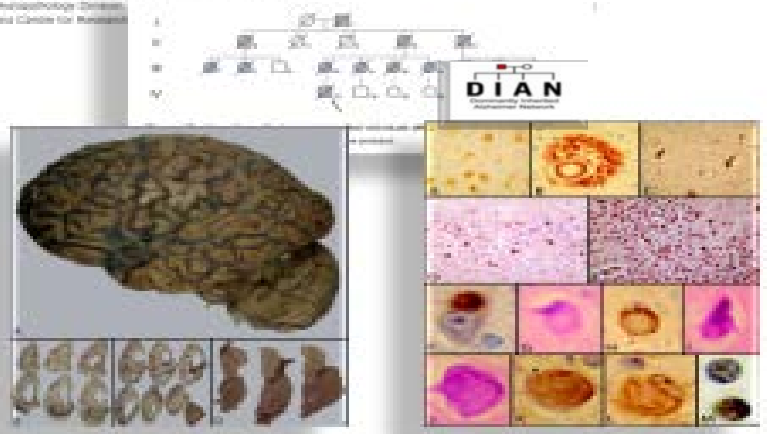


B A C E
Banco de Cerebros

RESEARCH ARTICLE

Familial Dementia With Frontotemporal Features Associated With M146V Presenilin-1 Mutation

Miguel A. Rudaeni*†; Leonardo Bartolini†*; Juan C. Troncoso‡; Olga Pletnikova‡; Peter St. George-Hyslop§; Mariano Schultz*; Gustavo Sevlever*; Ricardo F. Allegri†



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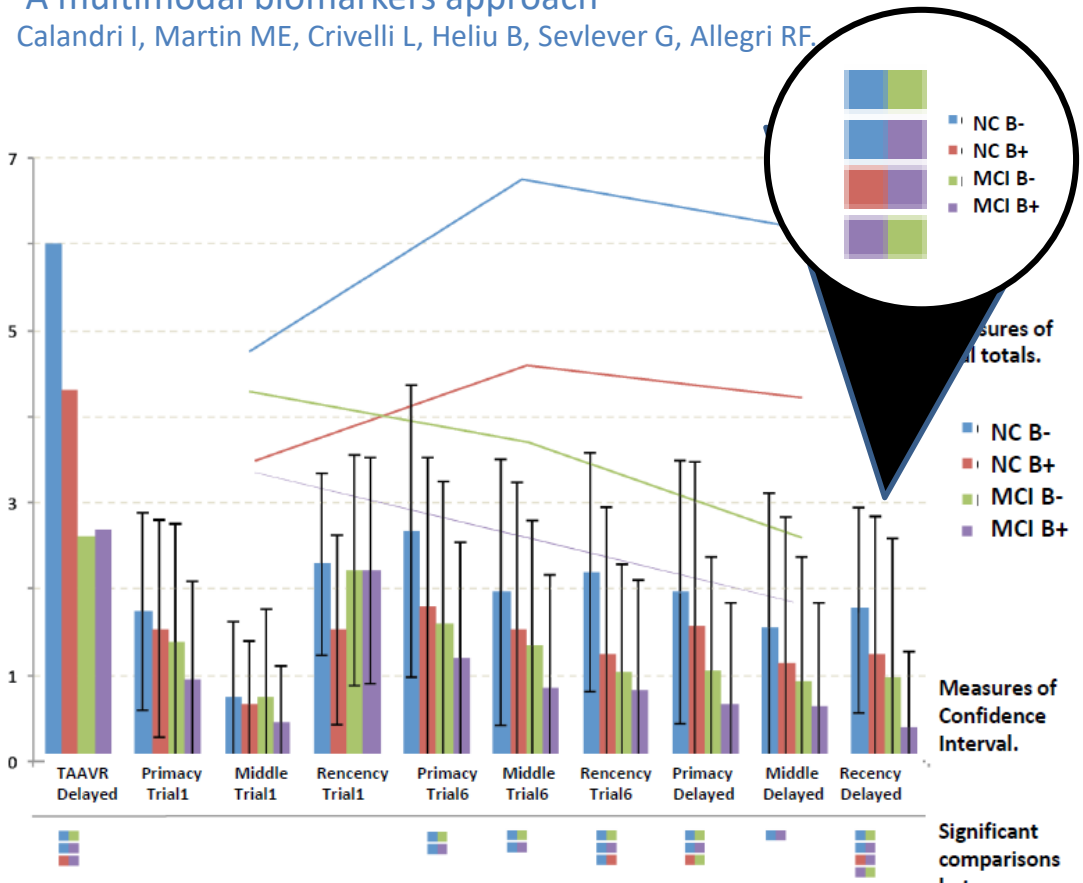
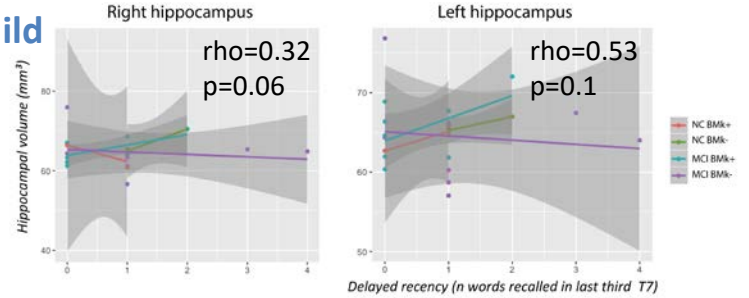
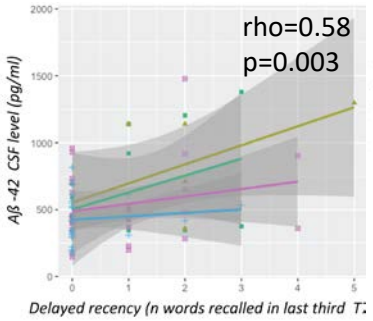
Relevance of serial position effect in the differential diagnosis of Mild Cognitive Impairment.

