

UTILIDAD DE LA CONECTIVIDAD ANATOMO-FUNCIONAL PARA EVALUAR EL DAÑO POR CONSUMO DE DROGAS



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Biomedical
Technology

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MEG!!



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(Center for Biomedical Technology) UPM-UCM



INVASIVA

D

**RESOLUCIÓN
ESPACIAL**

**NEUROIMAGEN
FUNCIONAL**

**RESOLUCIÓN
TEMPORAL**

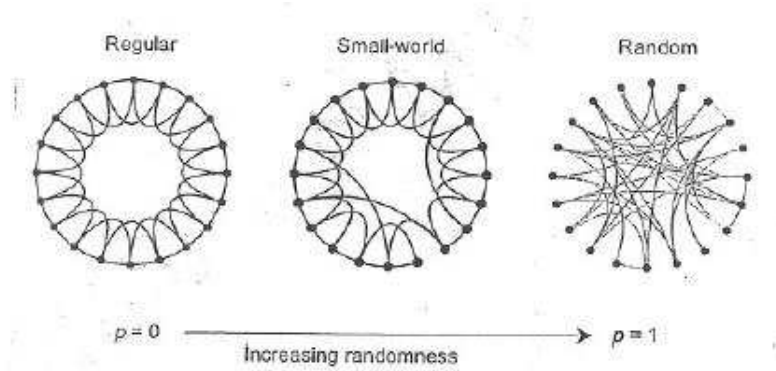
**SITUACIÓN
DE REGISTRO**

**ACTIV. NEURONAL
DIRECT/INDIRECT**

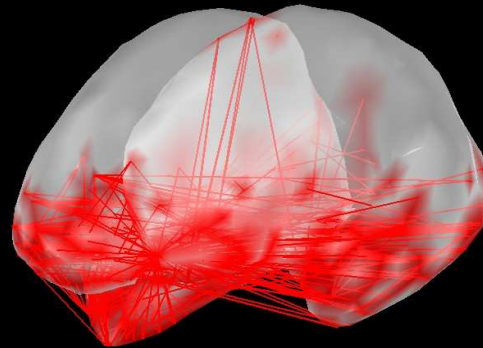
ANÁLISIS DE FRECUENCIA!!!!!!

Resolución Espacial (RE) y Temporal (RT) de las Técnicas para el Estudio Funcional del SNC





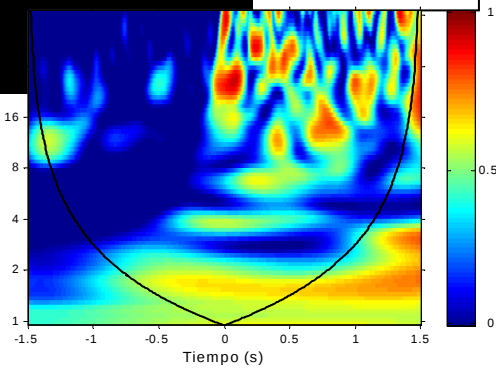
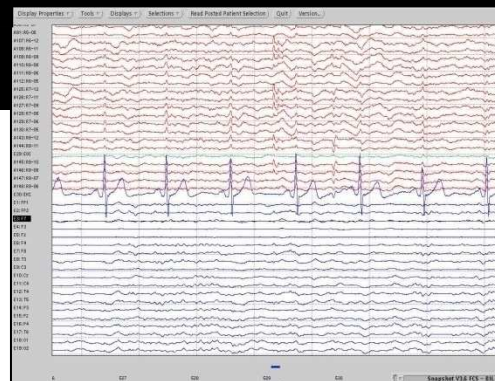
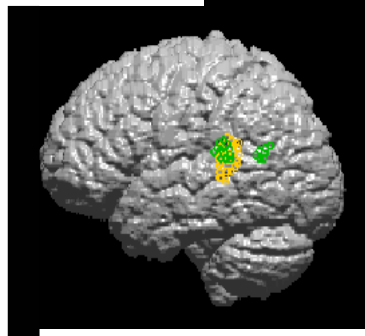
CONECTIVIDAD FUNCIONAL

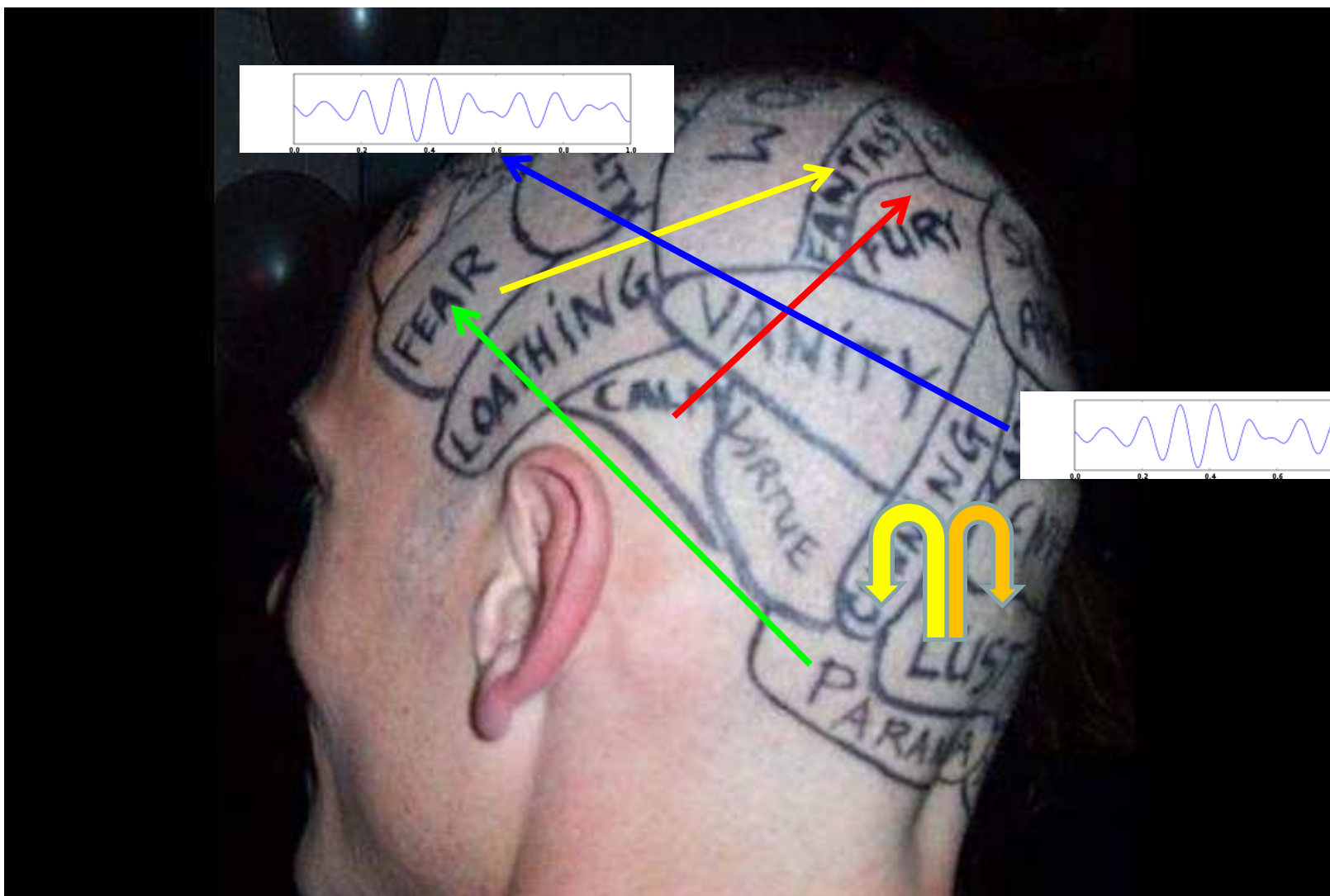


ESPACIO

TIEMPO

FRECUENCIA





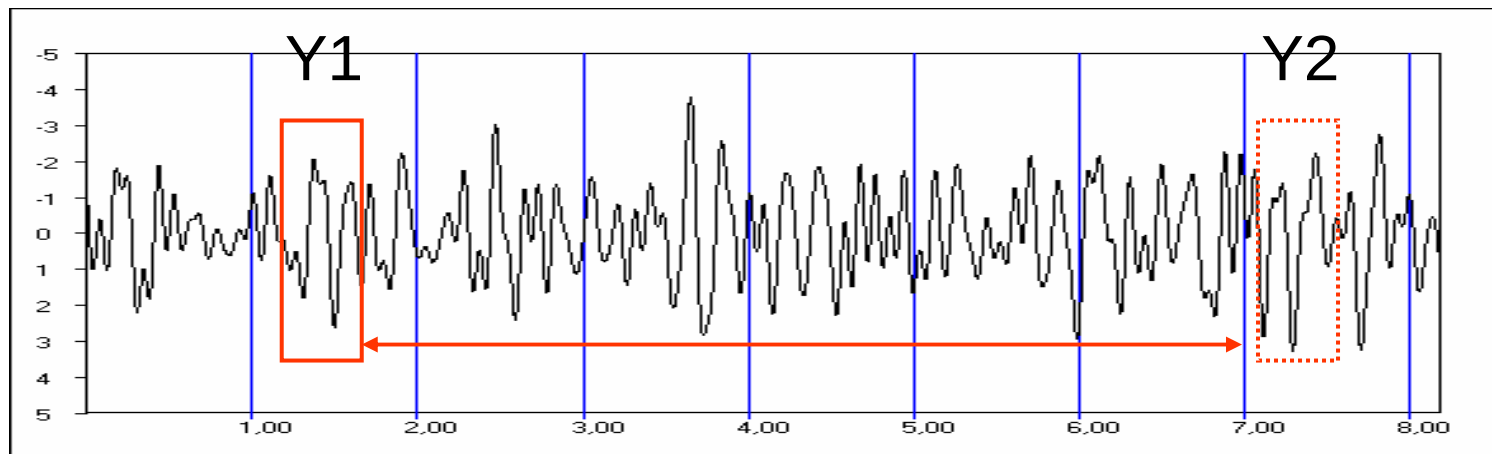
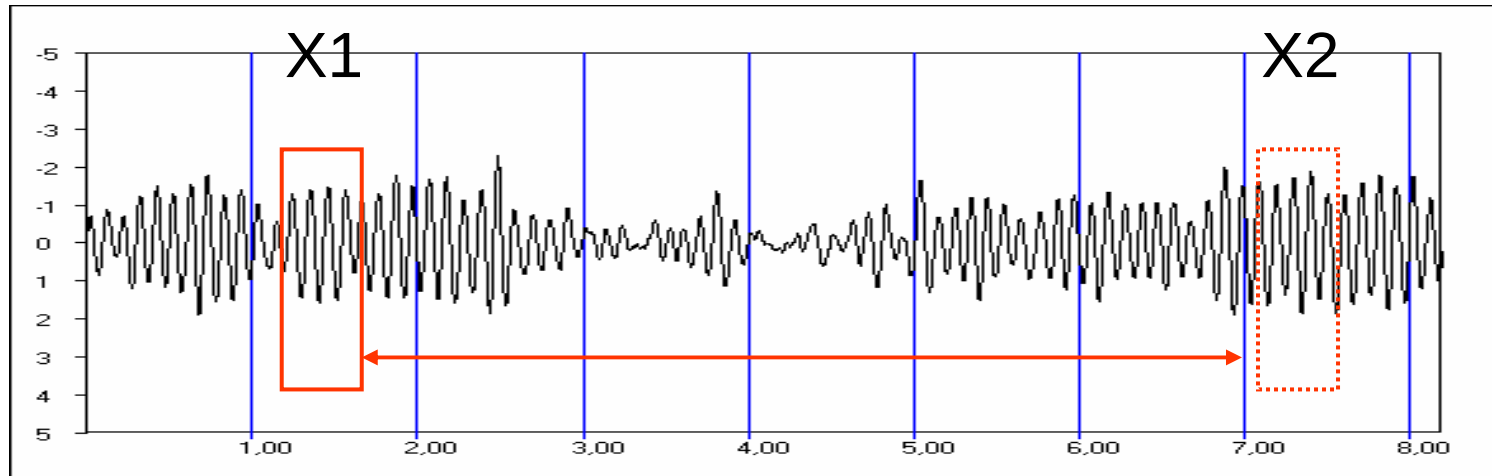
QUE ES LA CONECTIVIDAD FUNCIONAL

