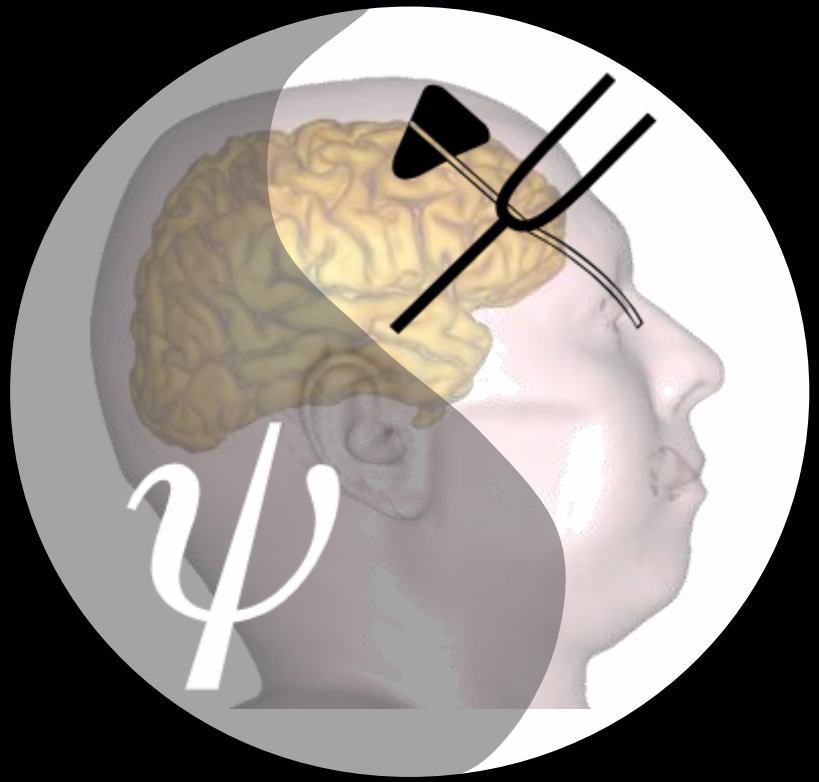
Beyond the validation of a biomarker in the periodic catatonia



Dr Clément de BILLY - MD
Non invasive Neuromodulation center of Strasbourg

de Billy C, Jeanjean L C, Mainberger O, Obrecht A, Clauss J M E,Schorr B, de Sousa P L, Lamy J, Noblet V, Landré L, Berna F, Sauleau E A, Foucher JR

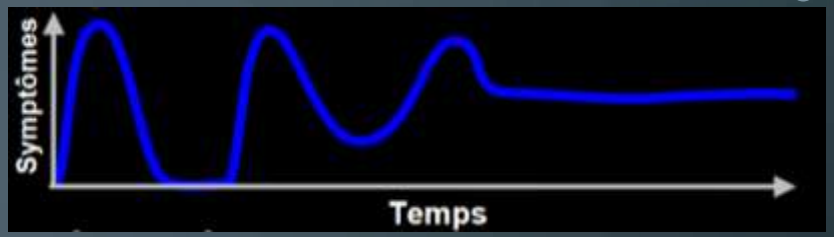
Neuromodulation in psychiatry
February 10th 2023
Forum amphi 301
Strasbourg

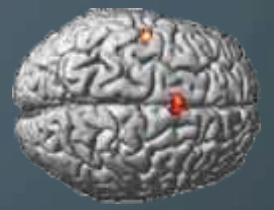
Conflict of interest

- None

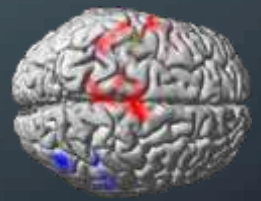
Focus on the periodic catatonia

- Polymorphic psychosis with psychomotor impairment
- Progressive remittent bipolar evolution
- Diagnosis of phenotype ! (lifetime)
- High heritability
- Neuroimaging group studies: 2 ROIs