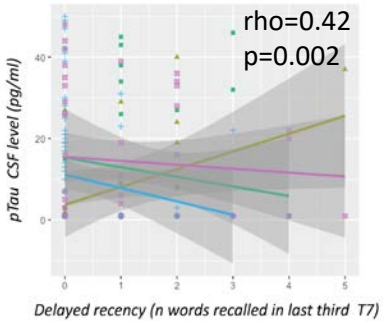
A multimodal biomarkers approach

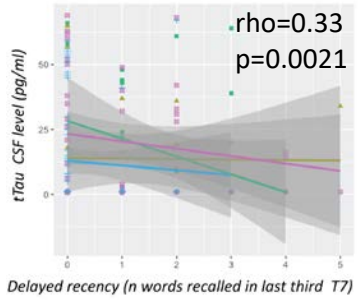
Calandri I, Martin ME, Crivelli L, Heliu B, Sevlever G, Allegri RF.











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Format: Abstract

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A biological classification for Alzheimer's disease - Amyloid, Tau and Neurodegeneration (A/T/N): results from the Argentine-Alzheimer's Disease Neuroimaging Initiative.

Allegri RF[1], Pertierra L[1], Cohen G[1], Chrem Méndez P[1], Russo MJ[1], Calandri I[1], Bagnati P[1], Tapajóz F[1], Clarens F[1], Campos J[1], Nahas FE[1], Surace E[2], Vázquez S[3], Sevlever G[2].