Medida mediante algoritmos de sincronización

Si dos regiones disparan a la vez están trabajando juntas

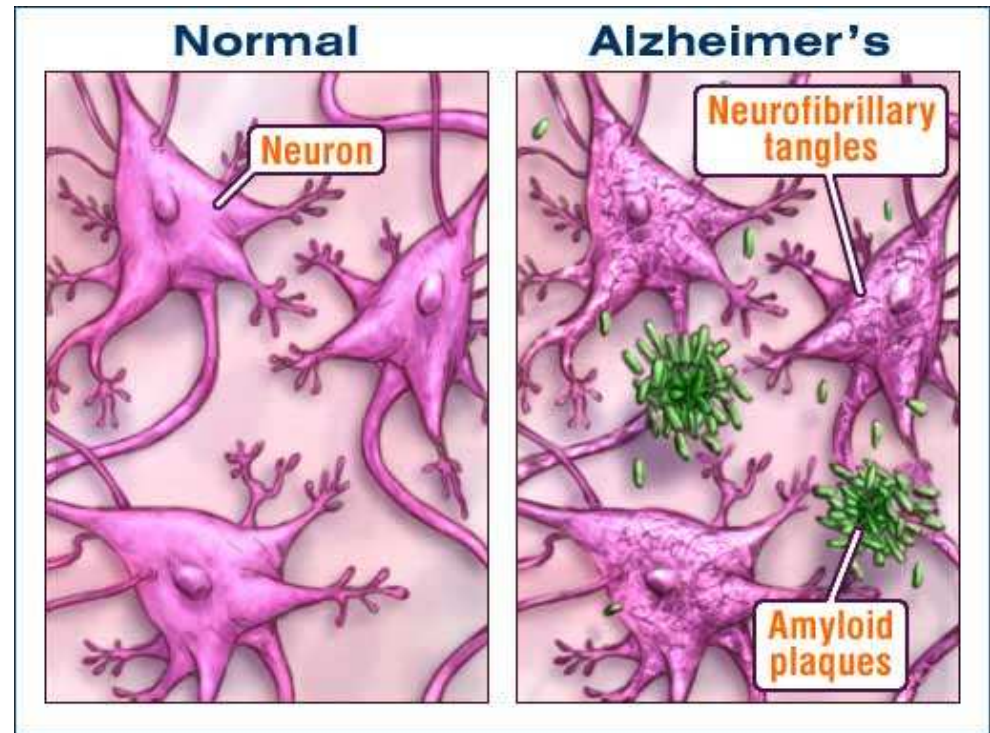
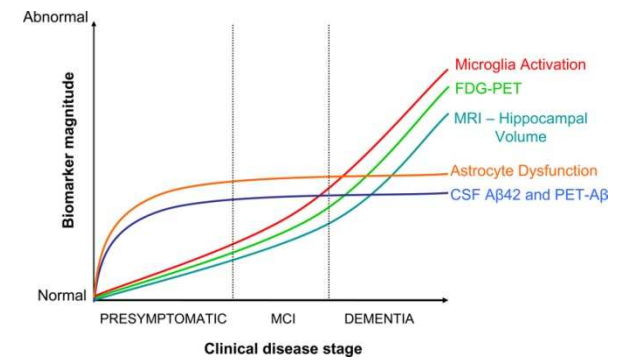
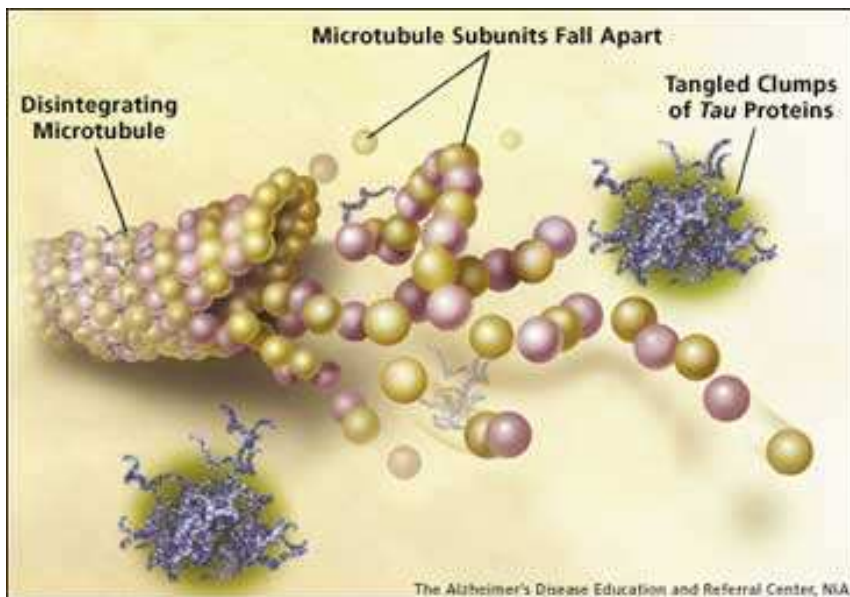
Synchronization likelihood

Likelihood that Y2 resembles Y1, each time that X2 resembles X1



Functional connectivity in Mild Cognitive Impairment: Evaluating the Disconnection Hypothesis



