



HAL
open science

A better HEALTHCARE for a better WELFARE? CHRONOBIOLOGY and LITHOTHERAPY: SUSTAINABLE SYSTEMIC SOLUTIONS

Pierre Bricage

► **To cite this version:**

Pierre Bricage. A better HEALTHCARE for a better WELFARE? CHRONOBIOLOGY and LITHOTHERAPY: SUSTAINABLE SYSTEMIC SOLUTIONS. Systemic Solutions for Systemic problems, International Academy for Systems and Cybernetic Sciences; Sichuan University at Chengdu, Oct 2015, Chengdu, China. hal-01211365

HAL Id: hal-01211365

<https://hal.science/hal-01211365>

Submitted on 5 Oct 2015

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

A better HEALTHCARE for a better WELFARE ? CHRONOBIOLOGY and LITHOTHERAPY : SUSTAINABLE SYSTEMIC SOLUTIONS.

Pierre BRICAGE

IASCYS Secretary General, WOSC Directorate, AFSCET Vice-President
retired Head of Biology department and Co-Director of Health and Social Sciences department
Faculty of Sciences and Technology, University of Pau et Pays de l'Adour, Pau campus, France
pierre.bricage@univ-pau.fr

Abstract

Man-made chemicals accumulate in Earth soils and waters: local systematic use of drugs creates systemic problems for our species survival. Our “Take-Make-Waste“ society is not sustainable. Systemic solutions must arise at local and global levels. HOW chronobiology, for a better healthcare, and lithotherapy, for a better welfare, could be useful systemic solutions for prevention of such systemic problems?

The temporal organisation of living systems is evidenced as an innate and inheritable specific network of clocks that cannot be changed. But knowing these endogenous clocks functioning allows to understand WHEN and WHY therapeutic strategies are efficient or not. Sleep agenda recording and individual vigil chronotypes determination and their respect is the best way to avoid scholars' failure. Performance changes are depending on chronotypes and societal time changes. Results of students' competency tests (reports, talks, experimentations) are significantly increased (from 20% to 50%) when done AT THE RIGHT TIME. Man is an Earth clock shaped species. The minimal and maximal durations of all sleep cycles of a night obey a relationship that results from interactions between endogenous clocks and exogenous ones. All Earth living systems share a common ecoexotope of survival that is temporally structured by **solar, lunar and terrestrial rhythms**. These rhythms are synchronisers for our endophysiotope clocks. But some people are more sensitive to them than others and someones are resistant. Man night sleep changes depend on lunar cycles entrainment. Our Earth-hosted organism is physiologically structured with Earth as a fixed point and the analysis of sleep records points to **circa-annual solar rhythms** that can be considered as controls for the evidence of **circa-monthly lunar rhythms**.

WHAT methodology to evidence temporal organisations of living systems and their physiological responses? Only individual longitudinal measurements must be used. Into controlled network of clocks, different frequencies are running depending on responses to endogenous or exogenous changes. Not only “on“ stimuli but also “off“ ones have effects. For 1 clock, its latency phase duration is always equal to at least 1 period of the rhythm. HOW long is the latency of a network of clocks?

WHAT methodology to evidence lithotherapeutic effects? Stimuli responses must be tested according to a double-blind placebo-controlled survey. WHAT mineral to use FOR WHAT to do? It is a *a priori* complex study! WHAT scaling to use?, FOR WHAT treatment?, WHAT mineral to chose and WHY?, HOW and WHEN to treat? The characterisation of jade or jasper varieties, for example, is a challenge. The first difficulty is to identify commercial affordable sources of jade, nephrite and serpentinite, for testing for treatment of night urination difficulties. Each control, placebo or treatment record is lasting at least 120 days. Compared with control, jadeite or nephrite enhances night quality with a decrease of at least 15 fold of awakenings and urinations. Depending on the jade variety, and its trace elements, properties change. Nephrite suits better with a 20 fold enhancement. The highest of all placebo effects was below a 4 fold increase. The mineral crystal structure is evidenced to have an action. The area of contact of a stone with the skin is the limiting factor of an energy transfer. The day phase of our life is structured in cycles as the night phase is. Placebo effects are greater during the conscious day phase than during the unconscious night one, but red jasper treatment enhances significantly the number and the intensity of diurnal physical working.

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015

Minerals act in a dose-dependent manner as drugs do. Using hematite before serpentinite (jadeite or nephrite), enhances the effect, as with chemical agonists, minerals may act in synergy. Hematite sole gives a placebo effect. But hematite increases serpentinite effect from a 15 fold value to a 22 fold one. Surprisingly, within an interactive network of clocks, the latency phase of the whole is shorter than the shortest latency phase of each clocks, thus enhancing the system reactivity to changes: **as a whole, a system is defined by some unanticipated emergent properties.**

Lithotherapy with affordable, easy to obtain, and not subject to imitation minerals is a *smooth way for an individualised, easy to use, non-violent, and non-invasive therapy* to treat chronic pathologies, *helping people in their today way of life*. Chronobiology is a way of thinking not only for knowing diseases causes and to elaborate treatments, but also for apprentice assisted learning: *the right interaction at the right place and the right time for the right person with the right person.* *New ways of research are emerging.*

Key words: chronotherapy, clocks, dose-dependent effect, double-blind placebo-controlled trials, ecoexotope, endophysiotope, latency, lithotherapy, rhythmicity, system of systems, unexpected emergence.

Introduction

Our modern human society is using drugs everyday, everywhere and for everything: -antibiotics to fight against bacterial diseases or to add to animal food, -hormones to enhanced animal growth or to avoid man reproduction, -phenols as chemical compounds in plastic bottles or disinfectants, -systemic insecticides... *“Drugs use and abuse makes money.”* But sooner or later all these man-made chemicals will accumulate in soils and waters. Systematic use of chemicals is creating systemic problems for man survival: -emergence of antibiotics resistant bacteria, -toxic water for drinking or cooking, -feminisation of male fishes... WHY?

Our *“Take-Make-Waste“ society is not sustainable* and is less and less sustained by people. A *“Take-Make-Waste but Recycle“* society is intended to cure these systemic problems [Bricage, 2002c]. Recycling makes money too... And it works [Doolotkeldieva et al., 2015]. But prevention is better than curing! **Systemic solutions exist for prevention of such systemic problems:** -chronobiology for a better healthcare and -lithotherapy for a better welfare. HOW?, WHY?

Chronobiology allows to use -only when necessary- just the right amount of drug, at the right time [Lévy et al., 2008] and the right place. But we must first know the temporal organisation of the living systems we are acting on [Bricage, 1985, 2015]. The question is: WHEN? Lithotherapy is the use of minerals for their natural potential applied to physiological processes. The questions are: WHAT?, WHAT FOR?, HOW?