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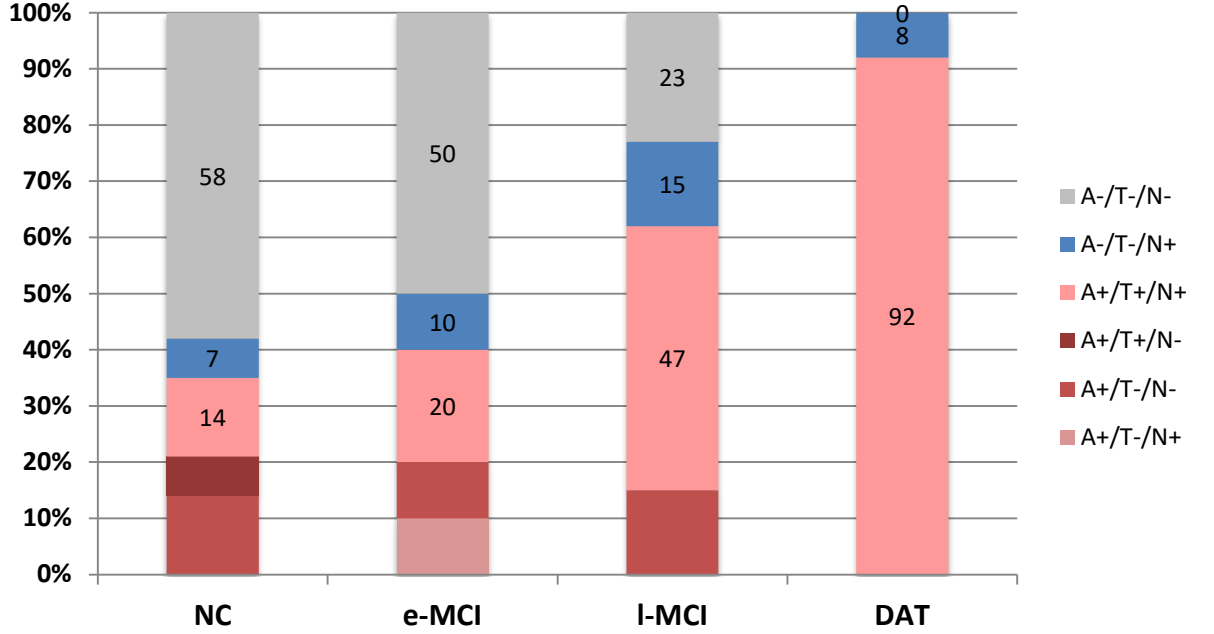
ATN in Argentine ADNI Cohort
Results from 60 months - follow-up (Allegri et al. submited)

Table 1. Demographic, clinical, cognitive and CSF biomarkers variables at baseline

	Controls	e-MCI	l-MCI	DAT	F (p)	* p (<.005)
Demographics						
N°	14	10	13	12		
Age, years	70.1(8.2)	73.0(8.8)	74.8(6.3)	77.9(5.5)	2.562 (ns)	
Sex, (male/female)	4/10	6/4	5/8	5/7		
Education, years	14.1 (2.8)	12.8 (5.3)	14.3(4.2)	12.3 (4.0)	0.702 (ns)	
Clinical						
CDR	0	0.5	0.5	1	--	
MMSE	29.6 (0.8)	29.3 (0.8)	28.1 (1.4)	22.5 (3.3)	34.470 (<.000)	c, e, f
NPI-Q	0.4 (1.0)	3.8 (4.7)	5.7(7.9)	5.9 (4.7)	2.222 (ns)	
GDS	1.2 (1.1)	2.3 (2.1)	2.7(2.5)	1.8 (1.7)	0.850 (ns)	
FAQ	0.0 (0.0)	3.0 (3.6)	3.1(3.0)	8.3 (6.7)	6.119 (<.005)	c
Cognitive						
RAVLT delay recall	8.3 (2.7)	3.6 (1.8)	2.0 (2.3)	0.4 (0.8)	29.781(<.000)	a, b, c, d, f
RAVLT recognition	13.3 (1.2)	11.3 (2.7)	8.1 (4.1)	6.0 (3.6)	11.310(<.000)	b, c, f
BNT	28.5 (2.1)	26.9 (3.2)	24.6 (4.9)	20.0 (6.2)	7.047(<.001)	c, f
SVF (animals)	22.0 (5.2)	18.5 (2.8)	17.1 (5.4)	11.8 (4.0)	17.420 (<.000)	b, c, f
PVF ("p")	19.7 (4.4)	14.4 (6.8)	16.5 (4.0)	13.8 (5.4)	2.841 (<.05)	
Span direct	5.6 (1.2)	5.5 (1.1)	5.3 (1.0)	5.3 (1.0)	ns	
TMT A (seconds)	32.5 (9.7)	47.6 (20.1)	47.7 (20.8)	131.9 (121.3)	5.614 (<.002)	
TMT B (seconds)	69.1 (23.1)	150.0(125.6)	129.2(61.1)	332.1 (134.5)	17.497 (<.000)	c, f
Biomarkers						
ApoE						
Carrier e4, %	35.7%	40%	53.8%	50%	ns	ns
Volumetric MRI						
Left Hippocampus	4.216(0.681)	3.311(0.656)	3.369(0.807)	2.545(0.710)	8.000(<.000)	c
Right Hippocampus	4.356(0.689)	3.272(0.525)	3.258(0.768)	2.462(0.509)	13.082(<.000)	b, c, d
CSF biomarkers						
Aβ$_{1-42}$ pg/ml	734.6(243.6)	614.2(263.1)	627.9(359.3)	423.7(269.3)	ns	ns
t-tau pg/ml	224.9(108.6)	258.4(115.8)	480.2(312.9)	596.3(261.2)	5.348(<.004)	c
p-tau pg/ml	38.2(14.4)	34.7(14.6)	74.6(50.2)	78.4(27.1)	4.285(<.05)	ns
Amyloid PET(PIB)						
% positive	14%	30.0%	53.8%	83.3%	12.410(<.000)	a, b, c, e, f