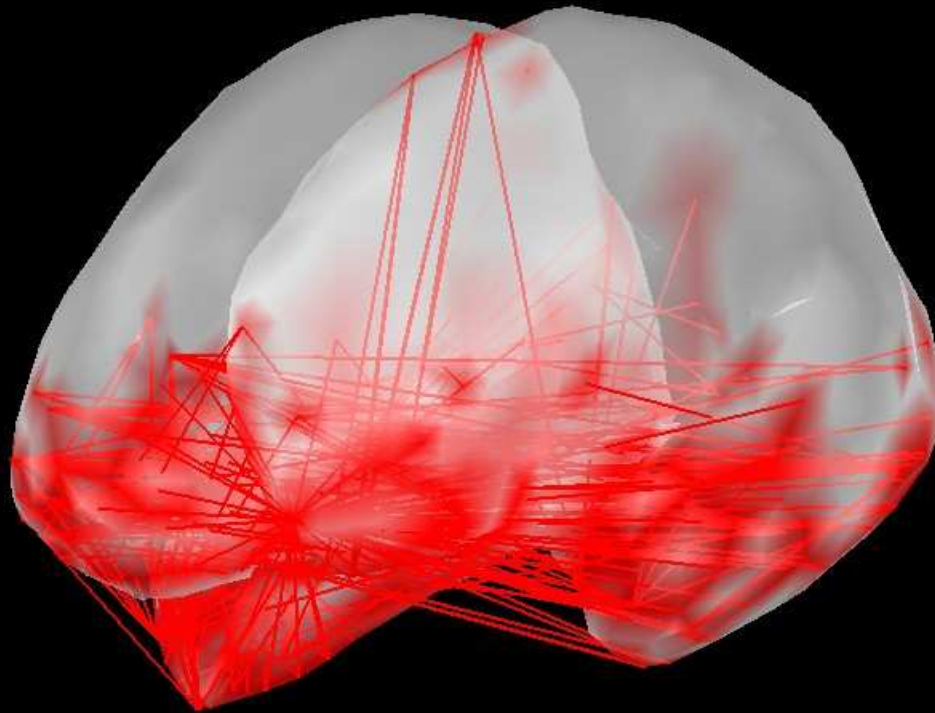


Profile of functional connectivity

The ventral pathway



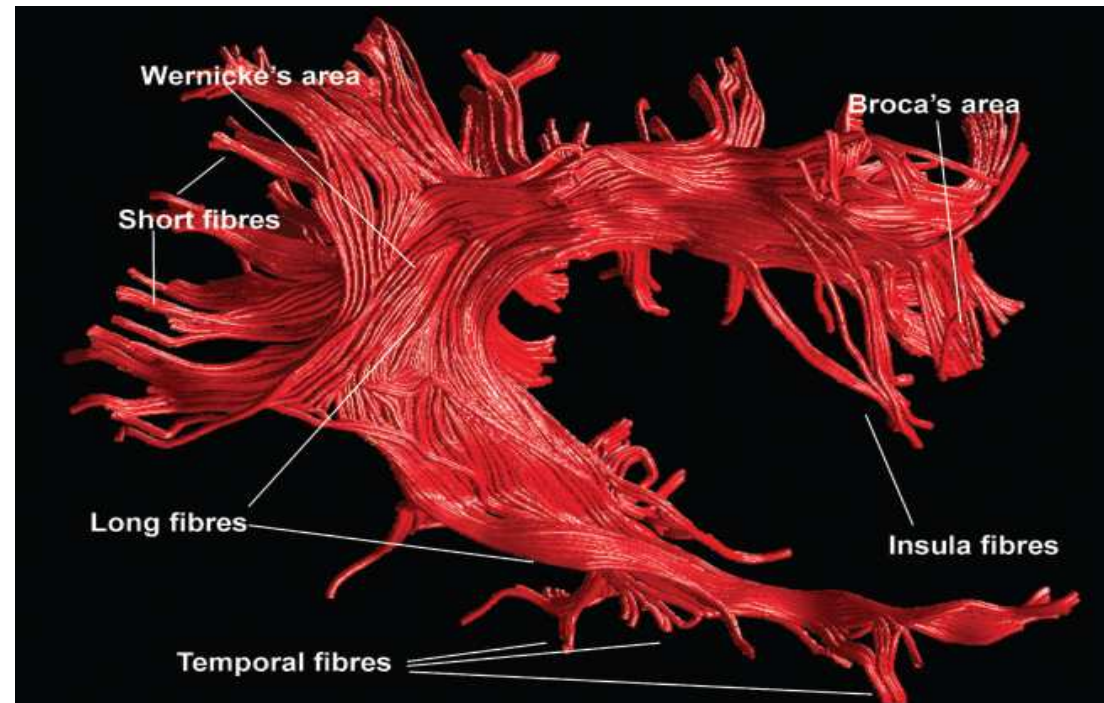
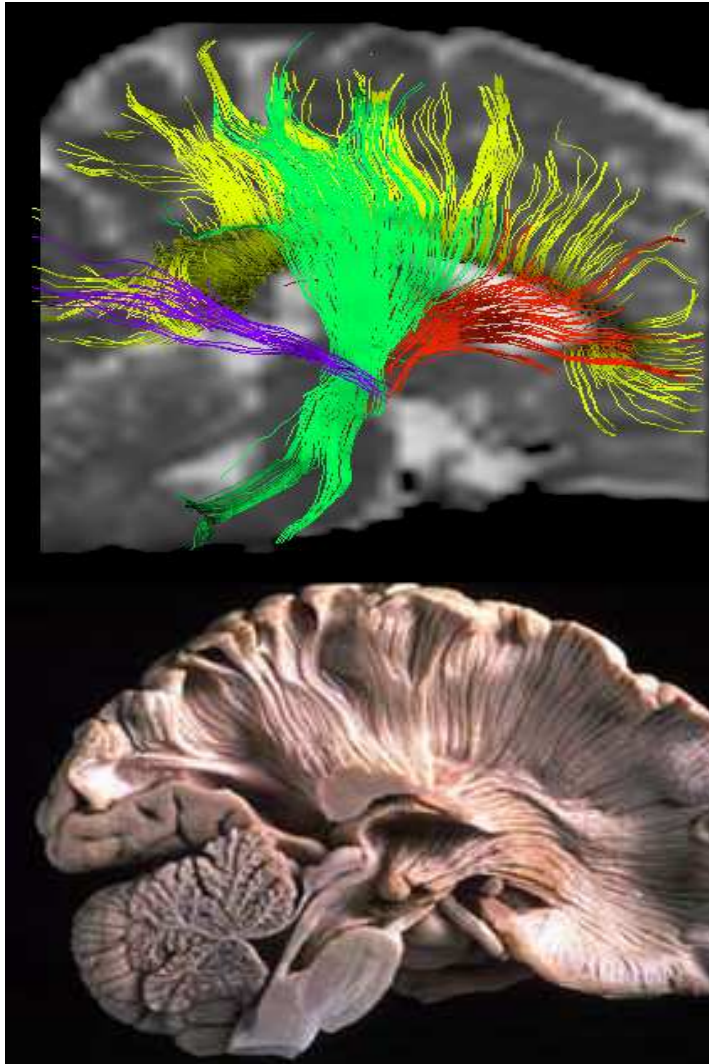
(Maestú et al, 2008)



(Cuesta, Castellanos, Moratti, Bajo et al, in preparation)

**CONECTIVIDAD ANATOMO-FUNCIONAL EN
PERSONAS CONSUMIDORAS DE DROGAS
ALGUNOS EJEMPLOS**

DTI – Tractografía

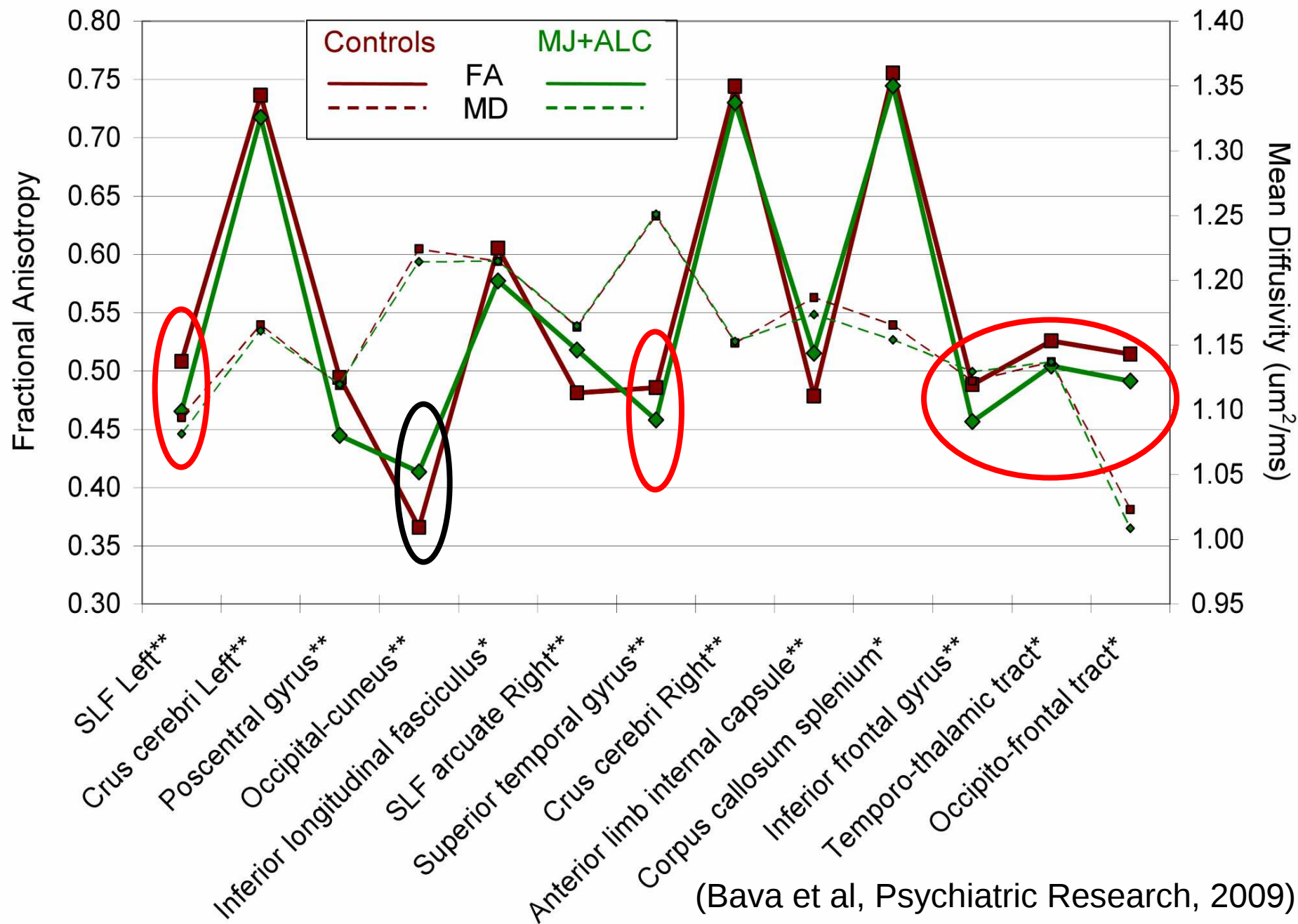


D. Jones – U Nottingham, UK

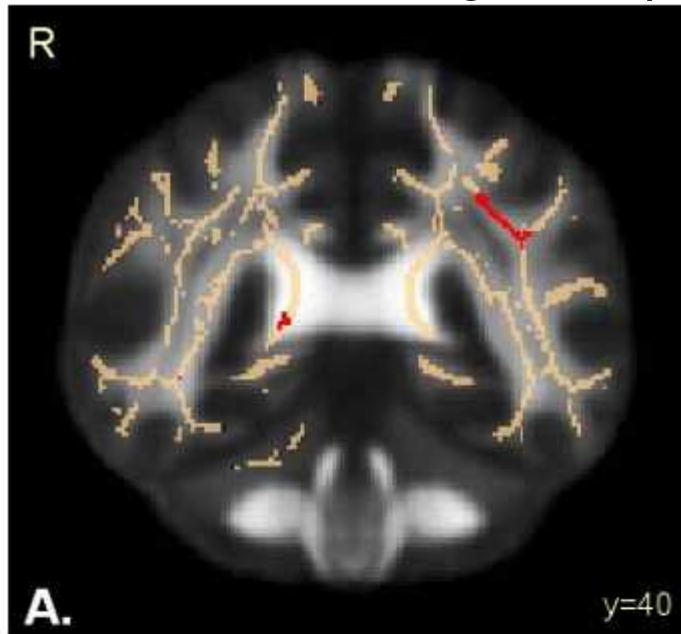
S. Mori - JHU

Bava et al, 2009

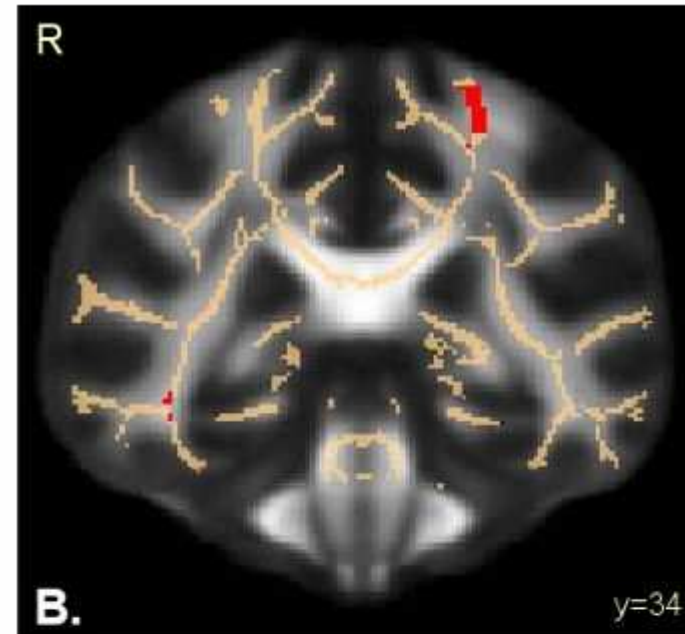
- Consumidores de cannabis desde los 13 años
- Actualmente 16-19 años
- 10 regiones cerebrales muestran daño
- Tractos fronto-posteriores más afectados