I. The temporal organisation of living systems.

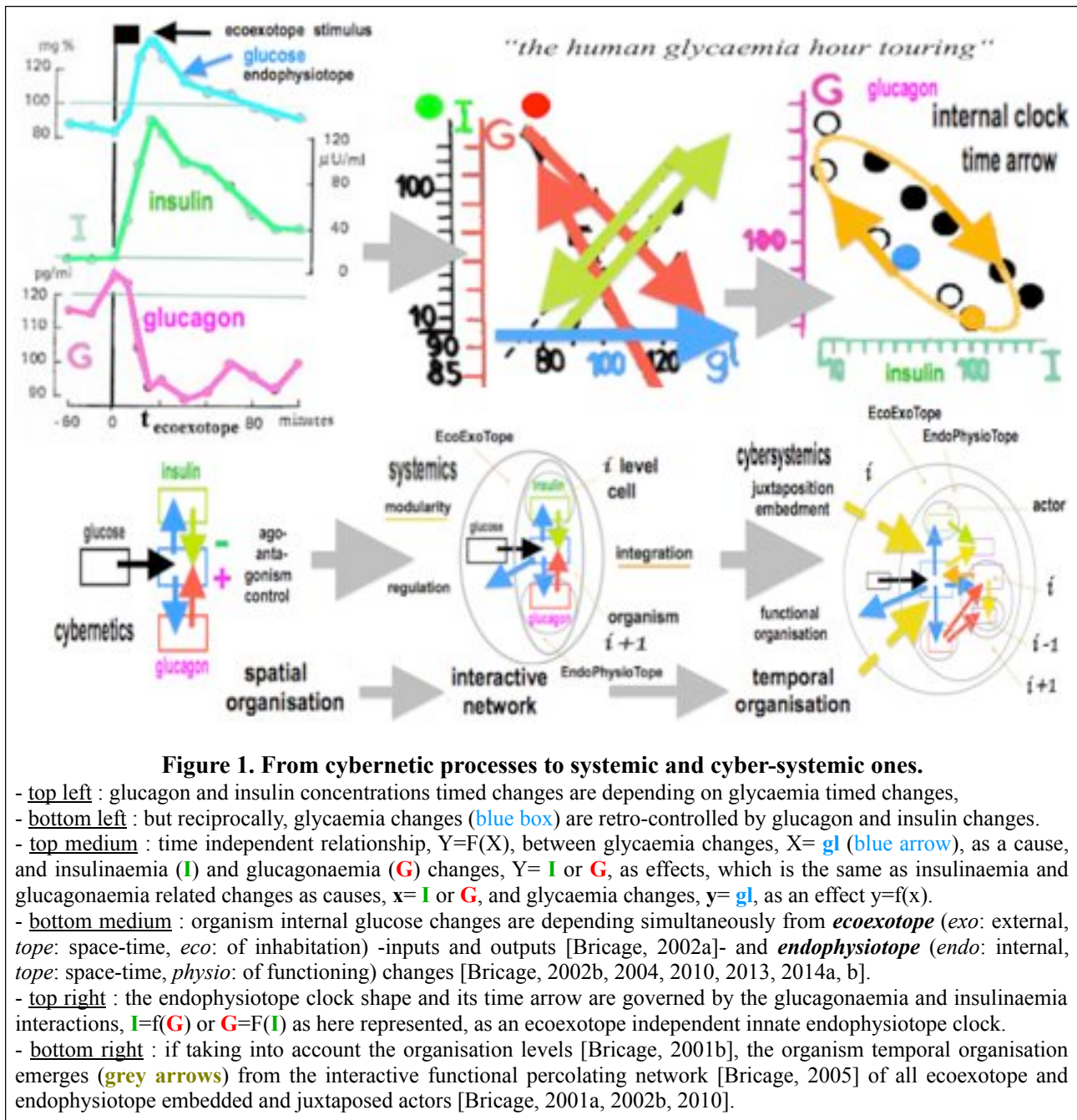
The time graphed simultaneous variations in man glycaemia, glucagonaemia and insulinaemia can be explained as *a cybernetic process*: the global control of blood glucose concentration depends on **ago-antagonistic retro-controls** (figure 1).

I.1. Example of temporal organisation: *“the human glycaemia hour touring“*: an endogenous clock.

We can graph the same recorded values as *a systemic process*, using time independent *instant simultaneous interactions* between glucose, insulin and glucagon concentrations. We can also graph the instant interaction between glucagon and insulin whatever the time and glucose concentrations and we will have the real time arrow of the living system internal clock. Pointing to the juxtaposed and embedded levels of organisation we can, with *a cyber-systemic approach*, graph their *instant local and global interaction network* to evidence an innate, inheritable, clock. Simultaneously pointing to spatial organisation, network of interactions and temporal organisation (figure 1), the clock is an innate and inheritable specific component that cannot be changed. Knowing the endogenous clock allows to understand WHEN and WHY paradoxical therapeutic strategies are efficient and logical ones are not [Bricage, 2004].

Systemic Solutions for Systemic problems

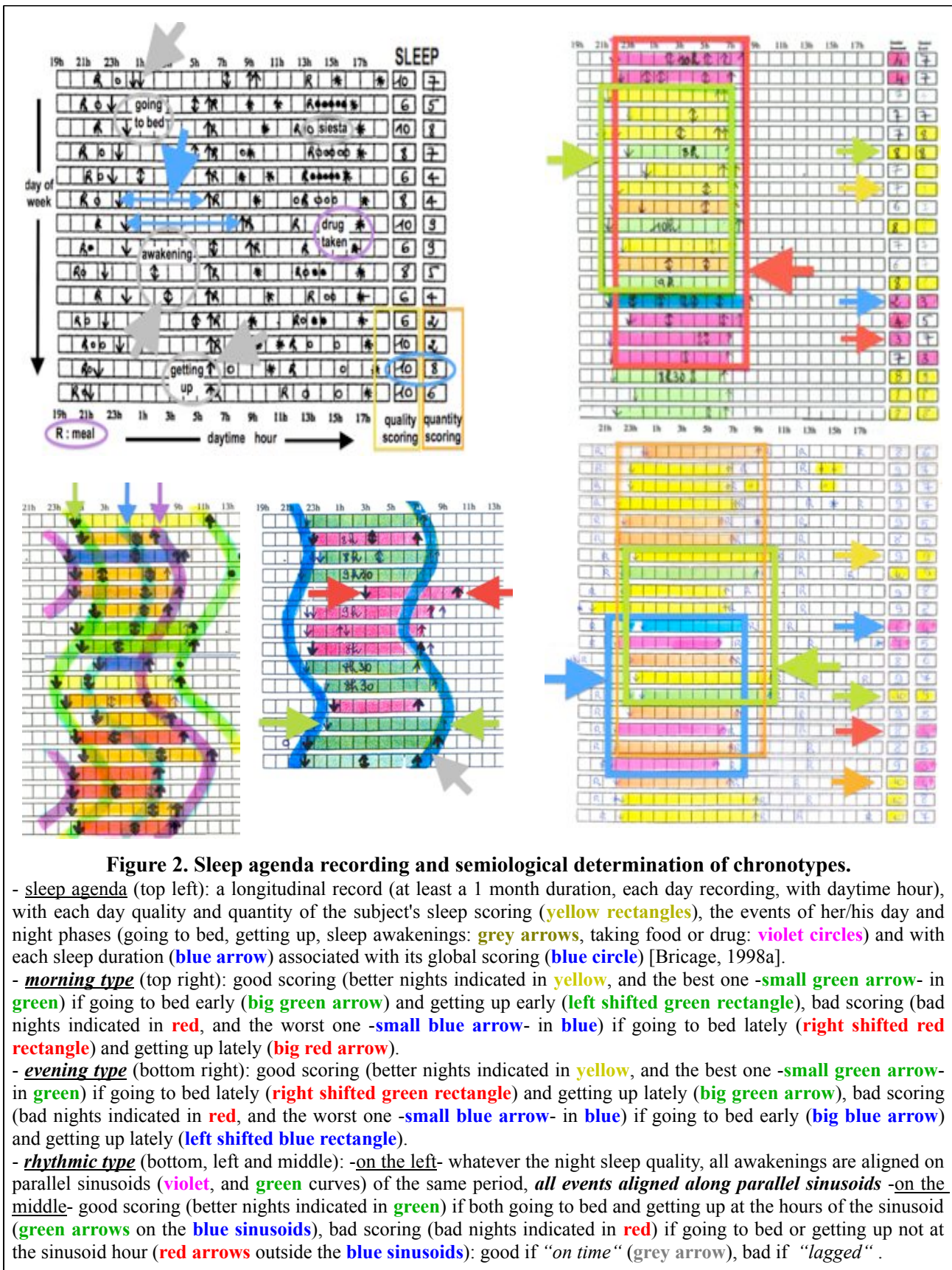
IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015

