Abstract of the following presentations:

G.Brunelli: : Stem cells,what is new, what is true?

My perplexities: it is almost 20 years that stem cells are on the stage. However they are still somewhat like U.F.O.

Numberless researchers and laboratories all around the world straddle the tiger. But no useful results has been published up to now as regards the true stem-cells even if some good results have been obtained by means old progenitor cells (precursors). New types of stem cells appear on the stage as the "iAS" and discussion arise if and how they can be guided to the type of mature cell we need , better than hES or not.

The N.O.T.C.H and WNT mechanisms that regulate the fate of the dividing stem cells are poorly understood and taken into consideration.

Perhaps it is now the time of updating the thousands of data about h.E.CS.,i.P.S. and precursors stem cells:

How should they be managed? Could they be used in spinal cord injuries, given that S.C.I. are not cell- lesions but fibres-lesions and that the central nervous system (the cord) is **non permissive** for the advancement of the axons regrowing from brain?

G.Brunelli Memory and Mind.

This is a review of the many aspects of our brain as related to the mechanisms which rule the memory and form the Mind. To understand memory one must know the brain and as thousands of articles of neuro science are published every year (40.000 in 2005), nobody can say he knows well the brain. Memory is based on bilions of neurons all of which have special compartments for special functions.

Memory consists of identification, codification and storage of afferences, ideas and thoughts and in recalling them afterwards on demand.

We are our memory (Bunuel). Ideas are based on the comparison of new afferences with memory and on an utilitaristic judgment of consequences.

Learning is essential for memory and it is easier in childhood due to peculiar opportunity windows that afterwards close with age.

Where has its seat memory? It has no seat : it is a function that involves billions of neurons searching for numberless fragments of memories stored in different areas of the brain cortex.

2 genes are particularly involved in memory: Reelin that promotes memory formation and Proteinphosphatase1 that abolishes memory formation. The association of mnemonic information occurs in

hippocampus like the composition of a digital photograph by means of numberless pixels. Functional magnetic resonance has unveiled peculiar sites of the brain involved in specific types of memory.
Explicit (episodic & semantic) as well as implicit (Procedural) memories are considered . Prospectic brain in animals and men is presented as well as prefiguration. Only 1 % of "lived" is stored in memory and we losed 3% of our knowledge every day . Thankfully we reconstitute the lost memory day by day. Various types of Amnesia are considered also related to the loss of neurons during a life time: We lose for apoptosis more or less 10.000 neuron a day: that means 330 milion of neurons in our life. Lukely 199bilions and 670 milion survive and many silent neurons are recruited. A hint is given to the ancient memory goddes Mnemosine and to Simonides and some anecdotes are told about god Toth, Cicero and others.
Methods to reinforce memory , apart from brain trainig are considered as well as the necessity of learning to forget.

G.Brunelli:Report on our experimental research .
Starting with our first experiments of 1980 on rats done by removing 1 cm of cord and grafting from upper to lower stumps of cord by means of peripheral nerves grafts that demonstrated the regrowth of axons (coming from the brain) into the graft but their stop and non progressivness out of the graft into the cord , the following 31 years of study were done on the possibility of bypassing this impediment on both rats and monkeys (macaca fascicularis). These results are presented up to the transfer of ulnar nerve from upper to lower limbs in human beings with recovery of voluntary walking (even if rudimentary) and up to the grafting from the corticospinal tract (C.S.T.) of the above the lesion cord with peripheral nerves, again with recovery of a voluntary rudimentary walking.
Histological and electrophisiological results are presented as well as the difficulties of recruiting human patients for these operations when they are told of the long lasting , very tiring and expensive reeducation treatment for the rest of their life.
By grafting from the C.S.T. the reinnervated muscles are not anymore activated by ACh but by Glutamate as they are connected with upper motoneurons. All the experiments to ascertain this and to demostrate the real glutametergic innervation have been done on rats by blocking

alternatively the ACh and Glut. transmission by means of Vecuronium and G.Y.K.I. supplying documentation.
Also retrograde tracing has been done demonstrating the connection of muscles with C.N.S.
No change of function of cortical areas has been demonstrated but the change of simultaneous firing of thousands of single neurons scattered in many different areas according to the voluntary request of single movements without co-contractions of other muscles connected with other neurons scattered in the same cortical areas.
Some recent alterations of the surgical protocol are presented as well as a new research done in rats by connecting the cord to the roots of brachial plexus in order to restore the function of the upper limb in paraplegics: (this is a possibility occurring in 2 to 3 % of paraplegics).
Five novelties have been shown by our research: 1) the capacity of upper neurons to restore the cytoskeleton of lower motoneurons, 2) their functional connection, 3) their selective function without co-contractions, 4) the alteration of the neuromuscolar junctions and 5) the brain plasticity by single neurons and not only by cortical areas.