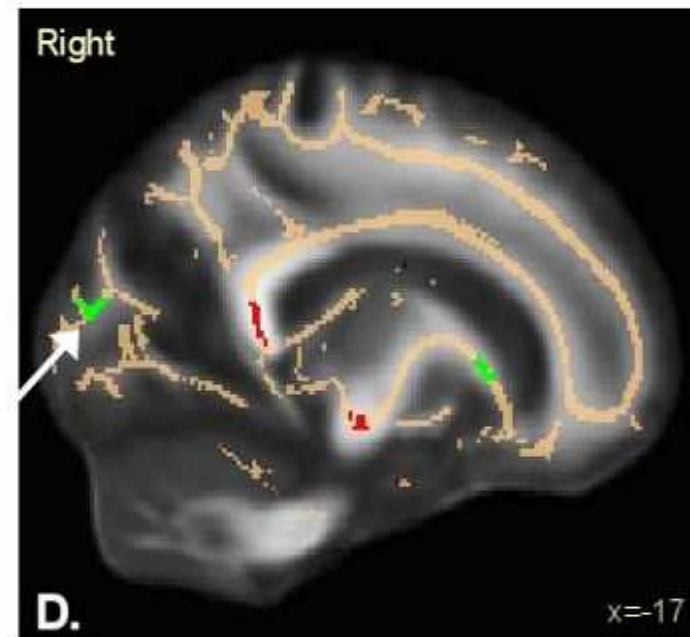
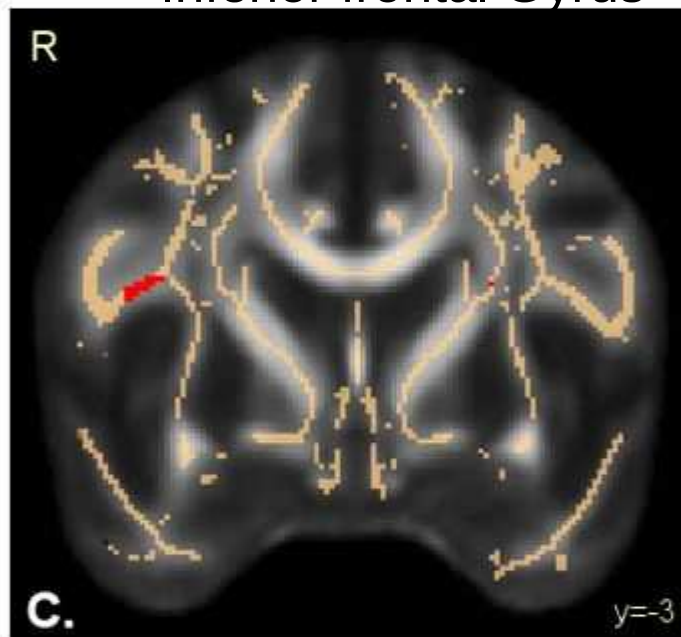
Fasciculo longitud sup



