

5th EBL NBO OFFICERS' SEMINAR

ROMA - 29th January – 1st February 2009

MIND - BRIDGE - DOPING

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EBL Medical Committee

MEMORY

*the ability to acquire
events and different type
of information*

MIND AND ITS COGNITIVE PROCESSES

CREATIVITY

*the ability to establish new
and not always, obvious
relations, to new and not
always obvious meanings
...and MORE*

INTELLIGENCE

*the ability to resolve
problems*

COGNITIVE PROCESSES



Are brain processes which generate, codify, elaborate, transform information - through various procedures - and realise a highly organized and complex system that modulates the various human activities

But, how did and how do they develop?

MIND AND BODY

In 1854 Giordano Bruno quotes *”much of what we build, commercialize, do is stated on the evidence of human ability to standing straight, walking and using hands”*

homo erectus, homo faber, homo sapiens
(no hand, no science)

In 1630 Cartesio makes a distinction between
Res cogitans (thought) and Res extensa (body machine)

In 1859 Darwin formulates the theory on the evolution
(modifications due to environment and natural selection)

MIND DEVELOPMENT



**Most of the animals have very simple brains
Its development is strictly linked to surviving:**

- reduce risk of predators**
- get of food**

*Neuronal systems in human being is far more superior to the
number of known celestial bodies*

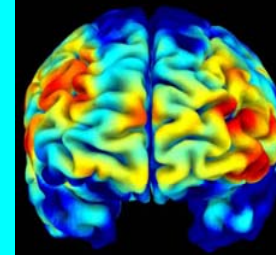
**The complex structure of brain (which is the biological base
of our mind), spreads over 200 squared cm of our cerebral cortex
(in more than 2 milion years human brain has become three times
bigger than the chimpanzee's one, with wich we share 98,5 of
genes)**

MIND DEVELOPMENT

Genetic/epigenetic



Cerebral
Plasticity



Social
support



Mental
activity



MIND DEVELOPMENT

Language, memory and communication is the result of interaction between social, mental and manual activity.

In cerebral connections genes form a general structure (hardware), the rest (software) develops through the stimulation of internal and external influences which at the same time, influences the hardware development (the body gives its own contribute too)

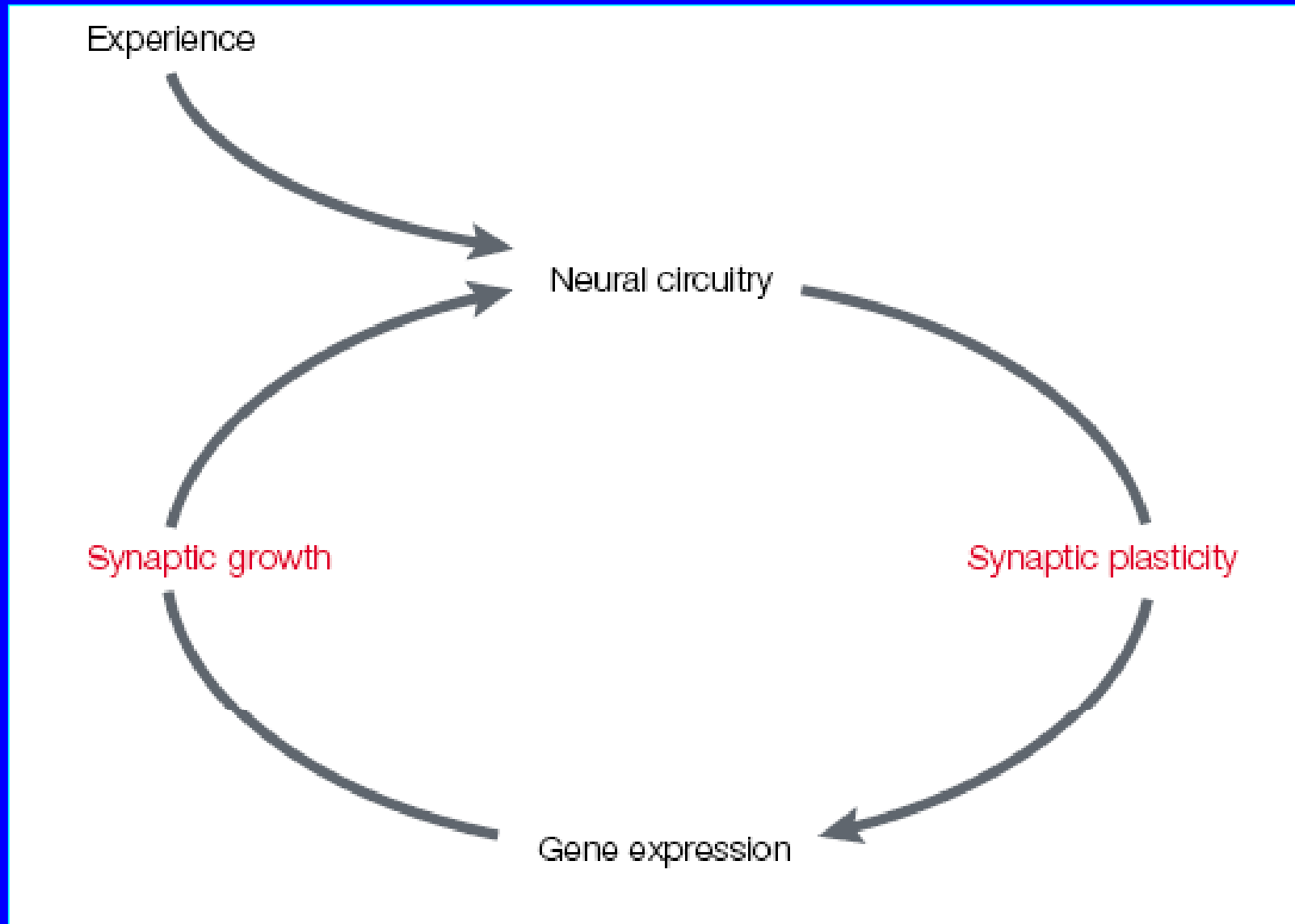
Edelmann thinks to a series of connections activated by stimuli for wich “*the darvinism of the synapsi replaces the darwinism of the genes*”