Walther et coll.
Schizophr Bull 2017



Foucher et coll.
Neuropsychopharmacol Biol Psychiatry 2018


DIE KATATONIE

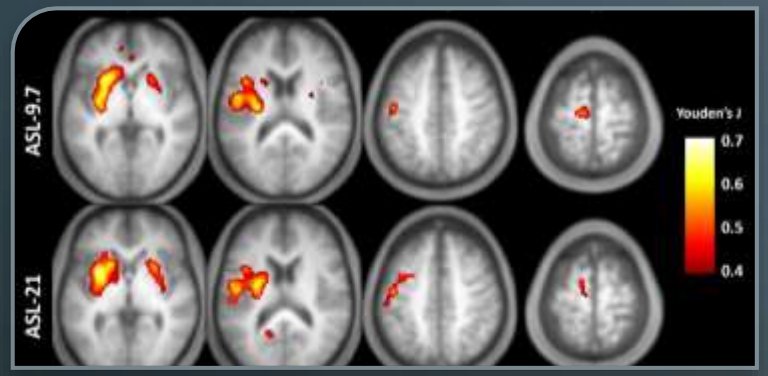
SPANNUNGSIRRESEIN,

Dr. KARL KAHLBAUM.

BERLIN.

de CRESPIN de BILLY, et al.
The Lancet Psychiatry, 2021

Cerebral blood flow measurements



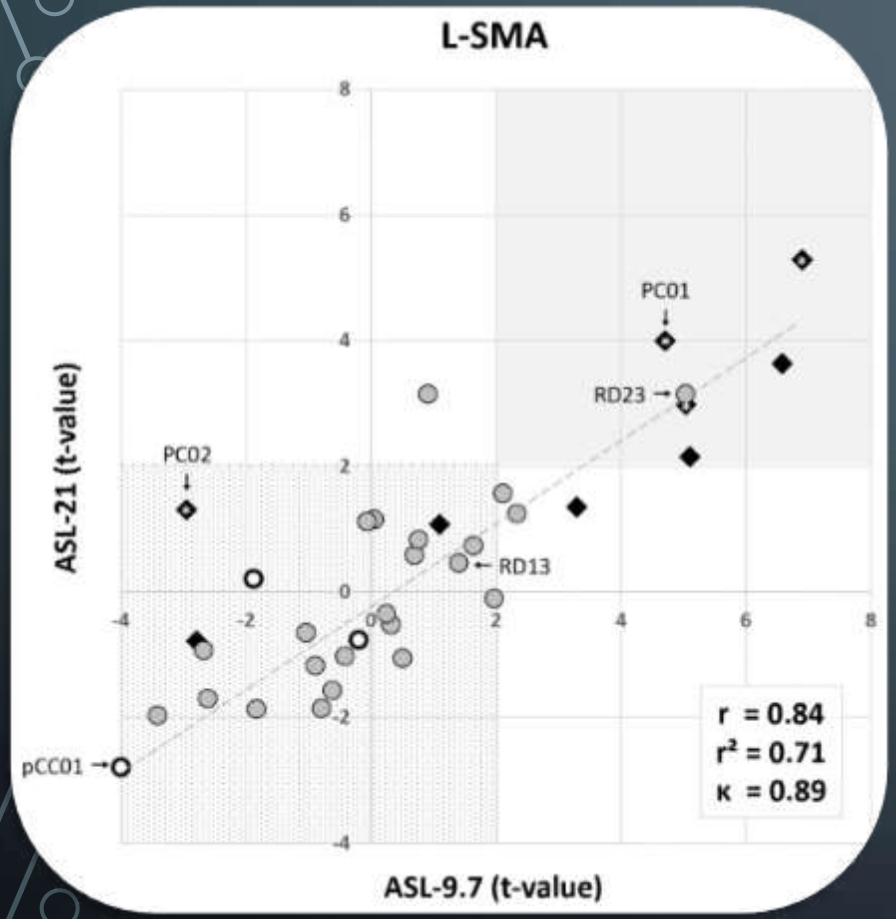
- rCBF via MRI (ASL no contrast agent)
- Images at rest and during tasks
- 3x2 measures (TE 9.7ms and 21ms)
- 2 ROIs: L-PM and/or L-SMA
- Single subject data
- Compared to 40 Controls database

Foucher et al., Journal of Magnetic Resonance Imaging, 2011

A bayesian statistical model

- modelling of an estimation of Se and Sp
- Possibility of repetitive analysis
  - Bayesian Updating ability !
- Uses of prior data
- More intuitive representation of the result
  - Belief in a result