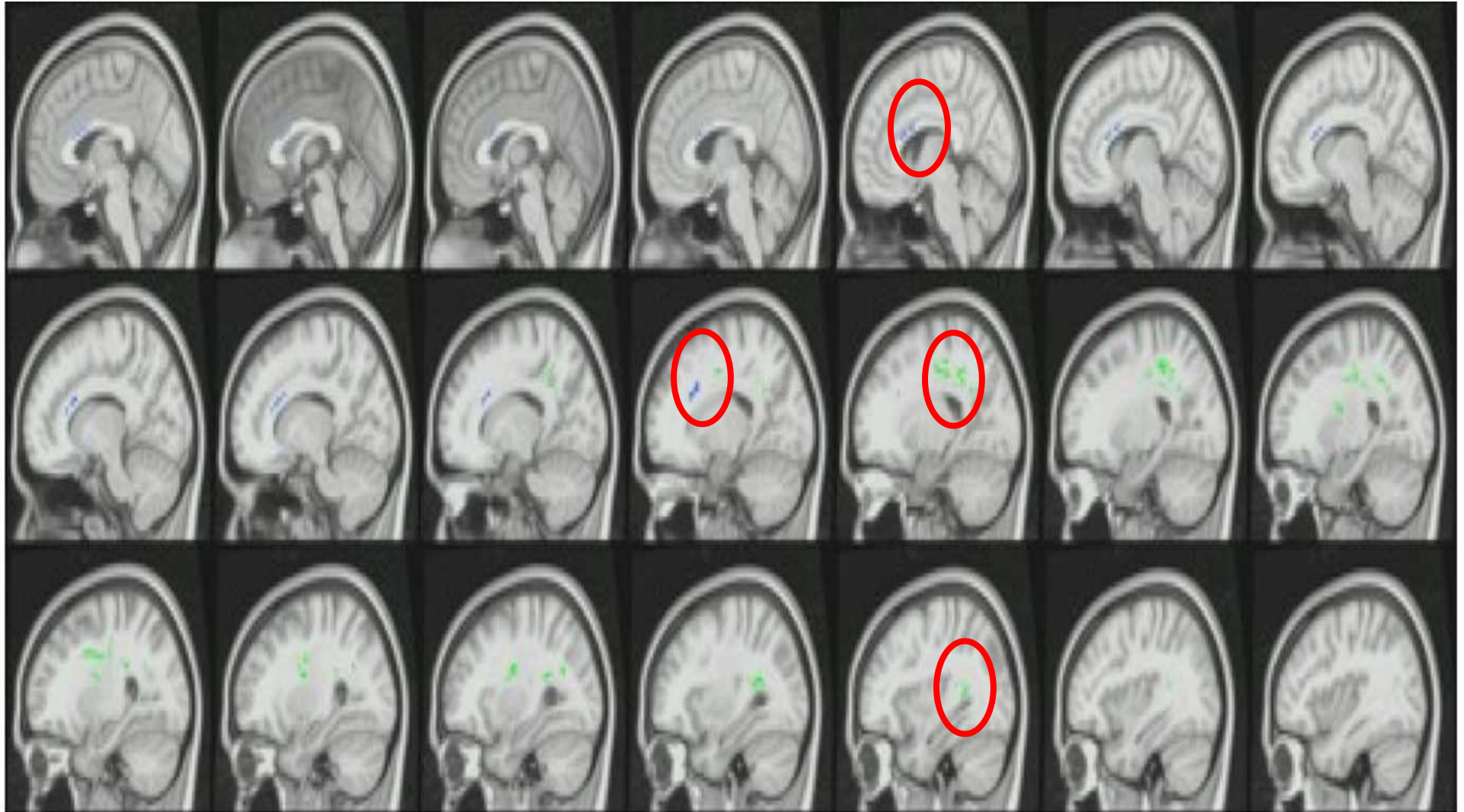
Giro PostCentral



Inferior frontal Gyrus



Menor integridad de sustancia blanca en consumidores de cocaína 16 años



Lane et al, Plos One 2010

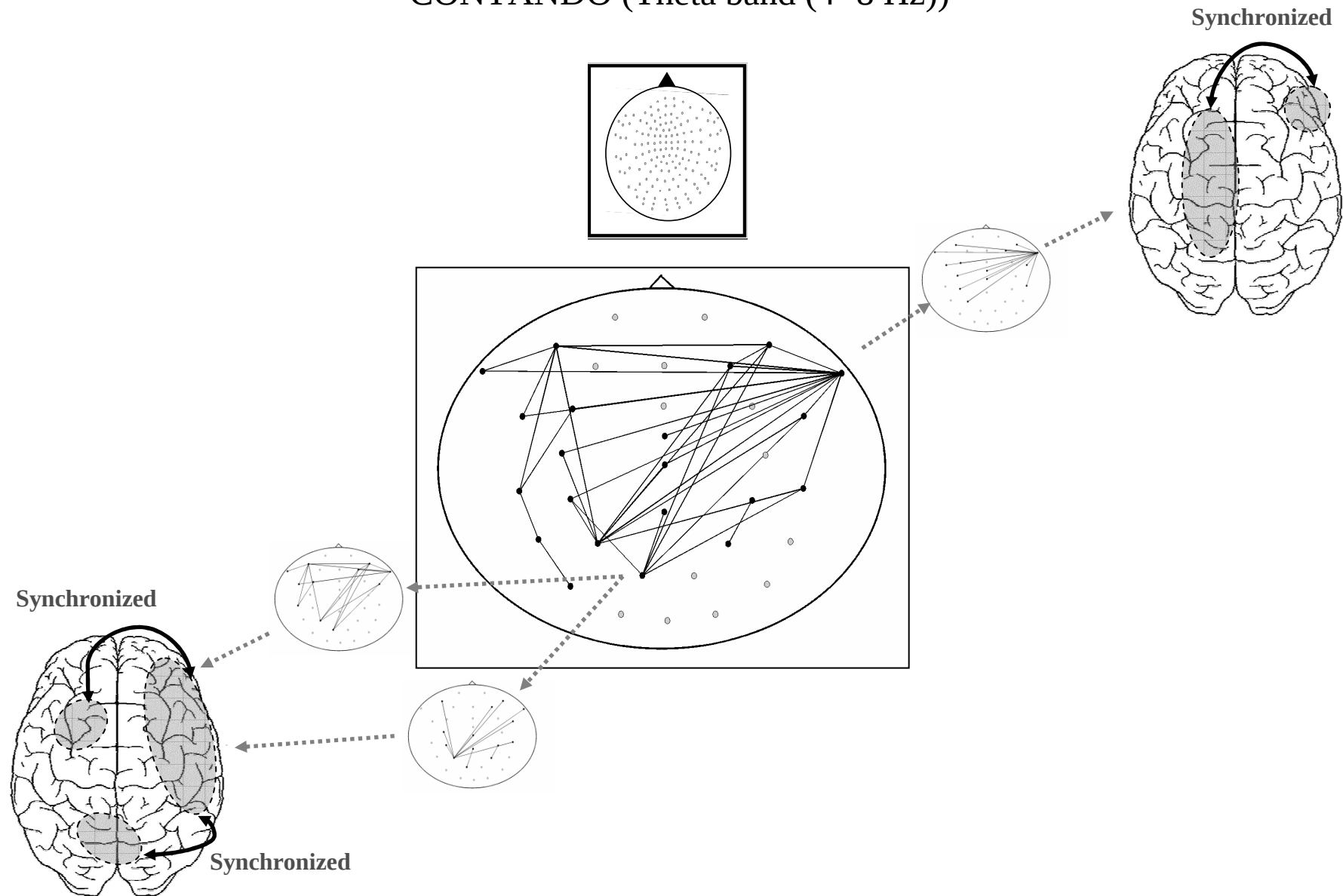
Policonsumidores

Tras 3 meses sin consumir

- Comunidad terapéutica
- 3 meses sin consumo
- mayores de 20 años
- Conectividad funcional residual

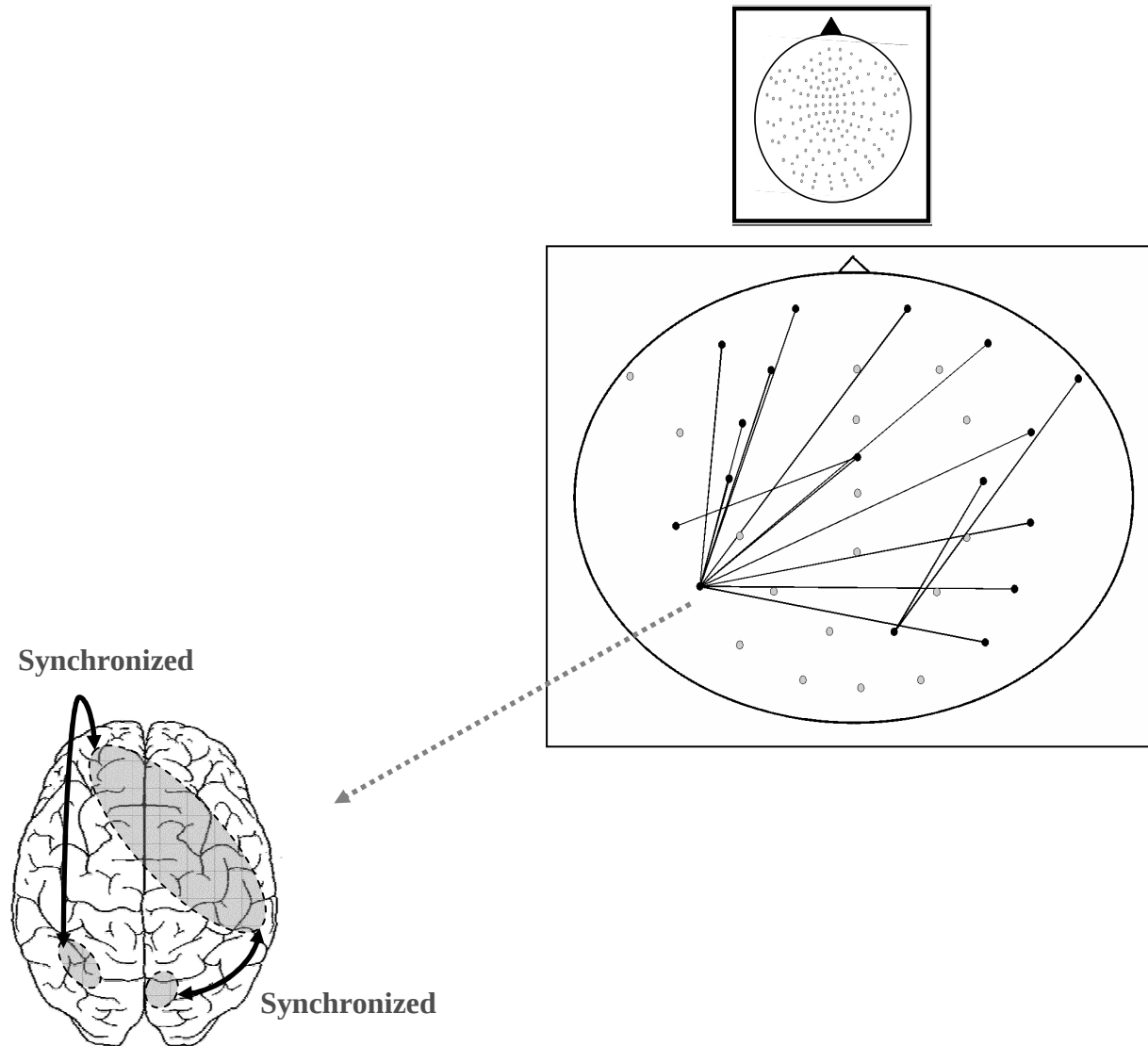
Hipersincronización en los PACIENTES

CONTANDO (Theta band (4 -8 Hz))



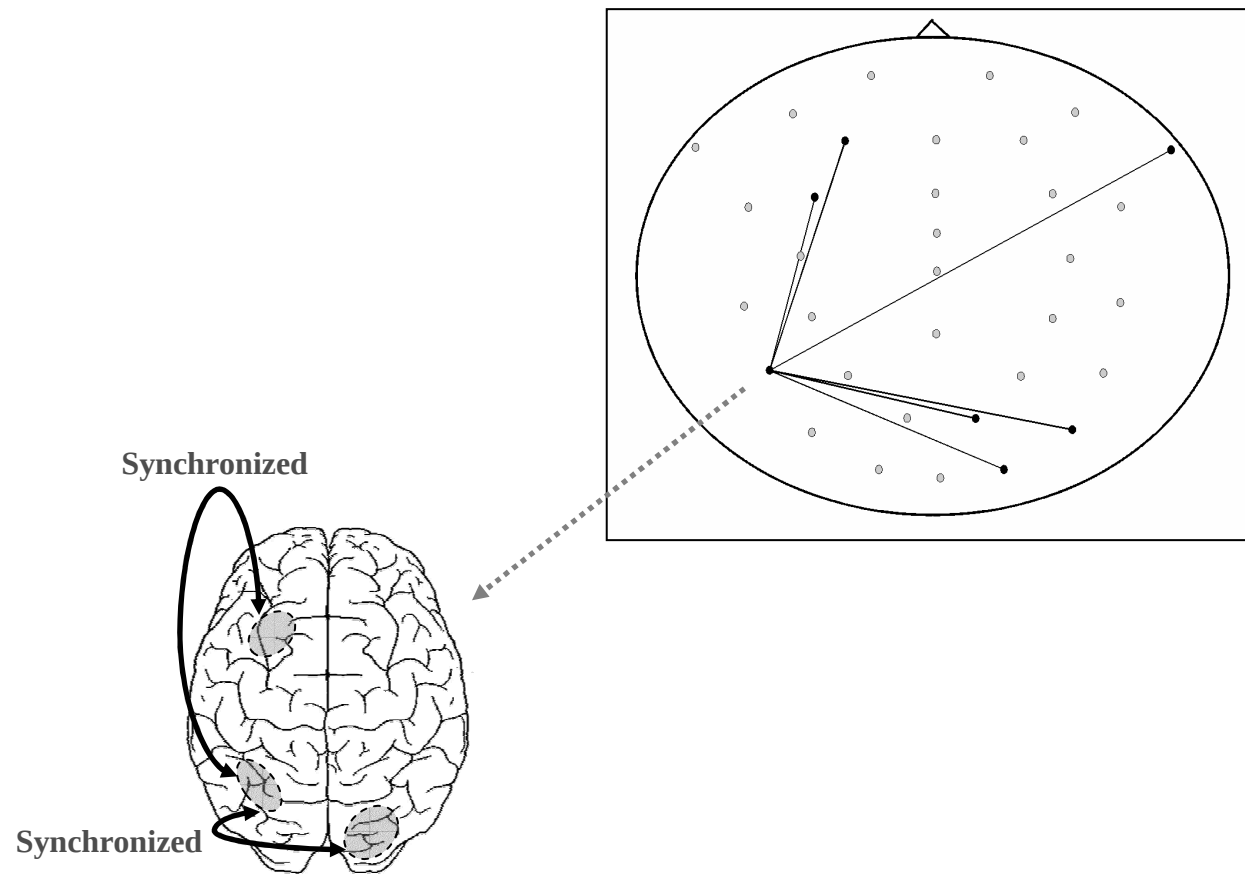
Hipersincronización en los CONTROLES

CONTANDO (Theta band (4 -8 Hz))