MIND AND MEMORY

The mind is the essence of individuality. Humans share fundamental genes for thinking and learning, but everybody has individual differences that lead to a complex interaction with environment and experiences which make the person unique

Our experiences change to us continuously and modify the layers of memories that we accumulate in our mind

NEURO-BIOLOGICAL BASES OF MEMORY



MEMORY CONSOLIDATION SYSTEMS

Human memory is a system enabled to elaborate, store and recover information which we acquire through our experience : perceptions, learning, emotions

The memory is fundamental for our personal identity, for programming our actions, for our patrimony of memories and knowledge

“If there no possibility to trace (memory) in neurons we could not even be sure of existing”

Armstrong “The nature of mind”

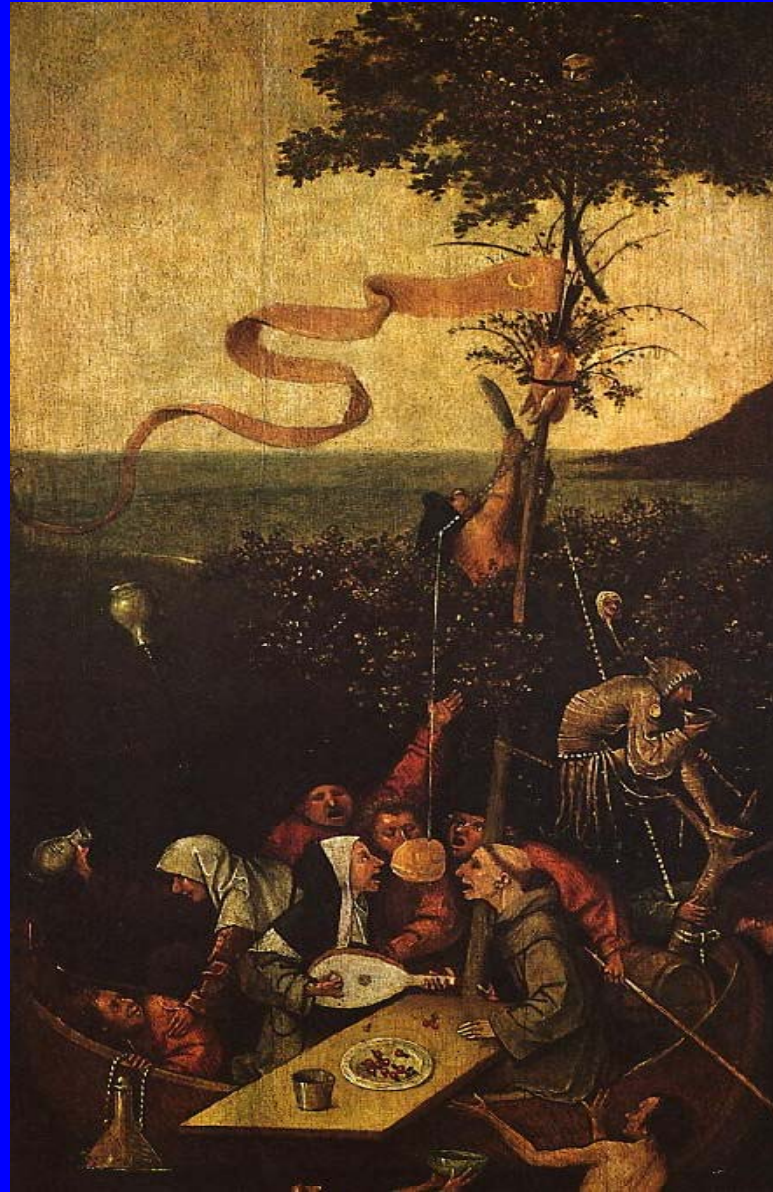
MEMORY PROTECTION

**Memory as an art to learning
to forget stressful and sad
and disturbing memories**

LEARNING TO FORGET

SCIENCE 2004, 304, 34-36.

“The boat of the mad”
Hieronimus Bosh (1500)
Louvre Museum
Paris



NEW TECHNOLOGIES TO IMPROVE AND MODIFY MENTAL PROCESSES

NEURO-DIAGNOSTIC TECHNIQUES

T.C. scanner - M.R.I. - functional MRI - PET – SPECT

POST -GENOMIC

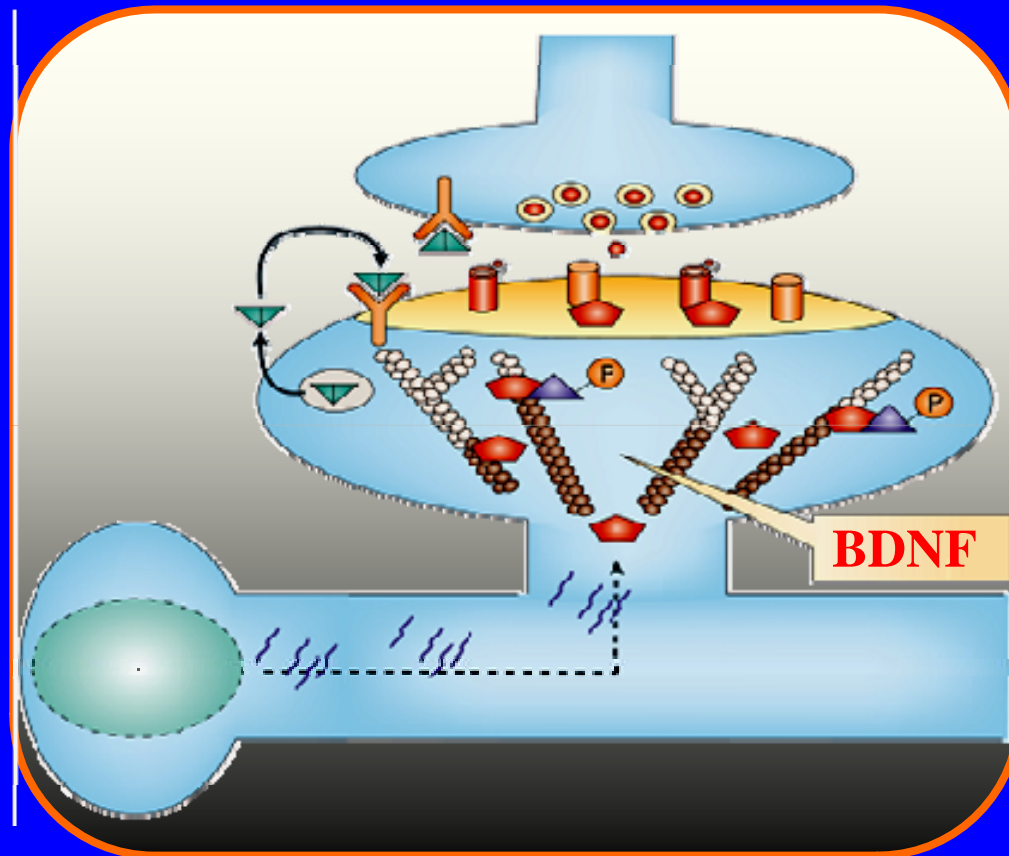
*The study of genes and components of genoma activity ,
and its cells constituents on molecular bases*

