Cerebral Simulation

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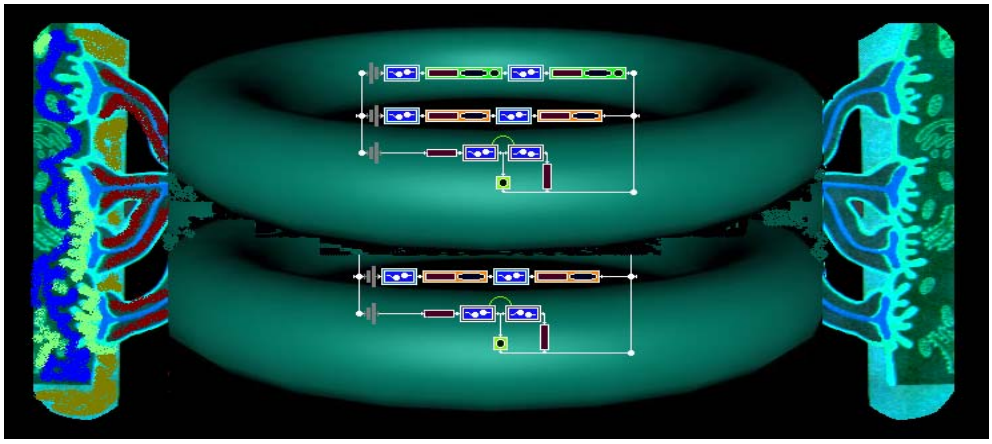
We present a series of data, which derive from an emulation of a very simple electronic and informational elementary circuit. This circuit is extrapolated from many circuits which are supported by a universal model and, working together, give coherent answers and are able to help or replace a neuron or a group of neurons which are "inactive or damaged, or however distressed by irreversible pathologies.
The circuit, which emulates the Na-K pump, is derived from new model of neural transmission, which considers that the essential difference between telecommunication and bio-communication is that telecommunication is rigid and aseptic and bio-communication has both inertia in transmission and in reception.
There also exists the hypothesis that whatever neuron behaves in analogous and not identical way in reception and in transmission is subdivided into decomposable more and more specialized portions and transmits and receives with lags only on iso-frequency trajectories, in cones of flux or fluid, which have the characteristics of a ionized gas.
We also believe that in any bionic synapse, messengers in and from any possible direction can be transmitted and received and that a specific kind of messenger is accepted by only one particular kind of receptor, or forwarded only by a particular kind of transmitter. Specifically, the receptor will have to utilize the same frequency of the transmitter.
To emulate this structure, we are convinced that:

1. lags are done by inductance;
2. switches give transient conditions and produce opening and closing extra-current;
3. charge and discharge condensers determine the threshold signals;
4. and only analogue signals have to be compounded and modulated, to create a steeples caring wave.

The switched input oscillator is the cybernetic equivalent of the tout court logic, changing it from an a-temporal in to a temporal logic. It can so effect the transition between objects (in this case: neurotransmitters) and connections, making, for example, the directions for the interconnections among elements to become interdependent. We have considered three types of elements of a circuit that, taken either of these three together, gives us 36 possibilities (some are repeated) for the construction of 27 different Na-K pumps. Each of these 27 different combinations

of electronic base components can be considered as an ATPase mechanism simulation. The final structure, projected and partially realized (from 80 to 960 cards in 27 different configurations, with different combinations, in double logic and everyone of them subdivided into 40 strata), even if it is only partially active, with a field of imposed frequencies of 1 to $2x10^4$ Hz opportunely combined and permutated between them, in its whole, can give at least 10^{45} interconnections, at various frequencies and wave-forms.
All of these interconnections, modulated, half in Aristotelian logic, half in fuzzy logic, simulate the left and right sides of the brain. We have obtained, for one single complete element of this structure, the theoretic simulation of at least 10^{52} messengers, with molecular weight units (m.w.u.) between 10^2 and 10^3, which give al least 10^{57} informative signals. For the structure, a three values logic is utilized, that for further formation of tissues of bionic elements, will increase by seven. This seems to be an ideal situation for planning, because, if it is impossible to create biologic messengers, then they may be replaced by their energy forms, transmitted or received through microprobes. Moreover, considering the automatic energy transfer, we can deduce that we can by-pass, exalt or eliminate the activation or inhibitory mechanisms, such as monoamine oxidase, MAO. After all, we have projected an emulator system as a quasi-Boolean net, but functional only, because the omni-directional reaction to an operative at a perturbation level action gives origin to different functionalities in a similar structure, which exists in a non-digital way. Or, it might be better to say, which lives in an analogical quasi-digital way, with molecular code and decode factors, to which, at present, we approximate in an incomplete way.