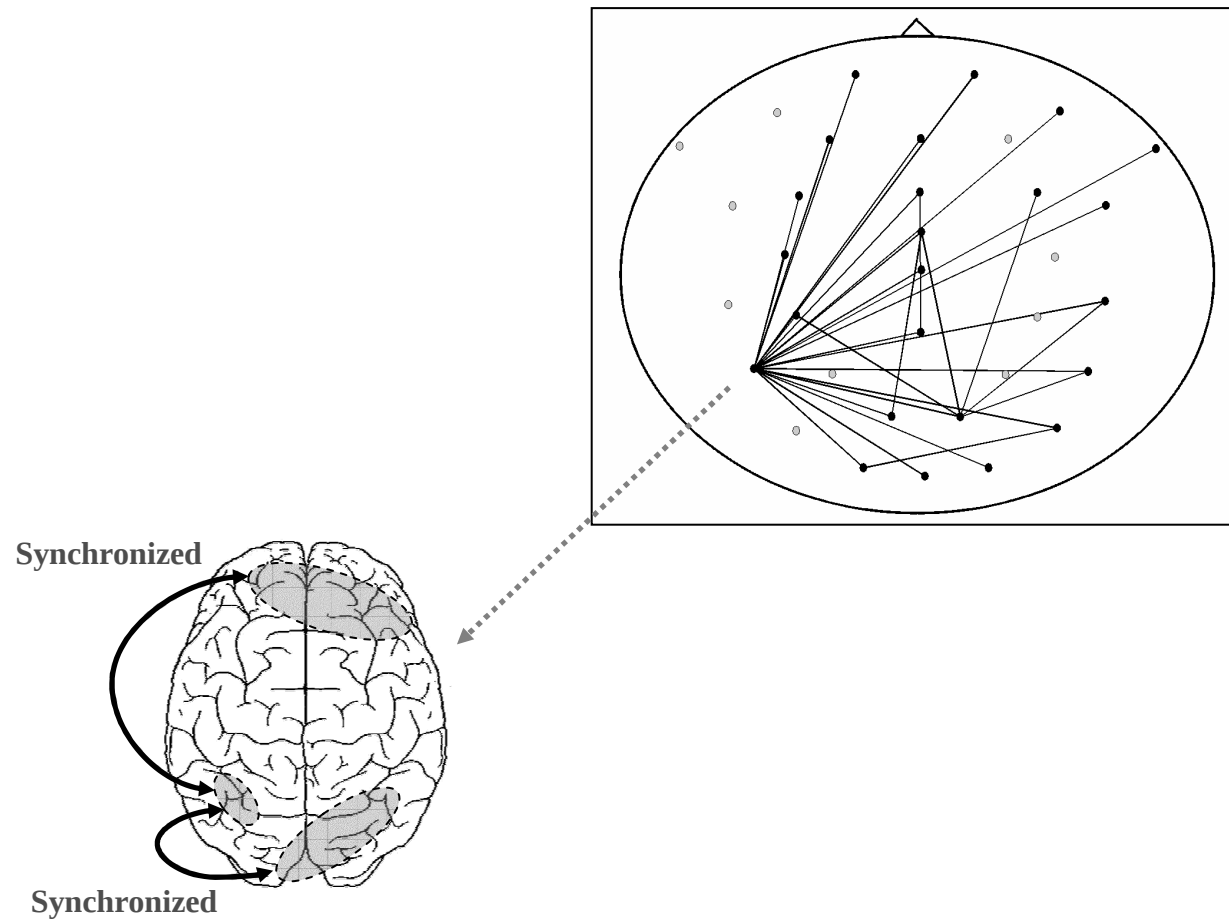
Hipersincronización en los CONTROLES

CONTANDO ((Alpha1 band (8 -11 Hz))

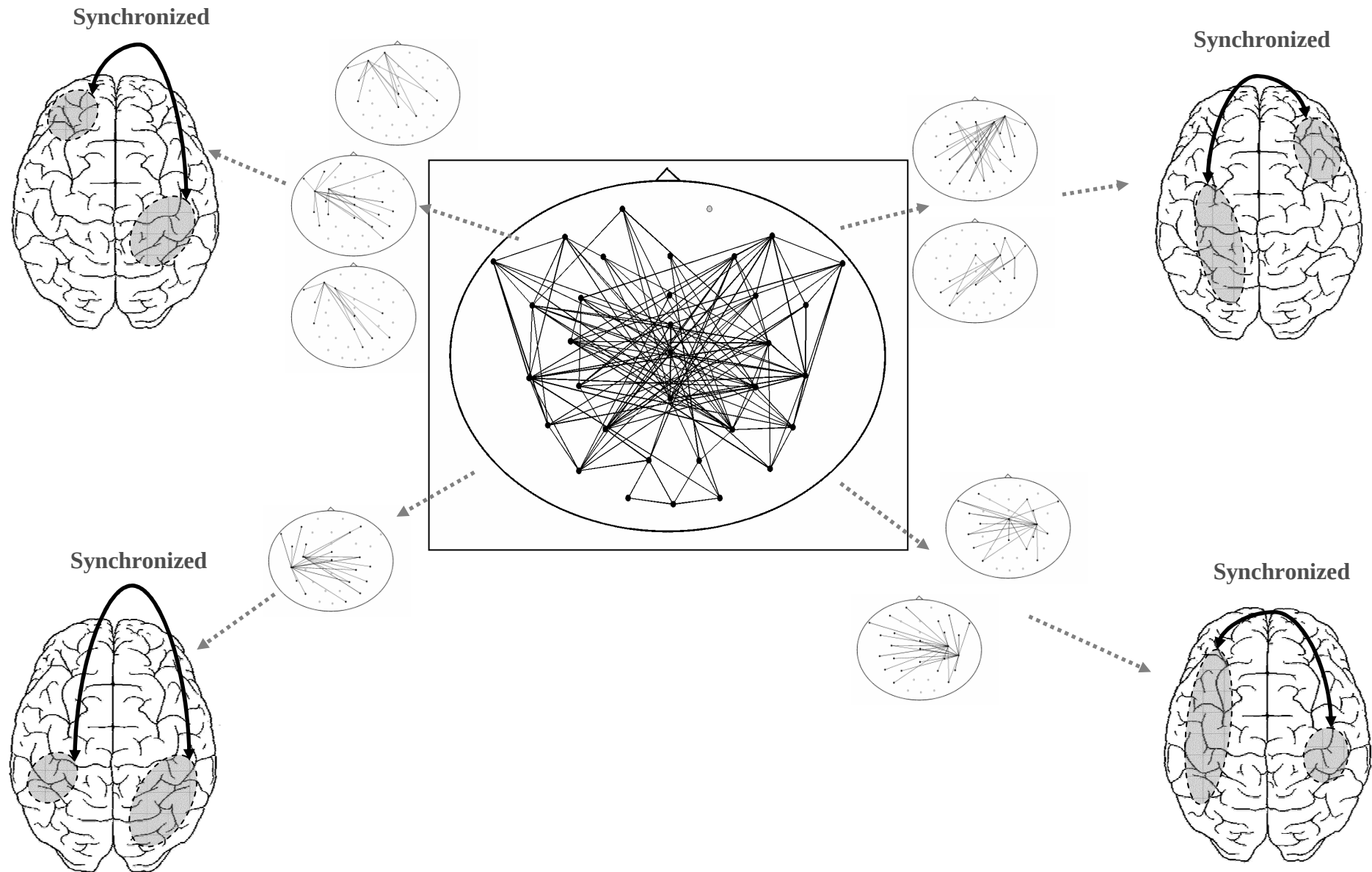


Hipersincronización en los CONTROLES

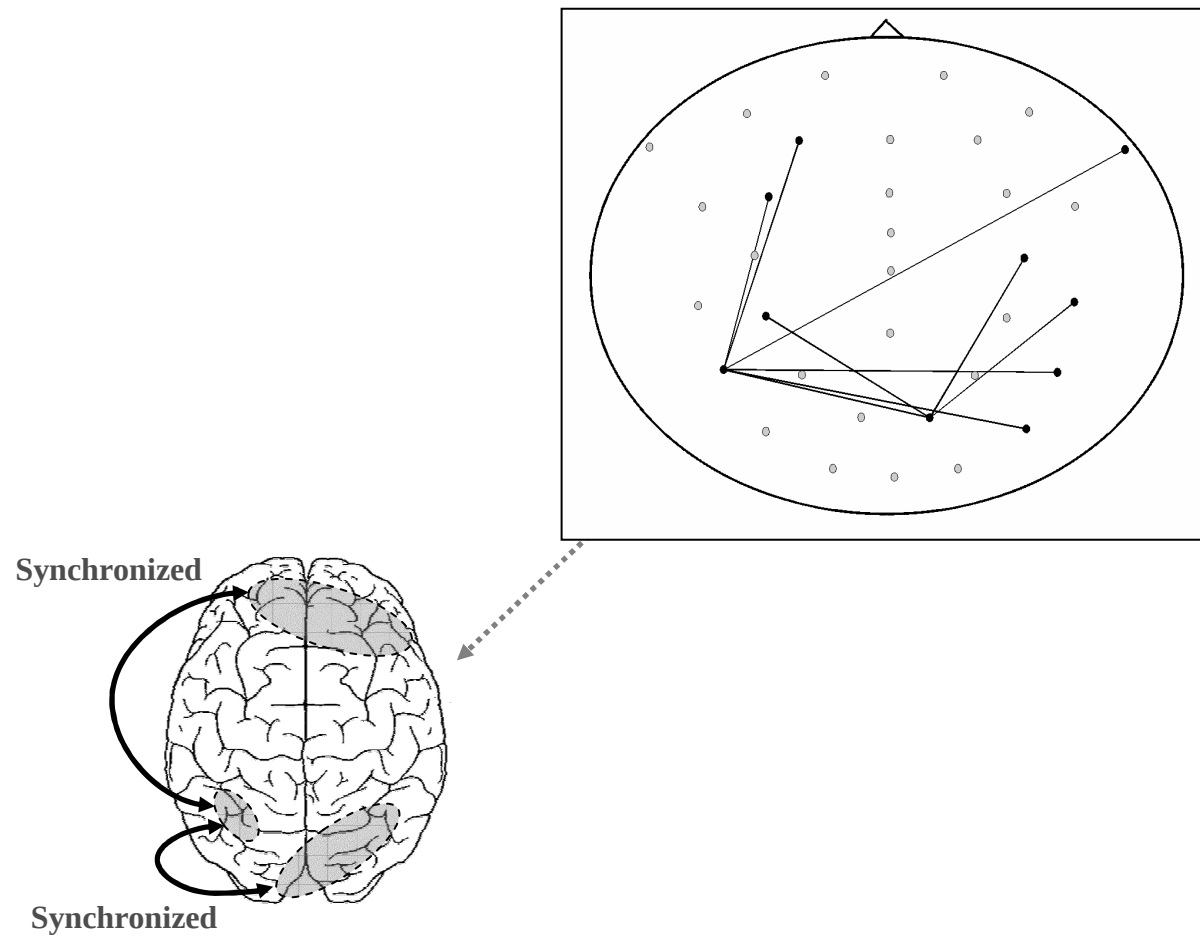
CONTANDO ((Alpha2 band (11 -14 Hz))