Reference: eMCI: early mild cognitive impairment; lMCI: late mild cognitive impairment; DAT: dementia of Alzheimer type; CDR: clinical dementia rating; MMSE Mini Mental State Exam; NPI-Q: Neuropsychiatric Inventory; GDS: Geriatric Depression Scale; FAQ Functional Activities Questionnaire; RAVLT: Rey Auditory Verbal Learning Test; BNT: Boston naming test; SVF: semantic verbal fluency (animals); PVF: phonologic verbal fluency (p)); TMT A and B: trail making test A and B; Rey fig: Figure of Rey.
Mean (SD); p (ANOVA) and * Bonferroni post hoc; a controls vs eMCI; b controls vs lMCI; c controls vs DAT; d eMCI vs LMCI; e eMCI vs DAT; f lMCI vs DAT.



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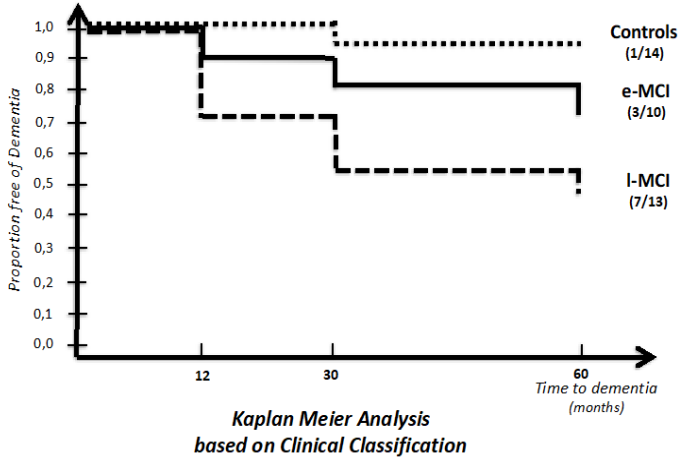

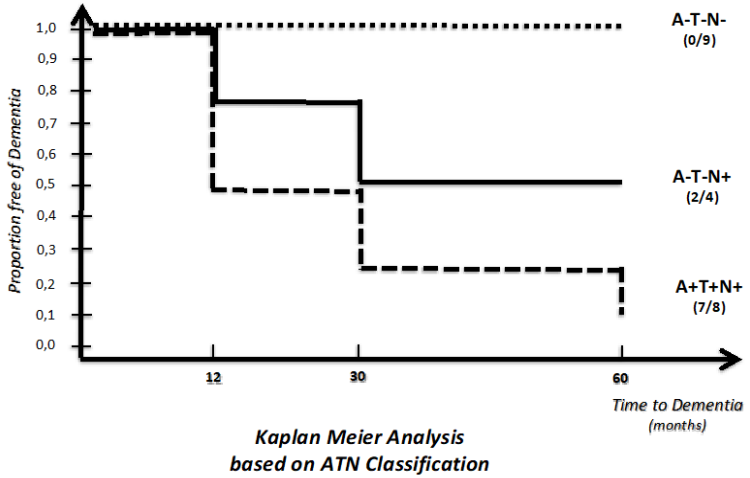

Figure 2: Survival Analysis in MCI: (Follow-up – 60 months)
by phenotype (e-MCI vs l-MCI) vs by Multimodal Approach (Biomarkers)