from Errigo's conferences, 1999÷2005

On the ground of theoretical calculus, every single stratum of oscillators originates as energy and frequency forms for the neurotransmitter emulation. Therefore, we

can have: for each neurotransmitter a quantum cloud equal to $3x10^5$ quanta, i.e. an informative unit cloud equal to $1.5x10^5$; to each m.w.u. 10^2 messenger, an association of at least 3 virtual masses, identical among them and to the real mass; and to each m.w.u. 10^3 messenger, an association of at least 30 virtual masses, identical among them and to the real mass.
All this happens either in reception or in transmission distances to the maximum of 500 times the Böhr ray, in closeness of length to a Debye wave, and with frequencies up to a thousand times smaller than the Larmor electronic frequency.
As in all previous prototypes, as well as the last *(the 12th)*, the essential work consists with these assumptions: we have the configuration of balance for the Na-K pump; we can insert in it switches and replace the generic resistances with appropriate resistors, which run in fixed frequency-fields; and opening and closing the circuits, we can create the conditions of de-equilibrium, which give different productions of currents, which, each in turn, generates various signals in transmission. The various signals must then be put together, placed, enlarged and transmitted.
With the above understood, we propose, here, a very simple model which consists of: a single substrate of 40+40, a single element of a hexagonal group; and this single element has 5 signals instead of 25.
We have obtained an almost perfect correlation between those signals that are generated in nature and those that we have artificially produced. Analyzing our data, we've noticed that equal signals obtained between the signals generated in nature and those that we have artificially produced can be compared, for values and development, to those pre and post-synaptic (from -65 mV to +55 mV volt agent, and inferior to 2 pA currents). In fact, the presented bionic structure proves to be analogous to a set of staminal cells, and moreover, with opportune modifications of the resistance elements, even analogous to a set of glial cells. We have demonstrated that, at present, we are able to: build signals similar to physiological ones; have a bionic dialogue; and build "3D" structures, ever more and more complicated.
We have demonstrated that, to build a real and working artificial intelligence, or a particular part of it, we must preliminarily plan an "opposite engineering" system that, starting from the biological and not "vice/versa", can, in the meantime, define the "how", hoping to become even the "why".
In conclusion, if we want to insert probes (in receiving and in transmission) which can work, for now, in relatively small spaces and, also, in the inter-synaptic spaces, we are, already, able to use a suitable system (math-inf-el) emulating the cerebral structure or a cerebral under-structure, or simply a neural or a cellular structure.
Given the results of this work, even if with a very simple model of an only unique circuit of an only form-circuit, the theoretic bases are, at the moment, the most completely configured. We are convinced that technological research is already equal to the instruments we need to use.

IN DEFINITIVA VEDIAMO IN CHE COSA CONSISTE
LA GAMMA DEI MIEI PROTOTIPI

Ho progettato e realizzato un circuito in grado di simulare i segnali analogici che si scambiano fra loro le cellule in generale e nervose in particolare. ***(Fig.1)***

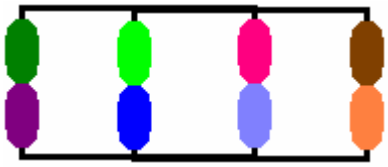


Fig. 1

Tanti circuiti di questo o analogo tipo, composti in vari modi, costituiscono una struttura sandwich, descritta nella relazione di cui sopra, che funziona come un chip molto più complesso di quelli usuali. ***(Fig. 2)***

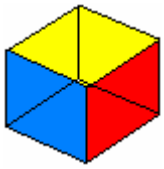


Fig. 2

Molti di questi sandwich possono essere collegati fra loro in modo "parallelo". ***(Fig. 3)***

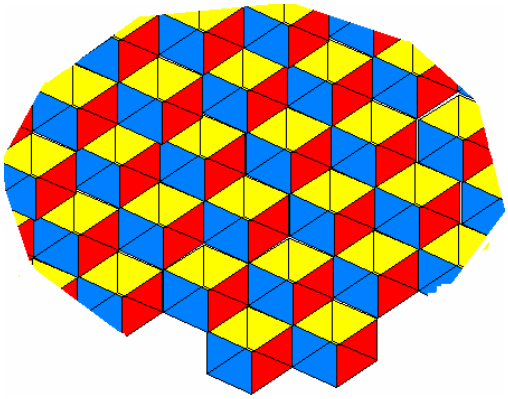


Fig. 3

E possono anche essere collegati fra di loro anche in "serie". ***(Fig. 4)***

Fig. 4

E anche in “serie” e “parallelo” ad emulare strutture particolari.
Per esempio, questa a lato, il cui significato pare abbastanza evidente. ***(Fig. 5)***