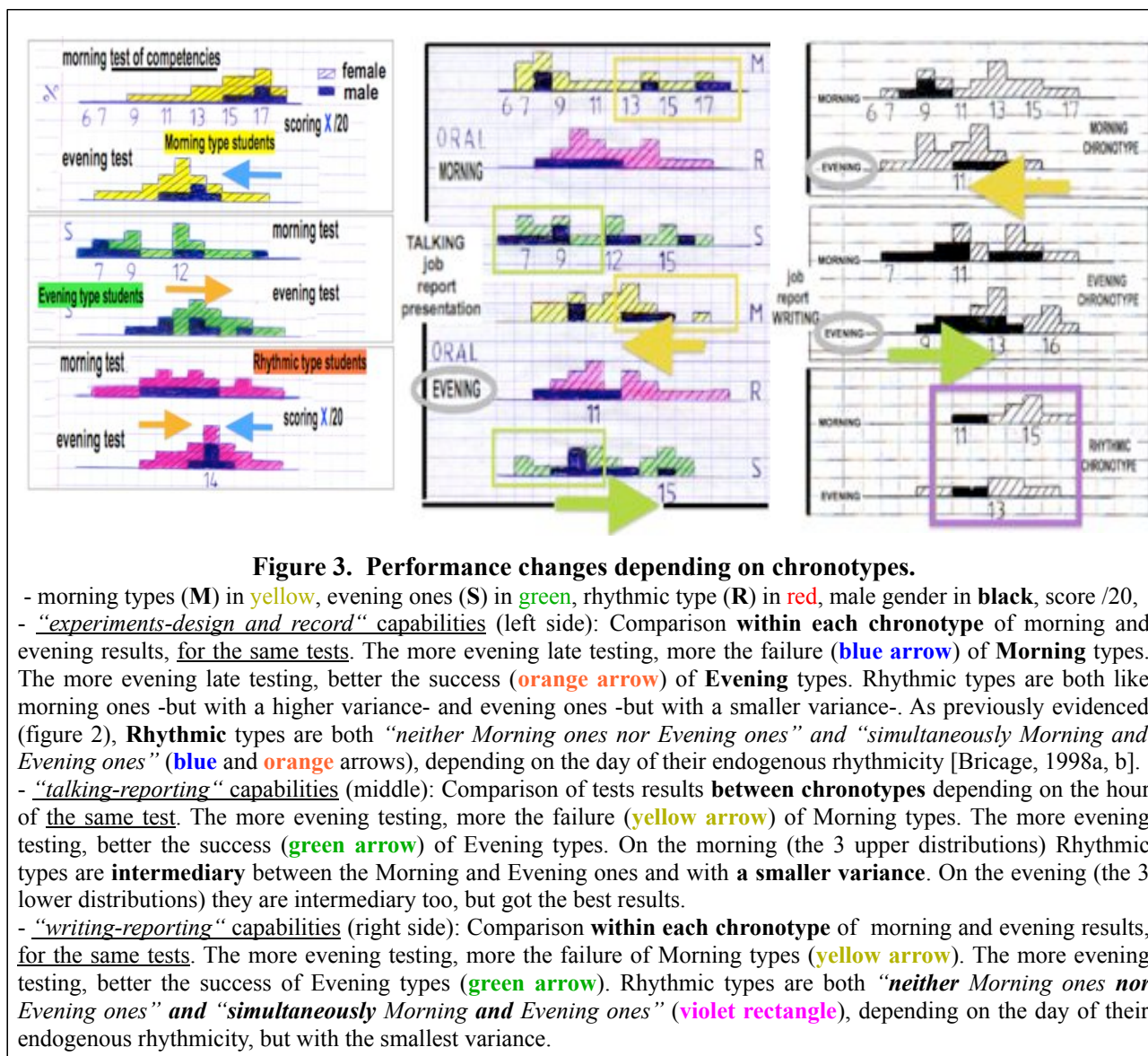


For diabetes treatments, now we know it is neither enough to know the place (WHERE), the mechanism (WHAT FOR) [Müller et al., 1970], and the functioning (HOW) [Ren et al., 2015], nor the determinism (WHY) [Nagorny & Lyssenko, 2012], but the time : WHEN [Bricage, 2013]!

I.2. Vigil **chrono-types** determination and respect: the best way to avoid scholars' failure.

Using sleeping schedules (figure 2), with day to day scoring of sleep quantity and quality, everybody can determine her/his unique vigil phenotype based on its going “to bed, getting up and night awakenings“ pattern. Three types stand out: a morning type (people who go to bed early and get up early), an evening type (people who go to bed lately and get up lately) and a rhythmic chronotype (people who are neither morning type nor evening one but both, depending on the day).



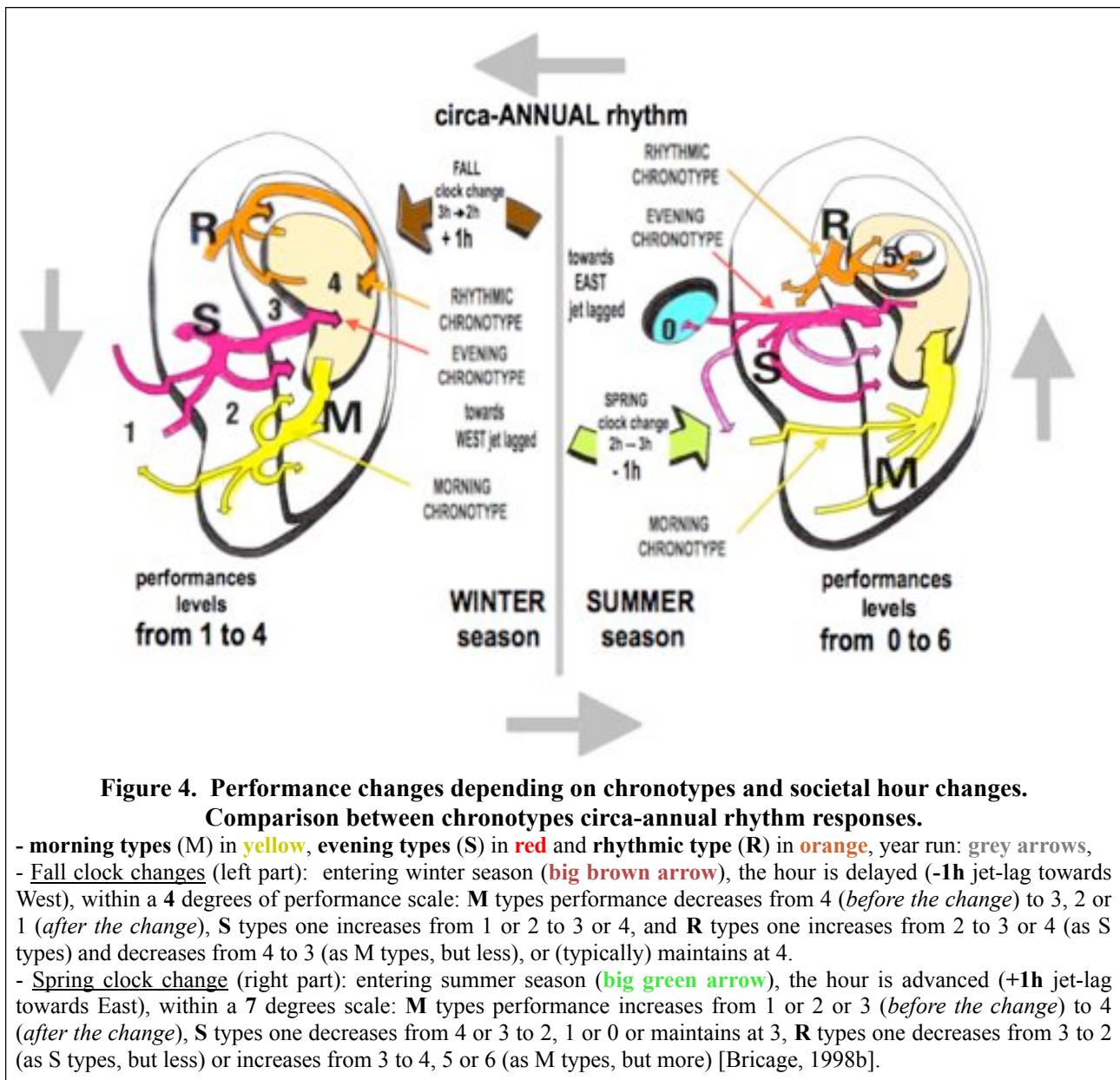


Nowadays, genes involved in time organisation have been identified [Ciarleglio et al. 2008] or sequenced [Lim et al., 2012]. The 3 chronotypes are inherited with 3 alleles of the same gene.

Knowing a person's vigil chronotype (figure 2) allows to plan for her/his drugs intake at the right time depending on its rhythmic schedule [Bricage, 1993, 1995]: **chronotherapy** [Bricage, 1999]. Taking into account the vigil chronotype allows **to plan for the best time for the best performance** of a student or a sportsman and for a particular risky or key activity. Results of students' competency tests (reports, talks, experimentations) are significantly increased (from 20% to 50%) only when done **AT THE RIGHT TIME** [Bricage, 1998a, b, 1999] (figure 3).