BIOTECHNOLOGIES

*Group of technologies that study genes and genoma, and
can use genetic enginnering to manipulate and reform the
human DNA*

“BDNF (Brain-derived neurotrophic factor) is essential to promote persistence of long-term memory storage”

P. Bekinschtein et al. PNAS 2008

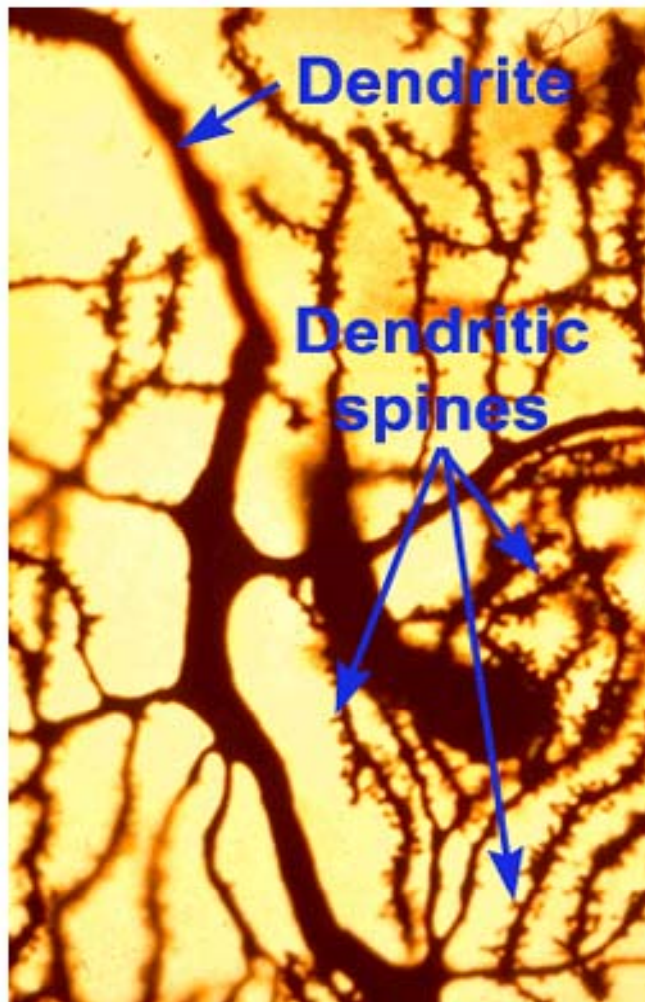


BDNF studies and its role in growing processes is a key point to the consolidation of the short - term memory

Lee, J. L. C. et al. Science 304, 839–843 (2004)