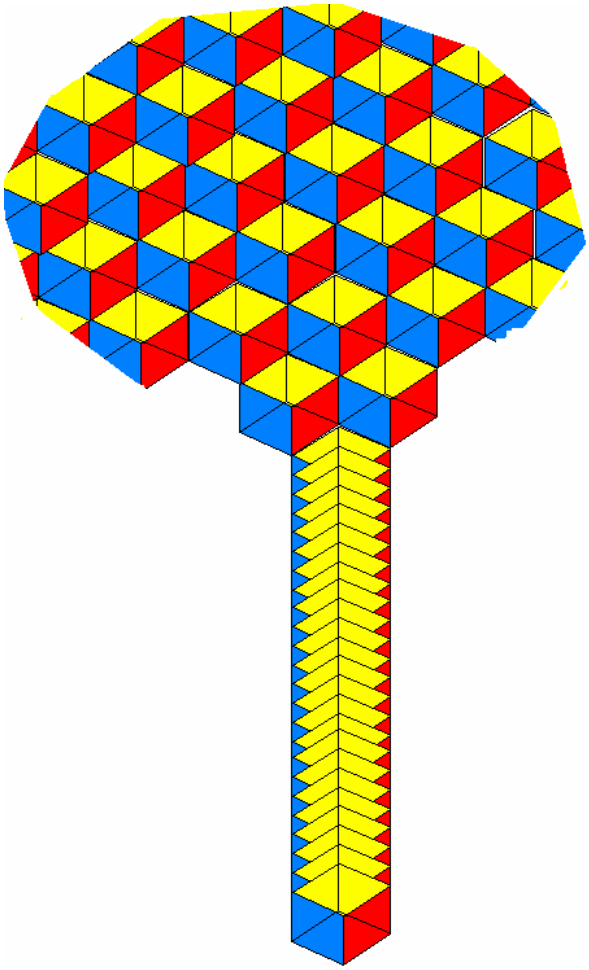


Fig. 5

COSA RIMANE DA FARE?

la trasformazione degli attuali circuiti elettronici in

↓

micro e successivamente in

↓

nano

LE TAPPE DELLA PROGETTAZIONE E REALIZZAZIONE

- **1963-1993:** impostazione teorica;
- **1993-1998:** primi esperimenti su circuiti semplici;
- **settembre-ottobre 1998:** simulazione teorica complessiva della globalità del sistema nervoso cerebrale *(Pippo 1)*;
- **novembre 1998:** prima simulazione elettronica su elementi minimi allo scopo di vagliare i percorsi comunicativi *(Pippo 2)*;
- **marzo 1999:** simulazione del pre-prototipo con scelta di elementi randomizzati *(Pippo 3)* e presentazione ufficiale;
- **novembre 1999:** realizzazione informatica dei moduli base ad alta riproducibilità *(Pippo 4)* e presentazione ufficiale;
- **dicembre 1999:** simulazioni matematica ed informatica dell'elemento base universale comunicativo *(Pippo 5)*;
- **giugno 2000:** predisposizione per la simulazione elettronica dell'elemento base universale comunicativo *(Pippo 6)*;
- **settembre 2000:** predisposizione per la simulazione elettronica dell'elemento completo universale comunicativo *(Pippo 7)*;
- **agosto 2001:** domanda di brevetto italiano del Modulo Universale (variante del "completo") *(Pippo 8)*;
- **ottobre 2001:** semplificazioni del Modulo Universale *(Pippo 9)*;
- **gennaio 2002:** implementazioni sul modulo universale *(Pippo 10)*;
- **marzo 2002:** il Modulo Universale completo *(Pippo 11)*: *in pratica, tutto il cervello;*
- **ottobre 2002**: il modulo universale con tutte le sue ramificazioni *(Pippo12)*; *in pratica, tutto il cervello con annessi e connessi (sistemi afferenti ed efferenti);*
- **dicembre 2002:** presentazione di Pippo 12 al Simposio dell'International Neuromodulation Society a Roma.
- **gennaio 2003:** semplificazione del modulo Universale ramificato (Pippo 13 –1-2-3-4);
- **marzo 2003:** implementazione del modulo Universale ramificato semplificato (Pippo 14 –1-2-3-4);
- **maggio 2003:** ricerca delle configurazioni per la simulazione dei peptidi proteici e non proteici (Pippo 15 – 1-2);
- **maggio 2003:** presentazione di Pippo 13 al Congresso Stroke Today a Spoleto;
- **luglio 2003:** ricerca delle configurazioni-frequenza per la simulazione dei messaggeri generici (Pippo 16 – 1-2);
- **settembre 2003:** trasformazione della configurazione in una nuova struttura con connessioni per i lobi cerebrali dx e sx, e simulazione dei tessuti (Pippo 17 – 1-2);
- **ottobre 2004:** simulazione dell'accoppiamento proteico (accoppiamento bionico) (Pippo 18 – 1-2);
- **ottobre 2004:** domanda di brevetto europeo del modulo Universale ramificato ed implementato
- **novembre 2004:** simulazione della "Glicina" (Pippo 19);
- **aprile 2005:** approccio teorico per il dialogo neurale;
- **settembre 2005:** simulazione elettro-informatica di dialogo neurale (Pippo 20 – 1-2).