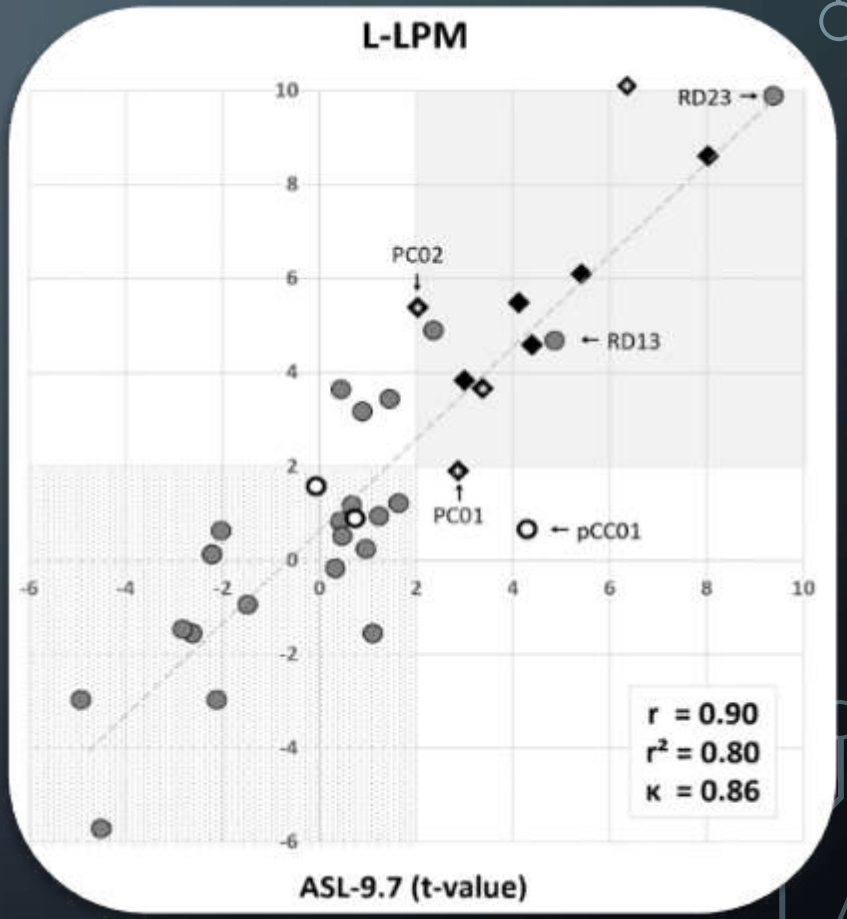
Results

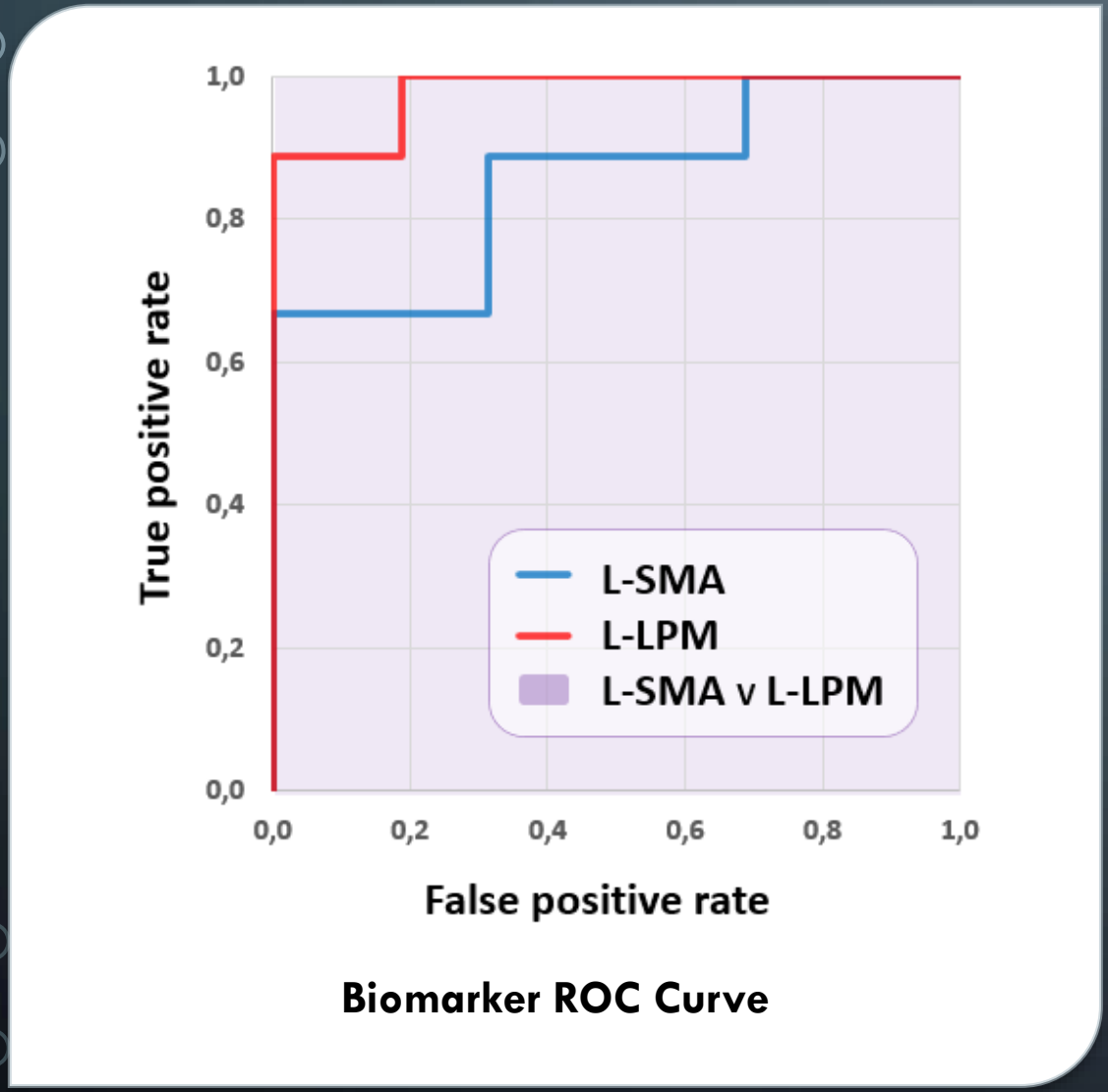


High Accuracy

High Repetability

Reliable measurement





Results

- 9 CP and 26 non-CP in a proof of concept study
- Se of 98 % and Sp of 88 %
- Non informative prior

*Foucher JR, **de Billy C**, et al. Neuropsychobiology. 2019*

Properties

Sp/other forms of catatonia!

Sensitive to other motor Impairment

Replication of results

- Analysis with a new prior (Weighted data from previous study)
- Inclusion of 13 CP and 8 non-CP
- Se of 77% and Sp of 78%
- Patients with more unclear diagnosis, diagnostic corrections

Ibrahim JG et al. Stat Med. 2015.

Update of the biomarker

- Non informative prior with full data
- Update of the Bayesian model
- Estimation of the biomarker potential