INCREASE AND IMPROVE BRAIN FUNCTIONS

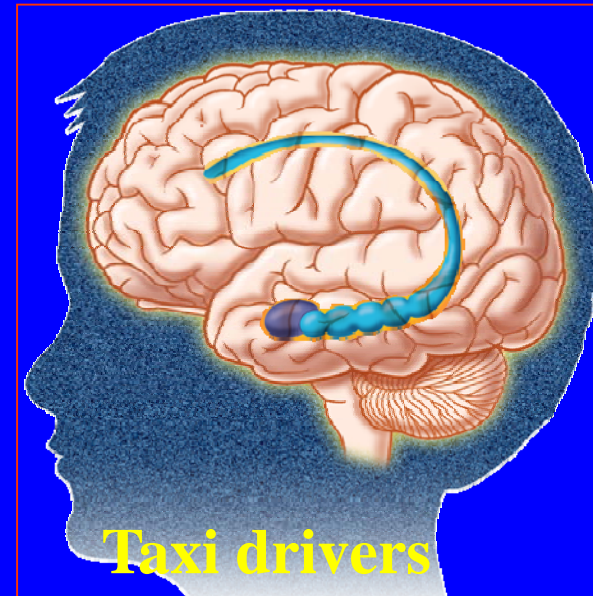
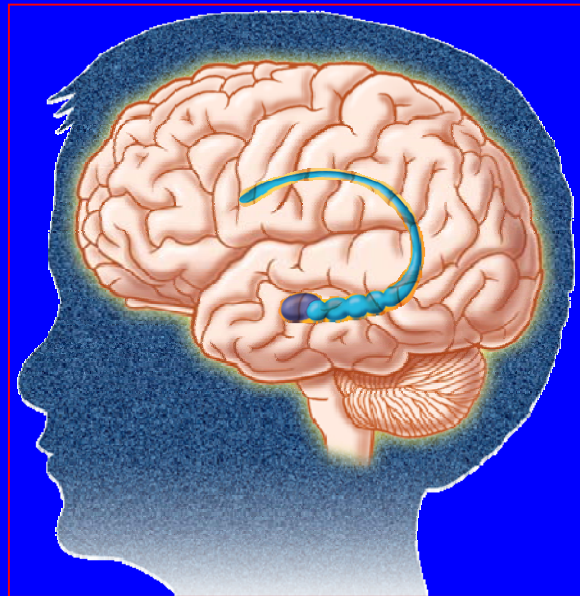
Dendritic Spines Increase with Learning



Navigation-related structural change in the hippocampus of taxi drivers

*Maguire EA, Gadian DG, Johnsrude IS, Good CD,
Ashburner J, Frackowiak RSJ, Frith CD.*

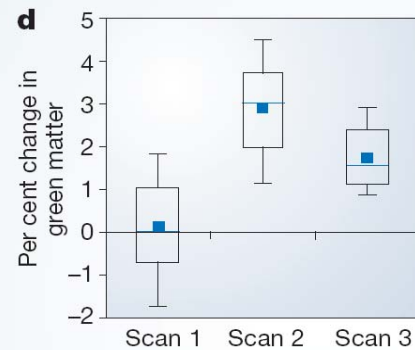
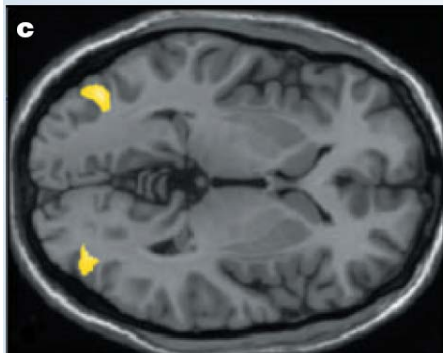
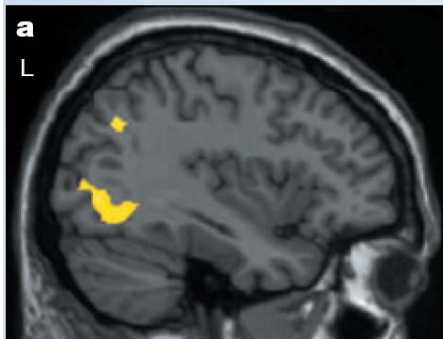
PNAS, 2000



The *hippocampus* (memory's area) is more developed in the taxi drivers because they must remember the maps of the city roads