But failures may result from external time changes, as jet-lag, that shift the interactive coordination between the external (*ecoexotope*) time and the endogenous (*endophysiotope*) one: **clocks desynchronisation** (figure 3). Innate clocks or calendars are **entrained by ecoexotope synchronisers** (Zeitgebers). Desynchronisation can be avoided and resynchronisation procedures can be enhanced by taking into account the individual chronotype (figure 4).

Vigil **chrono-types** determination and respect is the best way to avoid scholars' failure.



I.3. Individual night sleep awakenings rhythms: Man is an Earth clock shaped species.

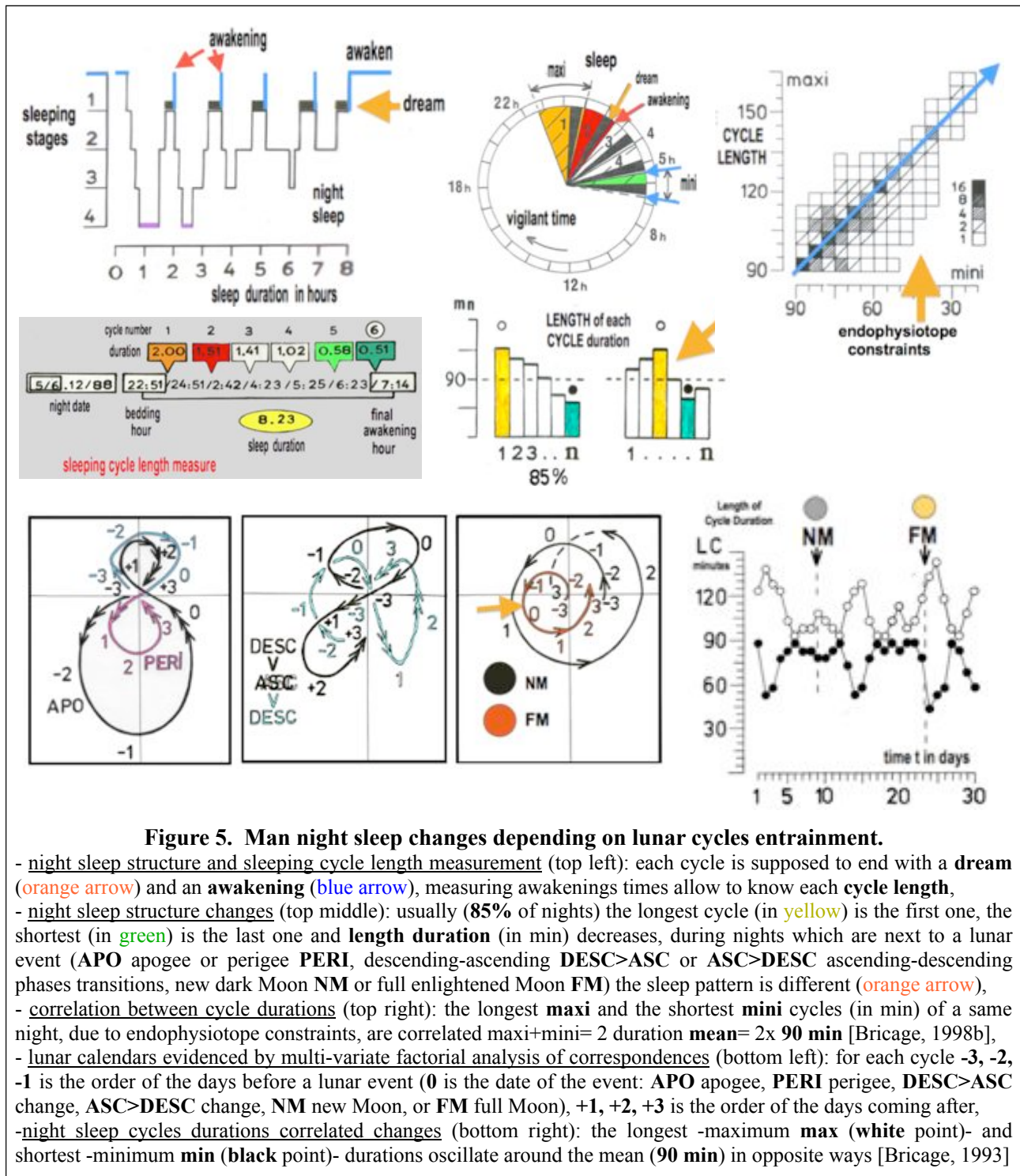
During a night, each one of us normal or pathological sleep is structured with cycles that end with dreaming [Saper, 2015]. The minimal and maximal durations of all cycles of a night obey a relationship that results from **interactions between endogenous clocks and exogenous ones**. The length changes of cycles duration can be modelled. All Earth living systems share a common ecoexotope of survival that is temporally structured by **solar, lunar and terrestrial rhythms**. These rhythms are synchronisers for our endophysiotope clocks. But some people are more sensitive to them than others and someones are resistant (like with bacteria facing antibiotics). Since thousands of years these physical rhythms have been used by civilisations to improve their ecoexotope independence.

A multifactorial analysis has shown that sensitive persons have their sleeping cycles lengths structured by lunar calendars (figure 5).

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015

The *lunar cycle of apogee-perigee* entrains individual sleeping rhythms along an analemma like curve calendar. The same entrainment with *the lunar ascendancy-descendancy cycle*, but a different analemma calendar. For a lot of animals it is known that even if circadian rhythms and sleep behaviour are genetically determined [Steinmeyer et al., 2012], the *light lunar cycle* is a synchroniser too (as for bees for example [Mohssine et al., 1990]).



Man is not an exception! [Bricage, 1993, 1995, 1998b]

The equation of time we have to consider to trace solar time-tables is *an analemma* [Schwarzenbach, 1983]. The fact that we are functionally time-structured with both solar and lunar analemmas means that even if from a physical point of view the Moon is running around the Earth and the Moon-Earth couple is running around the Sun, our Earth-hosted organism is physiologically structured with Earth as a fixed point, and each of us a fixed point too, with Moon and Sun apparently running around Earth. Indeed the analysis of sleep records points to **circa-annual solar rhythms**, to be considered as controls for the evidence of **circa-monthly lunar rhythms** (figure 6).

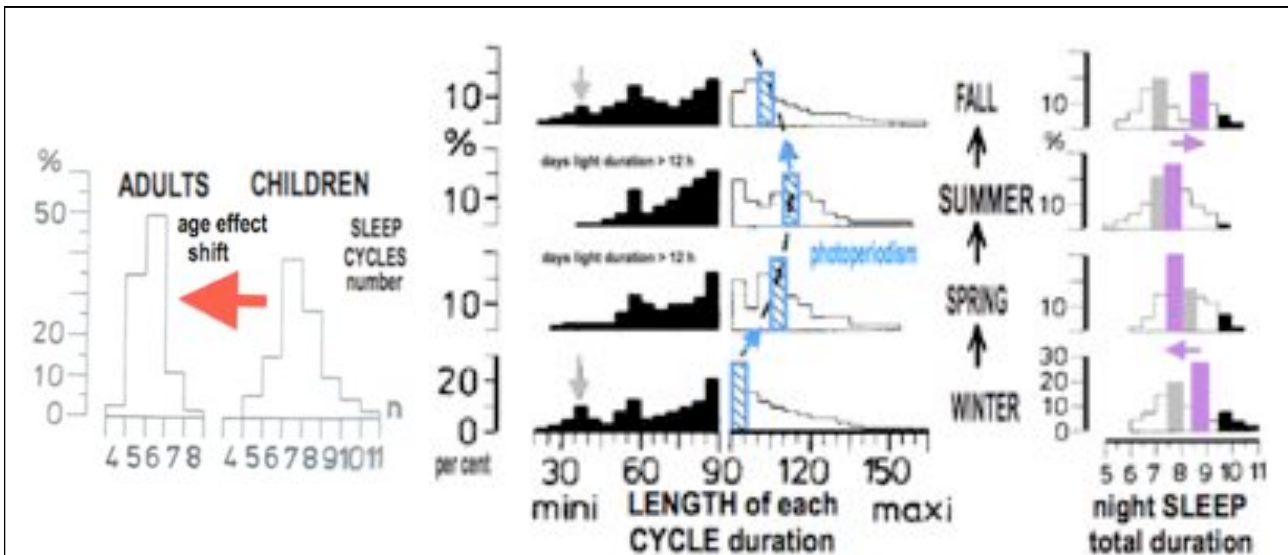


Figure 6. Man night sleep changes: controls.