- Correctly used: Se to 82% and Sp to 98%

Conclusion

Before Test	In case of SSD	After Test
14,2	PPV	73
14,2	NPV	3

Biomarker sensitive and specific

- Good PPV and NPV if associated with clinical examination

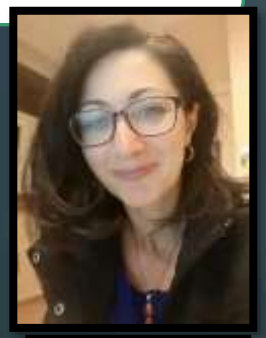
Replication of results in further studies

- model allowing repeated analysis using weighted past data

Perspectives

- More accurate diagnosis for boundary patients
- Genetic studies with follow-up of carrier parents?
- Phenotype scaffolding using a reverse phenotyping approach (ASD cases)
- Basic and therapeutic research

SPECIAL THANKS TO



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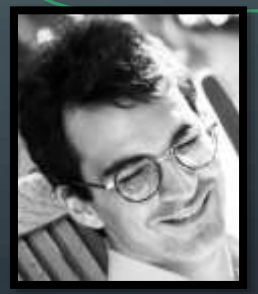

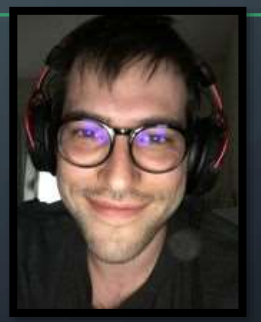

THANK YOU FOR YOUR ATTENTION

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