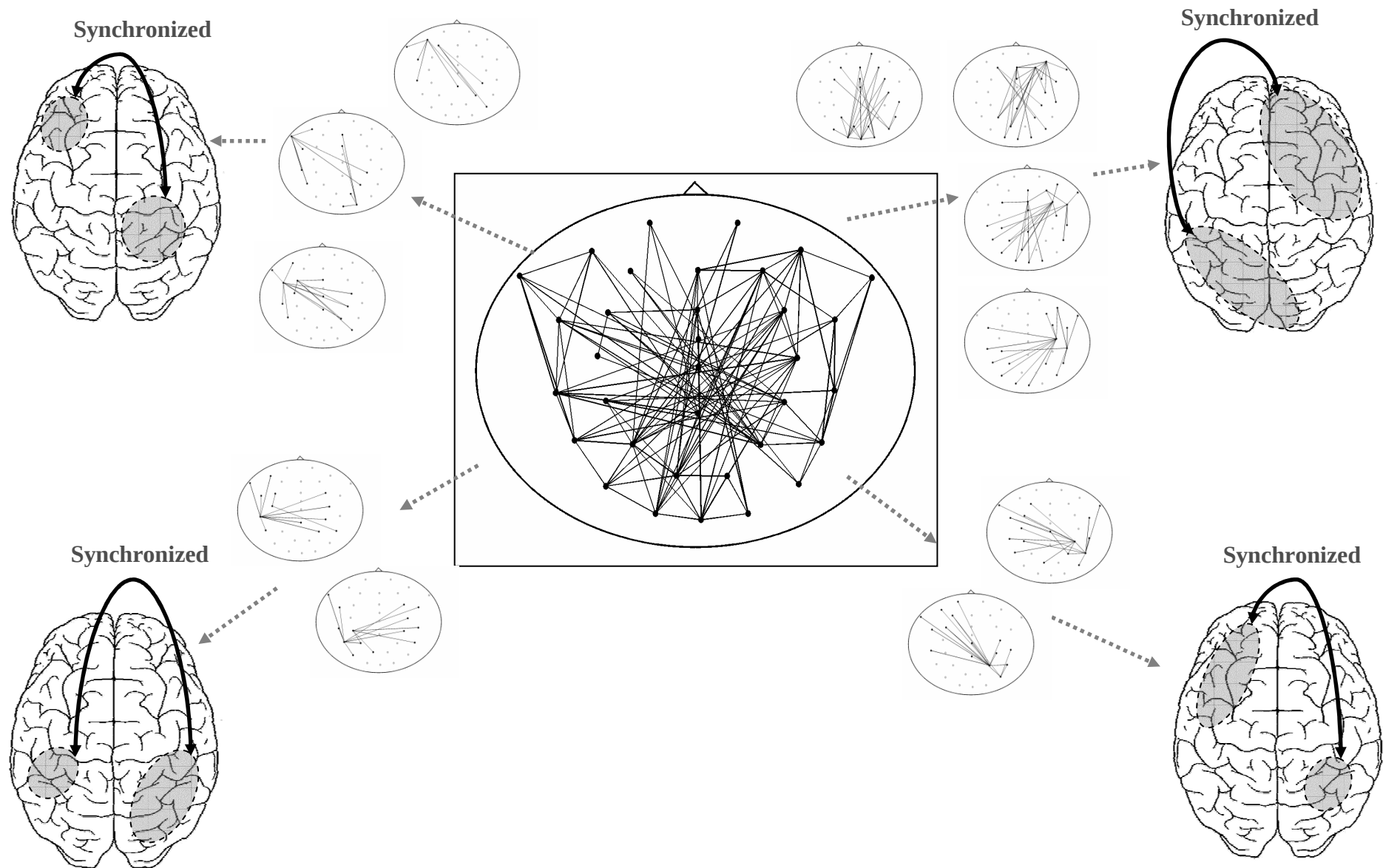
Hipersincronización en PACIENTES CONTANDO (Beta1 band (14 -25 Hz))



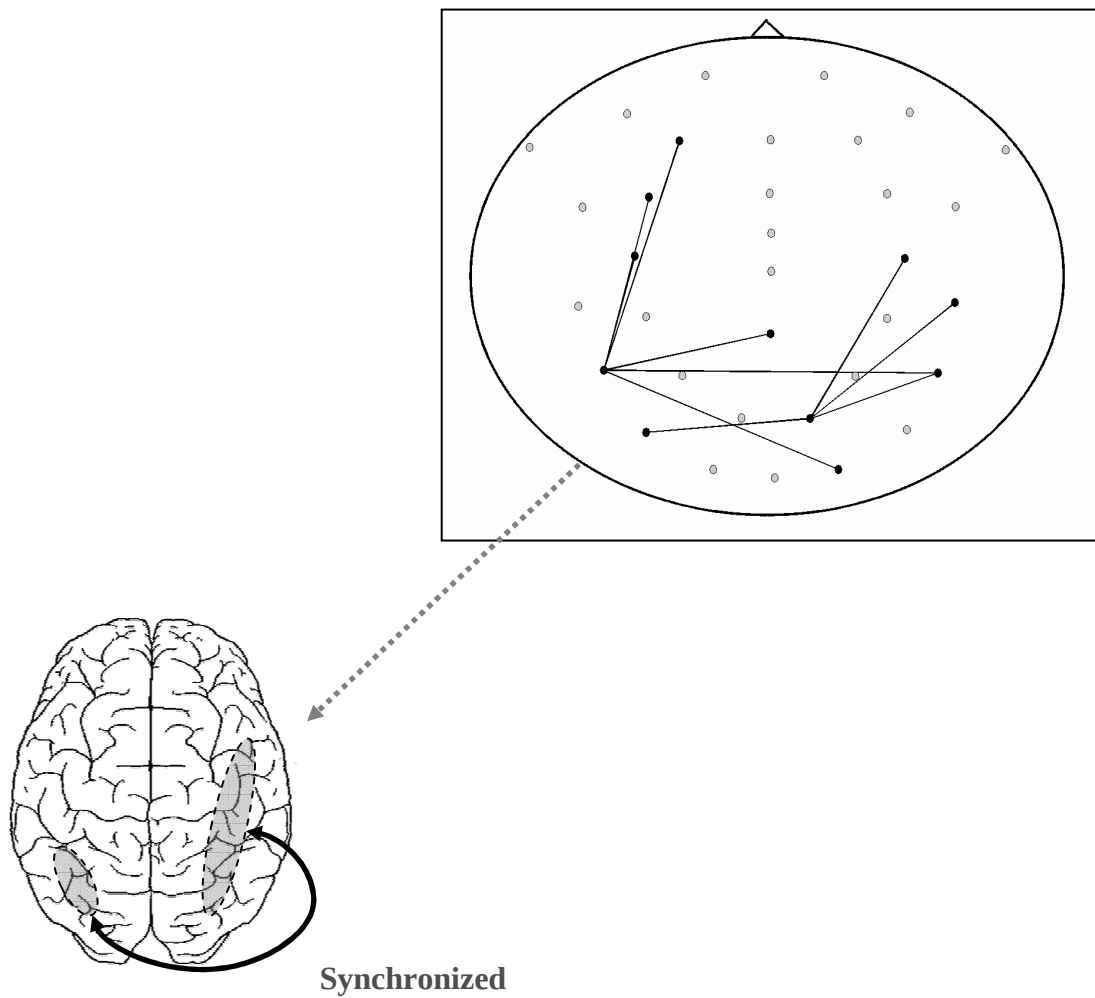
Hipersincronización en CONTROLES CONTANDO (Beta1 band (14 -25 Hz))



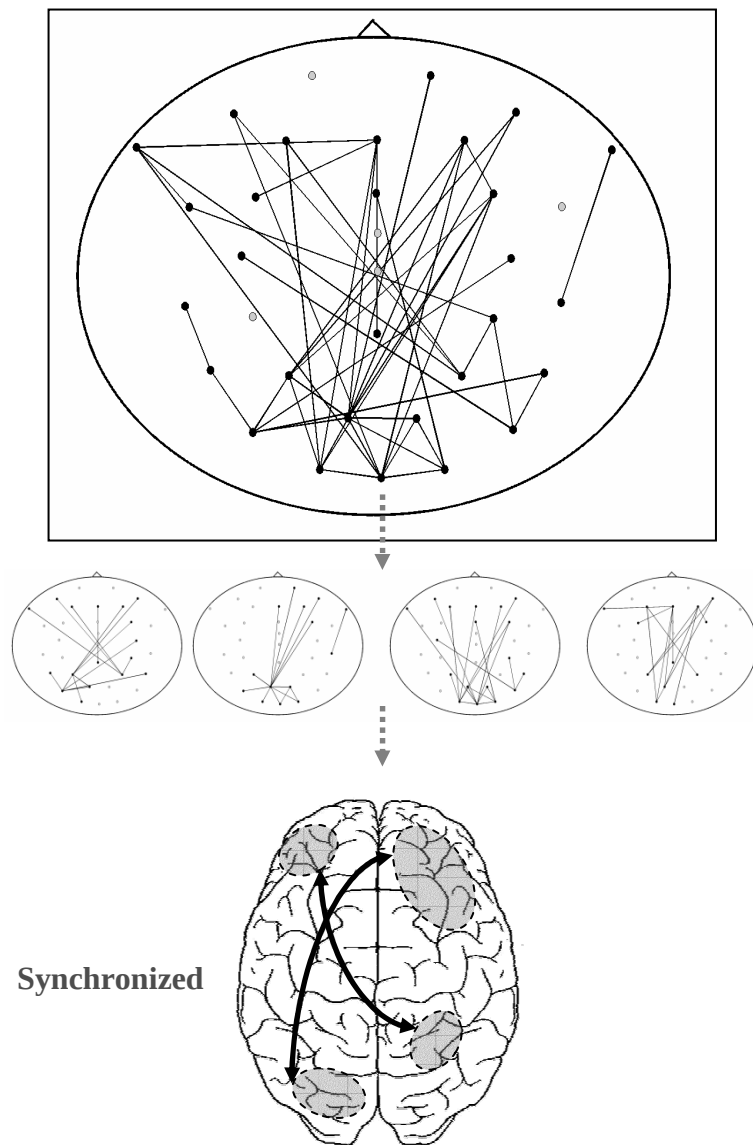
Hipersincronización en PACIENTES CONTANDO (Beta2 band (25 -35 Hz))