- night sleep cycles number adults-children comparison (on the left): the cycles number, **n**, decreases with age,
- seasonal circa-annual solar rhythmicity (middle and right): **mini** and **maxi** (figure 5) cycles lengths distributions obey a photoperiodic phenomenon with an increase of the longest cycle (**blue mode**) with photoperiod increase (**blue arrow**) and with an increase of **sleep total duration** (**violet mode**) with photoperiod decreasing (from summer to fall and winter) and a decrease with photoperiod increasing (from winter to spring and summer) (**violet arrows**).

A striking result is that, man's organism is running around the Moon candle like butterflies are running around a lamp at night, obeying a spiral curve going towards the light when light is “on” and escaping when light is “off” (figure 5). Man is not an exception! But the lunar candle oscillate along a month duration calendar. So the endophysiotope of our organism, like all terrestrial living systems, is time-structured with endogenous physiological clocks that are clocking up the biological “hour” (figure 1), the Earth day, the lunar month or the solar year (figure 6), according to exogenous physical clocks signals.

II. WHAT methodology to evidence real temporal organisation of living systems and their physiological responses?

We can use a transversal methodology when people are all obeying the same rhythm. And it is better their rhythm obeys a gaussian law...

II.1. First of all only individual longitudinal measurements must be used. No massive statistics!

We cannot use transversal measurements for chronobiology, that is to say a lot of different people with few days of longitudinal recording. The transversal methodology is used because it is easy to have a lot of people and to use sophisticated statistical tools to get interpretation rapidly and publish as soon as possible (“*publish or perish*”). Populations are heterogenous [Zienolddiny et al., 2013] with poly-modal distributions of markers and effects [Bricage, 1997], uni-modal distributions are often not gaussian, and the sum of uni-modal distributions is rarely an uni-modal one.

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015

The first systemic law is that ***“a system is always both more and less than the sum of its parts”***. So we cannot from the components have access to their sum and reciprocally we cannot from the sum have access to the components [Bricage, 2001a, 2004, 2010, 2014a, b].

Even if we dispose of the Fourier transform tool, distributions of data can be skewed, and different from normal or log-normal ones. There is usually ***an unknown network of interactions*** between endogenous data and exogenous ones. Biological values, like body mass index for example, can shift, depending on gender or age. **Mean values have no biological meaning !**

When rhythms are in interactions, diversity is high, variance is high, and it is difficult to find the same qualitative or quantitative behaviour phenotypes, so we must use individual longitudinal measurements [Bricage, 1999]. The great difficulty is thus to have enough subjects and to be able to follow their functioning along a statistically significant duration [Bricage, 1993, 1995].

II.2. Controls values and latency times must be evidenced and considered first.

Studies of plant transpiration [Brogårdh & Johnsson, 1974] have shown **a time controlled network of clocks** [Bricage, 2005]: ***“time structures living-systems and living systems are structuring time too”***. Different wave frequencies are running depending on responses to endogenous or exogenous changes. Before to evidence a response to a stimulus we must wait for a new steady state. Not only “on“ stimuli but also “off“ ones have effects too [Bricage, 1985, 1986].

Living systems have an endogenous memory [Bricage, 1986; Fukuda et al., 2013].

The latency phase duration is always from at least 1 period of the rhythm. [Bricage, 2005]

So before using data we must have been running at least 1 period of the rhythm. It is easy for a circa-hour rhythm, more longer for a circa-dian one, boring for a circa-monthly one, and there are annual rhythms and more... And to have statistical significant results we must longitudinally record the more rhythm repetitions we can. But with patience it works [Bricage, 1993, 1995, 1999].

II.3. Stimuli responses must be tested according to a double blind placebo controlled survey.

Both evaluators and subjects must be in the dark to whom is getting real drug and whom is getting placebo. After the test period is finished and all evaluator results are recorded, the identity is decoded, the real drug vs. placebo-control-group are compared for a true difference or not. An expert statistician reviews the results and determines whether or not there is a difference between groups that beats pure coincidence. A probability is assigned to each result [Bricage, 1988, 1993]. There is *a X% confidence* that the observed effect is physiologically real and ***not a random coincidence*** [Mirmohammadali et al., 2015].

III. WHAT methodology to evidence lithotherapeutic effects?

Since thousands of years *Chinese Medicine* knows the reality of nerves ways into the body and their congruence in nervous plexuses. Both acupuncture and feet reflexology techniques use reflex arcs reality (*meridians*) to treat diseases [Mazic-de Sonis, 2015]. In *Indian Medicine* nervous plexuses have been named *chakras*. We decided to use a ***Chinese bi*** for to treat on the heart chakra.

Before use, each ***bi*** (or ***pi***) stone was purified, each time, by a 3 minutes water flowing procedure and then energetically charged during 7 hours by exposure to day light on quartz geodes.

III.1. WHAT mineral to use FOR WHAT to do? A a priori complex difficult process.

Urine release difficulties in male gender are often associated to prostate cells growth that press on urethra. (1)

III.1.a. Use of **jade, nephrite, serpentinite** and related simulants.

We decided to use jade or nephrite (common Canadian and Chinese “jade“), which names originated to their ancient renown properties to act on kidney or nephron, for to treat urination difficulties. But this supposed effect is a matter of controversial discussions.

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015

The first difficulty was to identify **commercial affordable sources** of jade. Under the name of jade we have jadeite (a pyroxene group of stones) -which colour may range from white to yellow and dark green (and even with other colours: red, purple, blue, black) depending on the trace elements in it-, nephrite (an amphibole group of stones) and serpentinite (a stone of the serpentine group). Of course **trace elements could change properties**. The yellow jade which is the most affordable is often serpentinite (also called lizardite). Differences between jadeite, nephrite, serpentinite and other jade simulants can be evidenced through the measurement of their hardness (Mohs scale), density, light absorbance property and X-ray diffraction pattern which reflects their chemical type and crystal composition. Jadeite lattice is a granular material, but nephrite and serpentinite are fibrous ones. Serpentine class fibres are curly.

(Chrysotile, **obtained from serpentinite rocks** which are **common throughout the world**, has been used more than any other fibre type and accounts for about 95% of the asbestos found in buildings in America.)

III.1.b. Use of **red jasper and related stones**.

Jasper is a dense and opaque variety of quartz. It is not really a mineral, but a textural variety, a mixture of different types of microcrystalline quartz with impurities. It is an opaque reddish-brown variety of chalcedony other than carnelian. The common red colour is due to iron.

Traditional Medicines suppose red jasper enhances energy and courage for physical working.

Jasper of homogeneous colour, like goldstone jasper, looks a bit like a coloured, opaque flint, and shares with it and carnelian many physical properties, but it forms in different environments. Multicoloured jasper is used as ornamental stone, and red jasper is cut as a gemstone. Jaspilite is made of distinctive bands of jasper. The classification and naming of jasper varieties is a challenge.

As with jade (generic name!) **the difficulty is to identify what sort** of jasper (generic name!) we get to work with? [Kostov, 2010]

III.1.c. Use of **hematite**.

No problem for hematite identification as a black brilliant metallic coloured mineral. Easy to obtain, because consisting of ferric oxide, an important ore of iron. The stone is supposed to have a strong physical grounding energy. But because hematite has been used for a long time, it has **a too wide variety of healing properties ascribed to it**.

(The silvery hematite stones and magnetic beads that many people wear, are made from reconstituted hematite.)

Can we evidence stones properties using a double blind placebo controlled survey?

III.2. Results: WHAT?, WHAT FOR, WHY?, HOW and WHEN?

All assays are tested for any difference with **the usual time structure used as control**.

Each control, placebo or treatment, **day from day longitudinal records** duration was 1+3 lunar cycles long, to have a 100 days long record out of the expected latency phase and to express results in %. They were obtained with 60 to 71 years old male subjects for to test jade effect and from 25 to 70 years old male or female subjects for to test red jasper effect.

III.2.a. Scaling of control and placebo records (figure 7).

All tests with jade, nephrite or serpentinite (or placebo stone) were made at night.