Possibility of Development of Emerging Biomarkers in Latin America

1. Why do we need to develop BM in LA?
2. Why do we need to evaluate BM in LA?
3. Some words about our experience…
4. Are there resources availables in LA?
5. What is the challenge?

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Biomarkers in LA

VIEWS & REVIEWS | OPEN ACCESS

Dementia in Latin America

Assessing the present and envisioning the future

Mario A. Parra, MD, PhD, Sandra Baez, PhD, Ricardo Allegri, MD, PhD, Ricardo Nitrini, PhD, Francisco Lopera, MD, PhD, Andrea Slachevsky, MD, PhD, Nilton Custodio, MD, PhD, Davi Olivier Piguet, PhD, Fiona Kumfor, PhD, David Huepe, PhD, Patricia Cogram, PhD, Thoma Facundo Manes, MD, PhD, and Agustin Ibanez, PhD

Neurology® 2018;90:1-10. doi:10.1212/WNL.0000000000004897

For Clinical purposes

For Reseach purposes

Table 1 Diagnostic procedures followed by experts from the participating countries

LAC	Diagnostic workup: Steps to achieve a diagnosis	Cognitive screening tests and neuropsychiatric scales	Biomarkers				
			CSF	Amyloid/ tau-PET	FDG-PET	MRI	EEG
Argentina	The diagnosis is usually made by the GP relying on the clinical history, laboratory tests, and a CT scan. The GP rarely requests a full neuropsychological assessment.	MMSE; ACE-R; IFS	Yes[a,c]	Yes[a,c]	Yes[a,c]	Yes[a]	Yes[b]
Brazil	Diagnosis is usually based on information of cognitive decline provided by informants, clinical examination, cognitive screening tests, blood tests, and CT or MRI.	MMSE; MoCA; Brief Cognitive Screening Battery	Yes[a,c]	Yes[a,c]	Yes[b]	Yes[a]	No
Caribbean	The criterion validity of 10/66 diagnosis was superior to that of DSM-IV.[16]	Community Screening Instrument for Dementia, CERAD; cognitive test; Geriatric Mental State; and structured neurologic examination	Yes[a,c]	Yes[a,c]	Yes[b]	Yes[a]	No
Chile	At the primary health level, people >65 years undergo medical and functional examination (EMPAN and EFAM). They can be either referred to memory stimulation groups or to secondary health care. This pathway is available to approximately 40.3% of the population at risk. At the secondary level, diagnosis is based on neuropsychological assessment, laboratory tests, and CT or MRI scans.	EFAM includes an abbreviated version of the MMSE, the Pfeffer Functional Assessment Scale, and the evaluation of the risk of falls; the Chilean version of the ACE-R; The T-ADLQ; AD-8-Ch; Picture and Verbal Version of the Free and Cued Selective Reminding Test	No	No	Yes[b]	Yes[a]	No
Colombia	The diagnosis relies on the clinical history gathered from patient and family members, neuropsychological assessment, brain neuroimaging, and laboratory tests. Some groups have implemented a genetic interview (i.e., genealogy).	CERAD neuropsychological battery, MoCA, and IFS	Yes[b]	Yes[b]	Yes[b]	Yes[a]	Yes[b]
Cuba	The criterion validity of the 10/66 diagnosis was superior to that of DSM-IV.[16]	Community Screening Instrument for Dementia; CERAD; cognitive test; Geriatric Mental State; and structured neurologic examination	Yes[a,c]	Yes[a,c]	Yes[b]	Yes[a]	No
Mexico	The criterion validity of the 10/66 diagnosis was superior to that of DSM-IV.[16]	Community Screening Instrument for Dementia; CERAD; cognitive test; Geriatric Mental State; and structured neurologic examination	Yes[a,c]	Yes[a,c]	Yes[b]	Yes[a]	No
Peru	Three successive steps: screening, diagnosis, and classification (i.e., dementia subtypes). All patients with cognitive impairment identified by the screening tests carry out the evaluations proposed in steps 2 and 3. Diagnosis is based on cognitive screening tests, laboratory tests, and CT or MRI scans.	Screening phase: MMSE; the Clock Drawing Test, Mano version; the Pfeffer Functional Activities Questionnaire; the Memory Alteration Test; diagnosis phase: the Beck Depression Index; ACE	No	No	Yes	Yes[a]	No