Hipersincronización en CONTROLES CONTANDO (Beta2 band (25 -35 Hz))

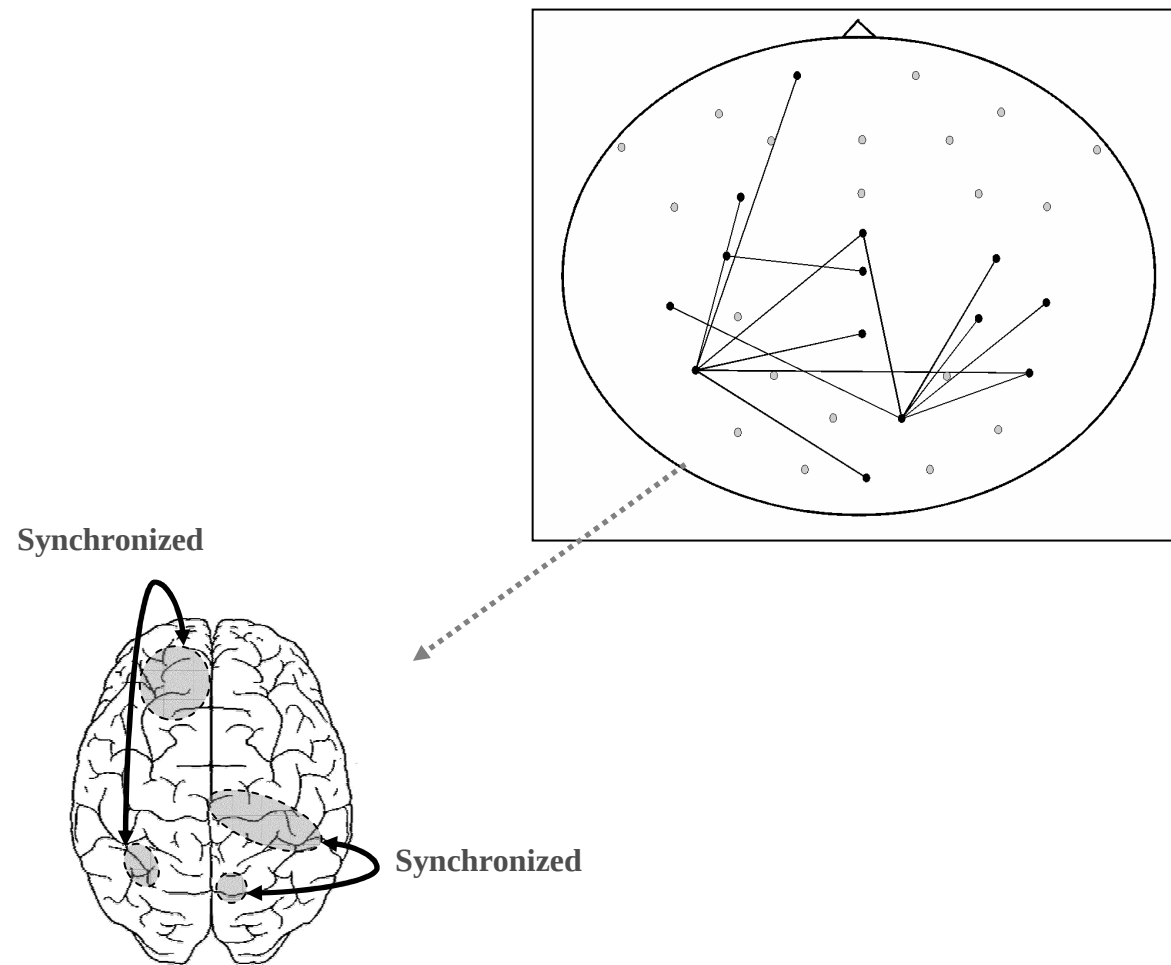


Hipersincronización en PACIENTES CONTANDO (gamma1 band (35 -45 Hz))

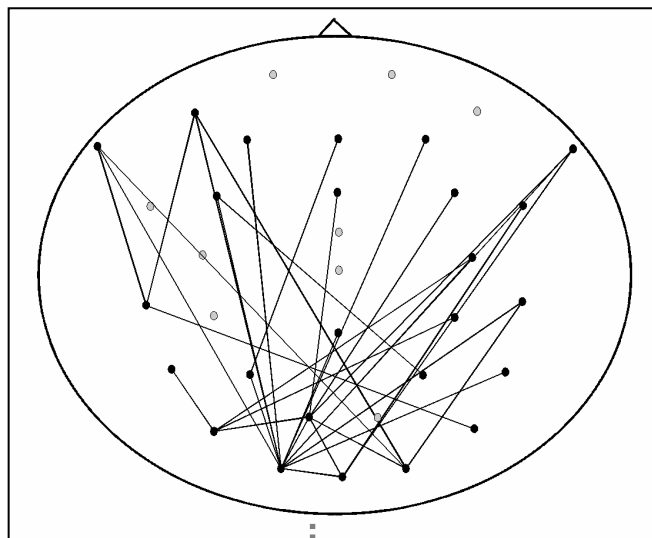


Hipersincronización en CONTROLES

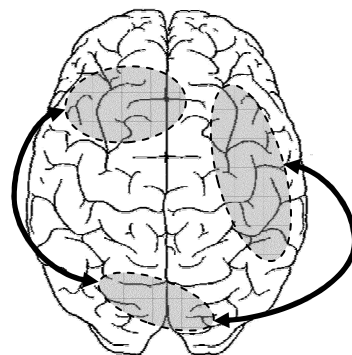
CONTANDO (gamma1 band (35 -45 Hz))



Hipersincronización en PACIENTES CONTANDO (gamma2 band (55 -80 Hz))

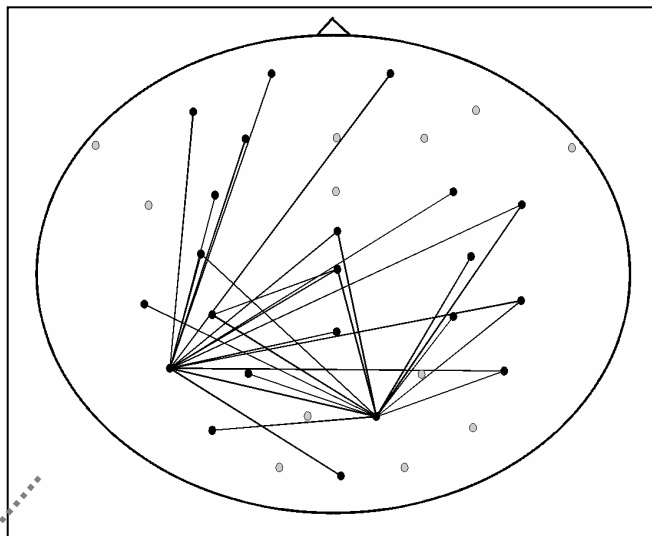


Synchronized

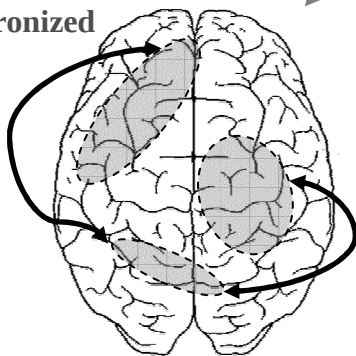


Synchronized

Hipersincronización en CONTROLES
Hipersincronización en PACIENTES
CONTANDO (gamma2 band (55 -80 Hz))
CONTANDO (gamma1 band (35 -45 Hz))



Synchronized

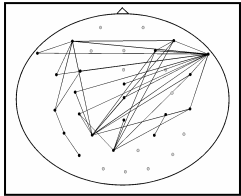


Synchronized

Pacientes > controles

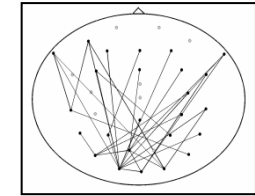
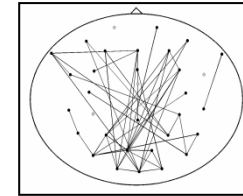
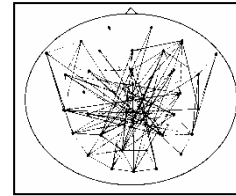
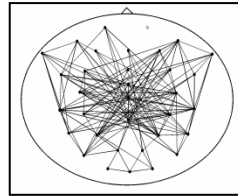
Contando

Theta (4-8Hz) Alpha1 (8-11Hz) Alpha2 (11-14Hz) Beta1 (14-25Hz) Beta2 (25-35Hz) Gamma1 (35-45Hz) Gamma2 (55-80Hz)



No
differences

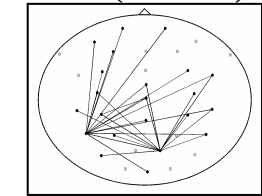
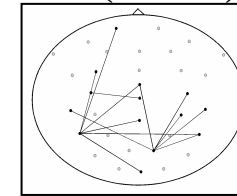
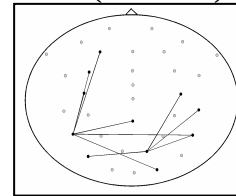
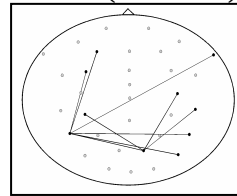
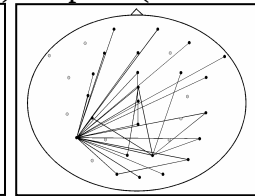
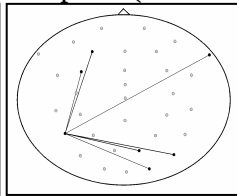
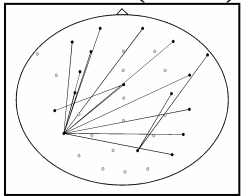
No
differences



Pacientes < controles

Contando

Theta (4-8Hz) Alpha1 (8-11Hz) Alpha2 (11-14Hz) Beta1 (14-25Hz) Beta2 (25-35Hz) Gamma1 (35-45Hz) Gamma2 (55-80Hz)



CONECTIVIDAD EFICIENTE