Use of hematite (or placebo) was done before jade test, from the dinner hour to going to bed.

All tests with red jasper (or placebo) were done during day, from getting up to the dinner.

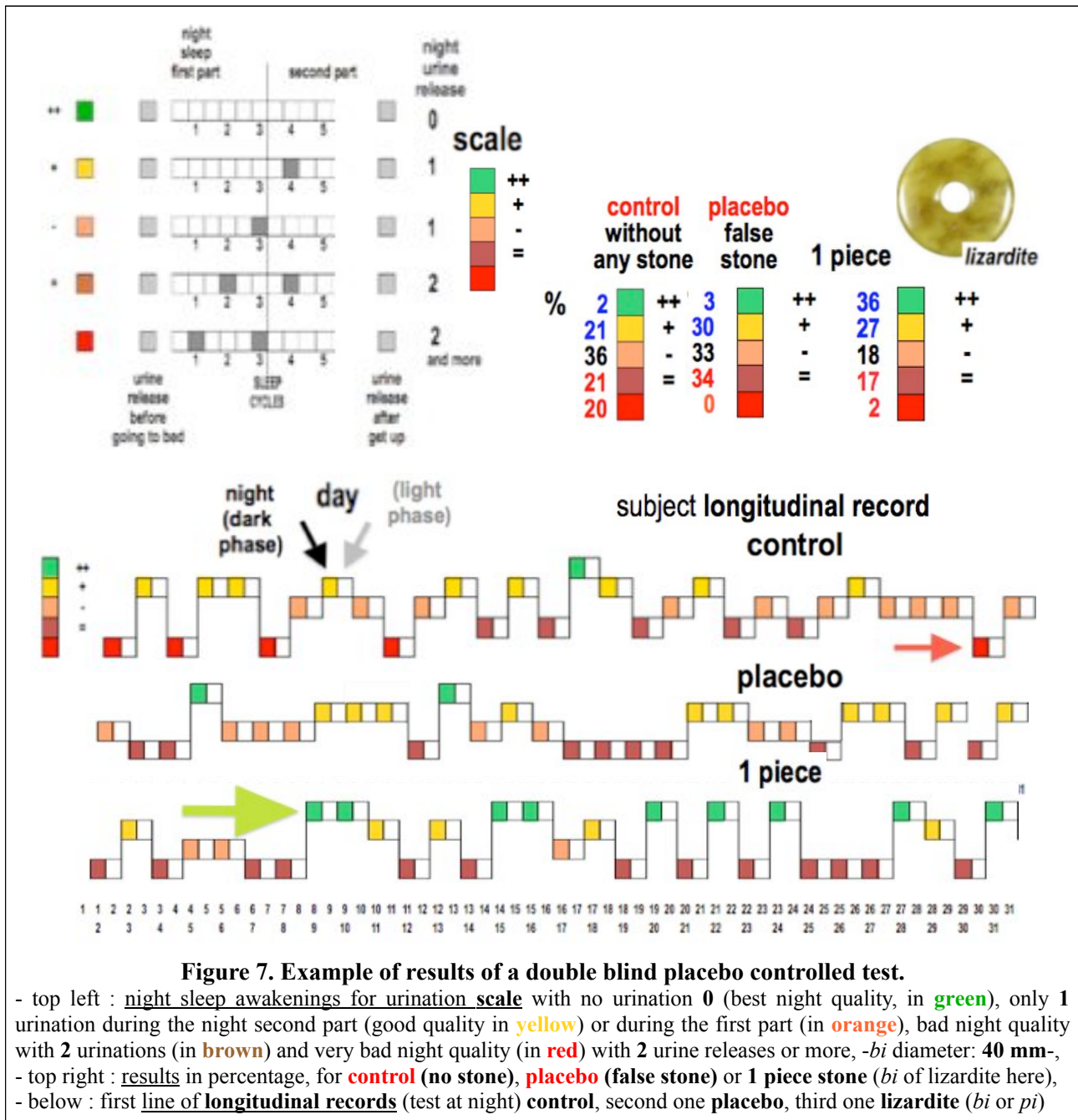
A special distinctive urination scale was used for night test and all results are expressed in %.

III.2.b. Controls: no-stone and placebo records (figure 7).

No-stone (control) or placebo longitudinal records are showing the same lunar side-effects. This effects are used for chrono-types control. They show the same type of interaction between lunar cycles we knew to exist [Bricage, 1993].

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015



III.2.c. 1 piece effect (figures 7 & 8).

Compared with control, one 40 mm diameter *bi* piece of jadeite or nephrite -night dark phase treatment (figure 7)- may enhance night quality (green arrow) with a decrease of at least 15 fold of awakenings and urinations. Nephrite suits better with a 20 fold enhancement of night quality (figure 8). The highest of all placebo effects is below a 4 fold enhancement (figures 7 & 13).

III.2.d. Crystal lattice and mineral composition influences (figure 8).

The crystal structure of the stone is evidenced to have an action because broken-glued serpentinite (or jadeite) lose at least 40% of their enhancing property. Depending on the jade variety (and trace elements) properties change. White jadeite has no effect (and eventually an adverse one). Translucent green jadeite allows the more enhancing 22 fold effect.

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015

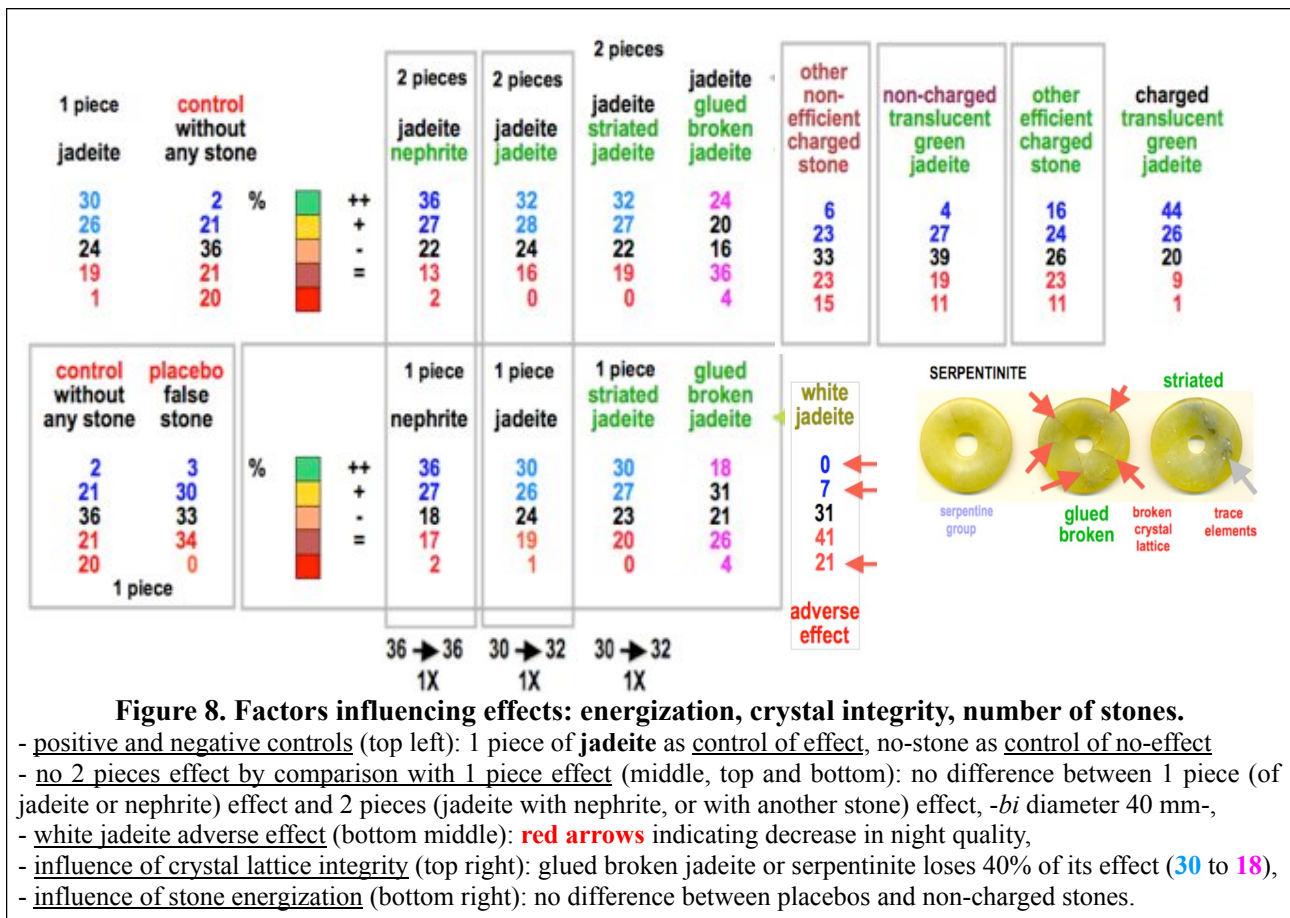


Figure 8. Factors influencing effects: energization, crystal integrity, number of stones.