Changes in grey matter induced by training

Nature, 2004

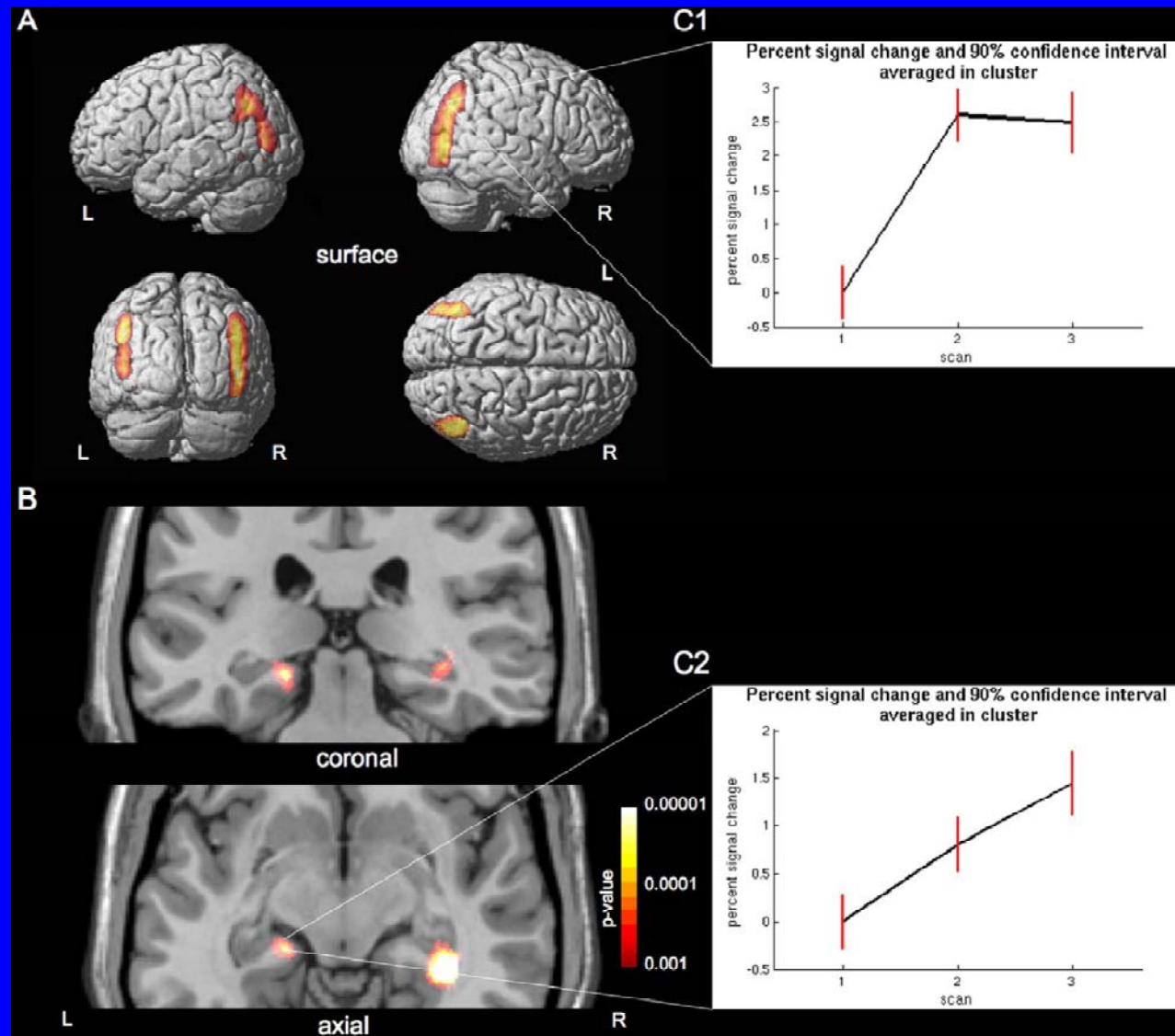


MIND SPORTS IMPROVE AND DEVELOP MEMORY

A research of the Albert Einstein College of Medicine of NY, about 469 elder people - “
edited in “New England Journal of Medicine”
in June 2003, demonstrates that the activities
as playing bridge, chess, or playing an
instrument improves mental performances
lowering the risk of dementia

Temporal and Spatial Dynamics of Brain Structure Changes During Extensive Learning

Draganski B et al., J. Neurosci., 2006



BRIDGE IMPROVES MENTAL HEALTH

**These data (of the scientific literature)
demonstrate how really the activity of the
bridge constitutes
an effective aid to the development and the
maintenance of the cognitive processes in
all the ages of the men**

DOPING

Drugs or medical treatments that potentially, artificially and in an unfair way enhance an athlete's performance

The last years have increased its uses thanks to professional sport development and its show business

It has brought athletes to serious health problems and been lethal for others

POSSIBLE DOPING IN MIND SPORTS

Till now, not a single substance was proved as doping in mind sports

In futur is possible that drugs not included in the World Anti-Doping Code (WADC) could be used to improve mental performance

In futur is also possible to use biotechnologies and genetic engineering with DNA manipulations to improve mental performances

PROBLEMATICS LINKED TO ANTIDOPING IN MIND SPORTS

Many of the drugs listed in the World Antidoping Code (for examples diuretics and beta-blockers) do not improve mental performances but are sometimes used by athletes for health problems.

**There are many issues open between EBL and
WBF and WADA**