Abbreviations: ACE-R = Addenbrooke's Cognitive Examination–revised; CERAD = Consortium to Establish a Registry for Alzheimer's Disease; DSM-IV = *Diagnostic and Statistical Manual of Mental Disorders, 4th edition*; GP = general practitioner; IFS = INECO Frontal Screening; LAC = Latin American countries; MMSE = Mini-Mental State Examination; MoCA = Montreal Cognitive Assessment.
In several LAC (e.g., Bolivia, Costa Rica, el Salvador, Panama, Paraguay, Uruguay), we were unable to find sufficient evidence to include these countries in the table.
[a] Employed for clinical purposes.
[b] Only for research purposes.
[c] Restricted to a few health institutions.

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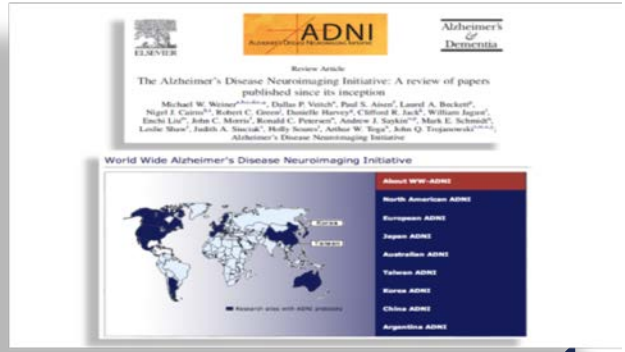
The Collaboration



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We must Develop the Emerging Biomarkers in Latin America…

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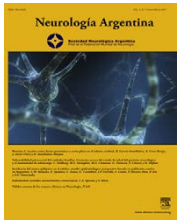

Editorial

No se puede tapar el sol con las manos. . . Nuevos criterios diagnósticos en la enfermedad de Alzheimer

You can't hide the sun with their hands.... New diagnostic criteria for Alzheimer's Disease

María Julieta Russo e Ricardo F. Allegri*
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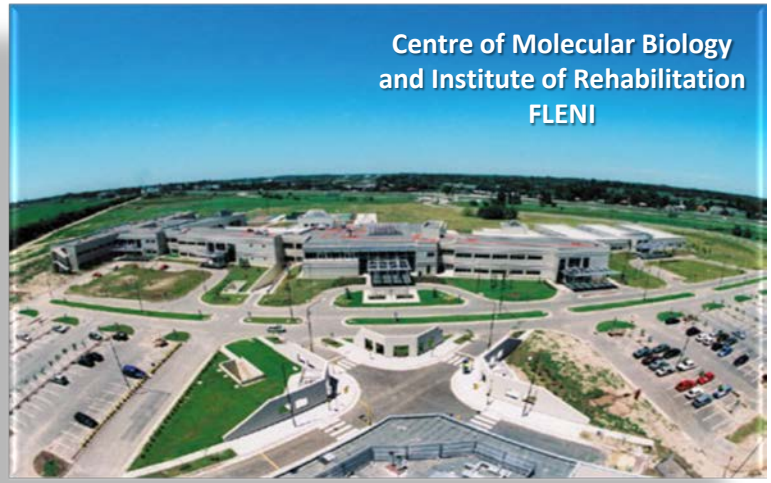

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Possibility of Development of Emerging Biomarkers in Latin America

Prof. Ricardo F. Allegri, MD., PhD.