- positive and negative controls (top left): 1 piece of jadeite as control of effect, no-stone as control of no-effect
- no 2 pieces effect by comparison with 1 piece effect (middle, top and bottom): no difference between 1 piece (of jadeite or nephrite) effect and 2 pieces (jadeite with nephrite, or with another stone) effect, *-bi* diameter 40 mm-,
- white jadeite adverse effect (bottom middle): **red arrows** indicating decrease in night quality,
- influence of crystal lattice integrity (top right): glued broken jadeite or serpentinite loses 40% of its effect (30 to 18),
- influence of stone energization (bottom right): no difference between placebos and non-charged stones.

III.2.e. Cleansing and energy charge influence (figure 8).

We may suppose on energy transfer because non-charged stones have no effect and energy charged non-efficient stones may have a 8 fold effect, 2 fold greater than all placebos effects.

III.2.f. No 2 pieces enhancement effect (figure 8).

With a 1 stone treatment (green jadeite, nephrite or serpentinite) the best night quality (green class) increases at least 10 fold, from 3% (placebo) to a range between 30% (striated jadeite) to 44% (translucent jadeite). No difference with a 2 stones treatment! Not the volume of stones but the area of contact of a stone with the skin is the limiting factor (figure 9).

III.2.g. Placebo effect and test timing.

Red jasper effect scaling is more difficult to built, it is more difficult to built a scale for quantitative effects than for qualitative ones. The day phase of our life is structured in cycles as the night phase is. Even if the placebo effect is greater during the conscious day phase than during the unconscious night phase, red jasper treatment enhances significantly the number and the intensity of efforts for the day cycles of physical working (figure 11).

III.3. WHAT mineral to use FOR WHAT to do? A a posteriori easy to explain process.

The use of 2 *bis* simultaneously has no more effect than the use of only 1 *bi* (figure 8).

III.3.a. **Minerals properties act the same drugs properties do.**

But the enhancing effect increases with the diameter of the bi, in a dose-dependent manner (figure 9). So we may consider a “from surface to surface” transfer, an energy concentration effect, depending on the contact area.

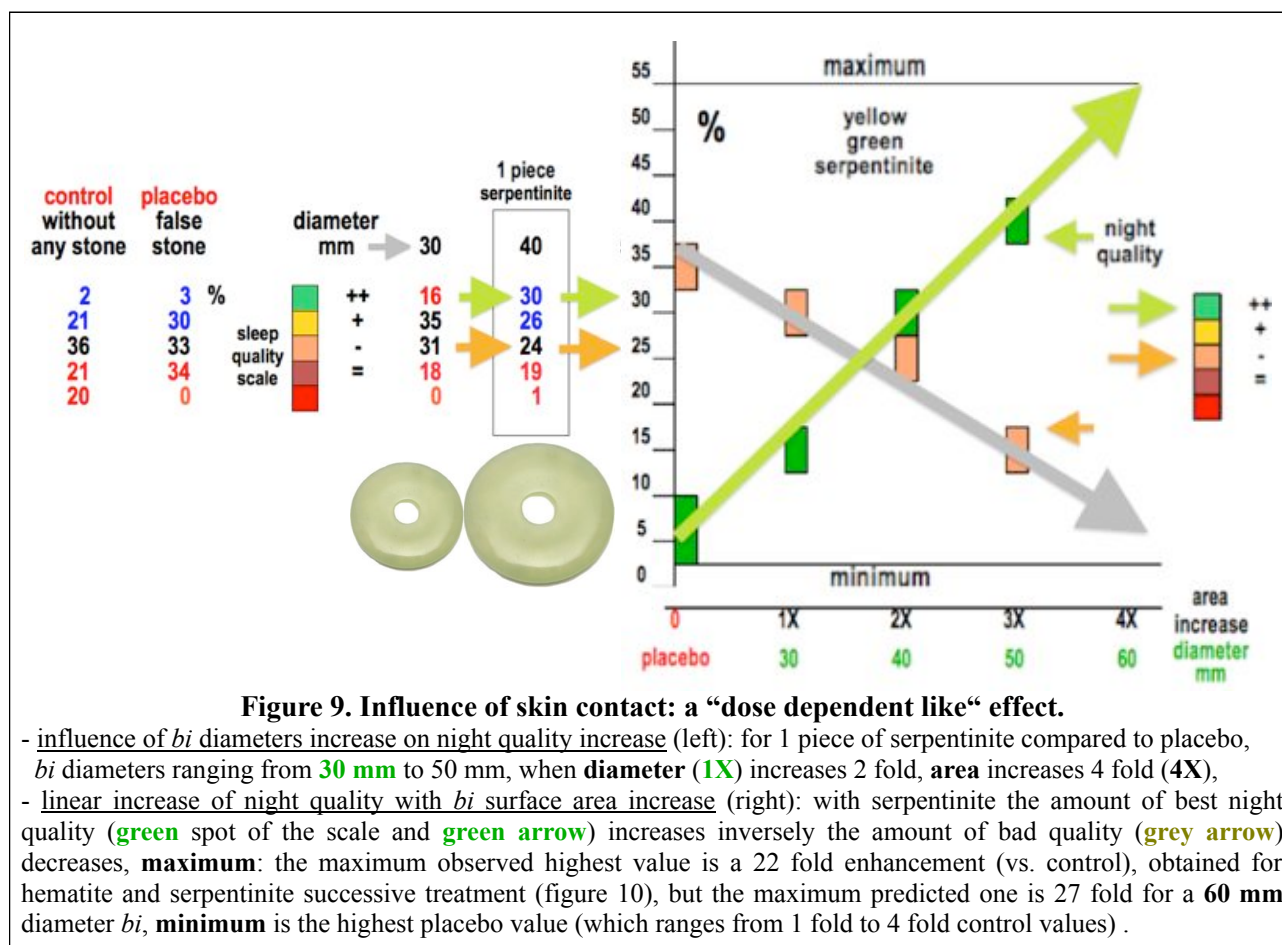


Figure 9. Influence of skin contact: a “dose dependent like” effect.

- influence of *bi* diameters increase on night quality increase (left): for 1 piece of serpentinite compared to placebo, *bi* diameters ranging from 30 mm to 50 mm, when diameter (1X) increases 2 fold, area increases 4 fold (4X),
- linear increase of night quality with *bi* surface area increase (right): with serpentinite the amount of best night quality (green spot of the scale and green arrow) increases inversely the amount of bad quality (grey arrow) decreases, **maximum**: the maximum observed highest value is a 22 fold enhancement (vs. control), obtained for hematite and serpentinite successive treatment (figure 10), but the maximum predicted one is 27 fold for a 60 mm diameter *bi*, **minimum** is the highest placebo value (which ranges from 1 fold to 4 fold control values) .

III.3.b. Evidence for synergistic effects.

Using hematite before serpentinite, jadeite or nephrite, enhances their effect (figure 10).

As with chemical agonists, minerals may act in synergy. Hematite sole gives a slight effect: from 1 fold to 4 fold placebo value. But hematite increases serpentinite effect from a 15 fold value to the maximum 22 fold one (figure 10), maximum which is probably limited by lunar influences.

III.3.c. As a whole, a system is defined by some unanticipated emergent properties.

That is exactly the case! We could logically suppose that within an interactive network of clocks, the latency phase of the whole will be greater than the shortest latency phase of each clocks (equal to their sum for example), but surprisingly the whole latency phase is reduced (figure 12). Considering here a network of 3 circa-monthly lunar rhythms (figure 5), each with a latency phase of a 1 cycle duration, their Whole is getting a 4 fold reduced one, thus **enhancing the system reactivity** to changes. Times are embedded and juxtaposed as spaces are [Bricage, 2013, 2015].

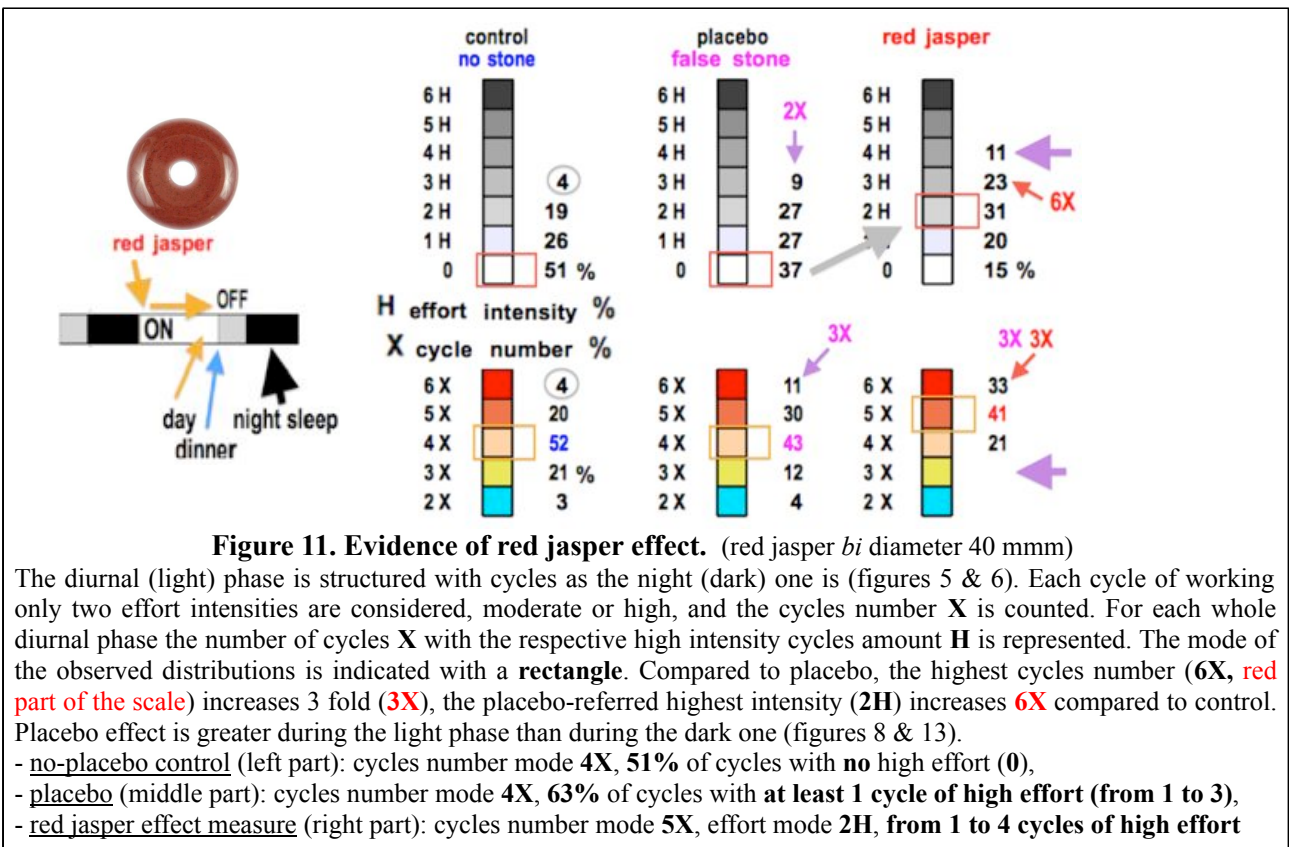
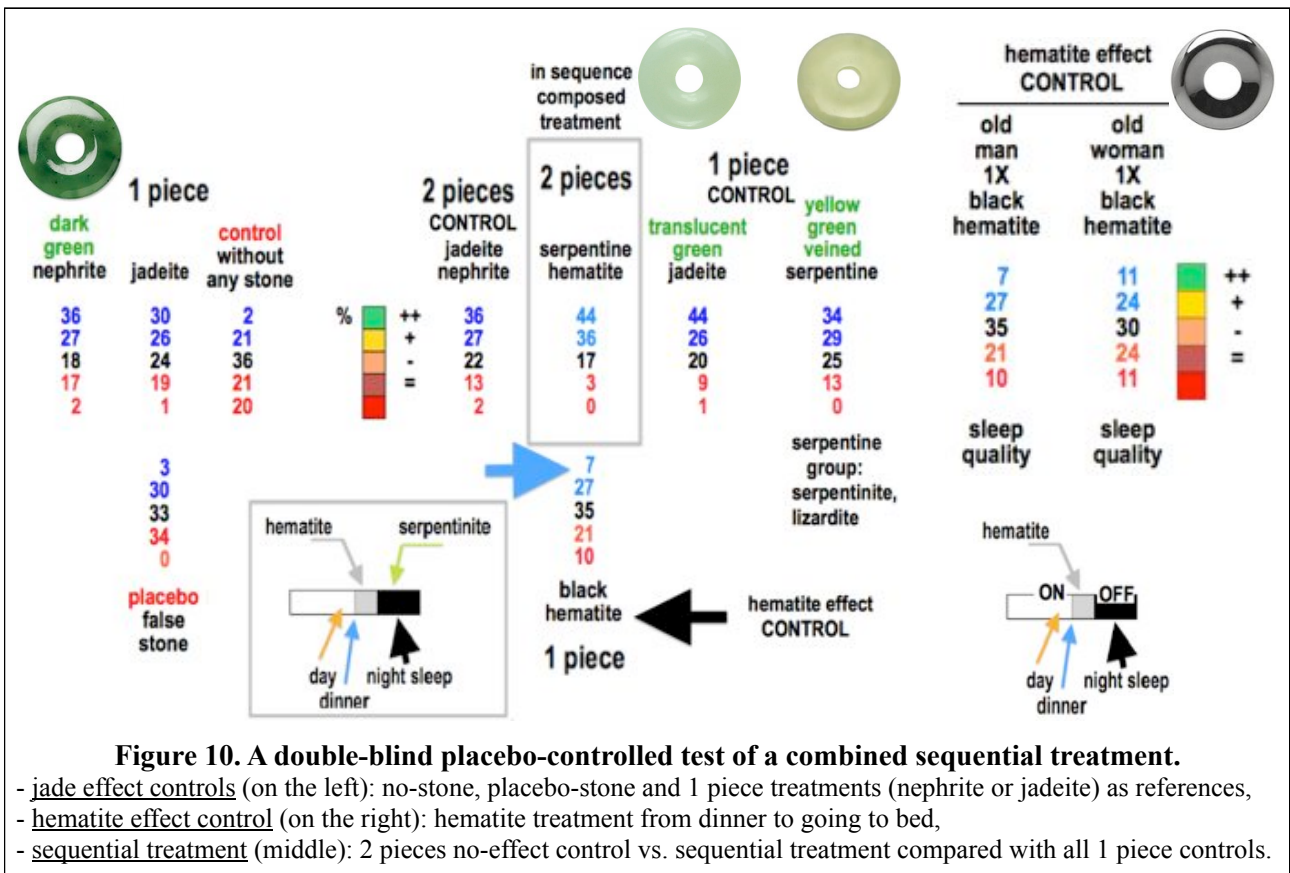
The Whole is both more and less than the sum of its parts [Bricage, 2004, 2010, 2014a, b].

Of course, because the interactions (figure 1) between each individual endophysiotope and its population common shared ecoexotope are unique [Bricage, 1997, 2002b], lithotherapy effects are obviously variable in a great range (figure 8), greater as placebo effects are variable (figure 13). As with drugs, different minerals (and lunar cycles) sensitive degrees exist [Bricage, 1993, 1995, 1997] depending on the individual inherited endophysiotope (figure 13).

Quick “emergency and recovery“, fast urgent curing, is not a role for chronotherapy and lithotherapy but “maintenance and prevention“, smooth steady state equilibration [Bricage, 1995, 1999] or punctual energizing (figure 11) is.

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015



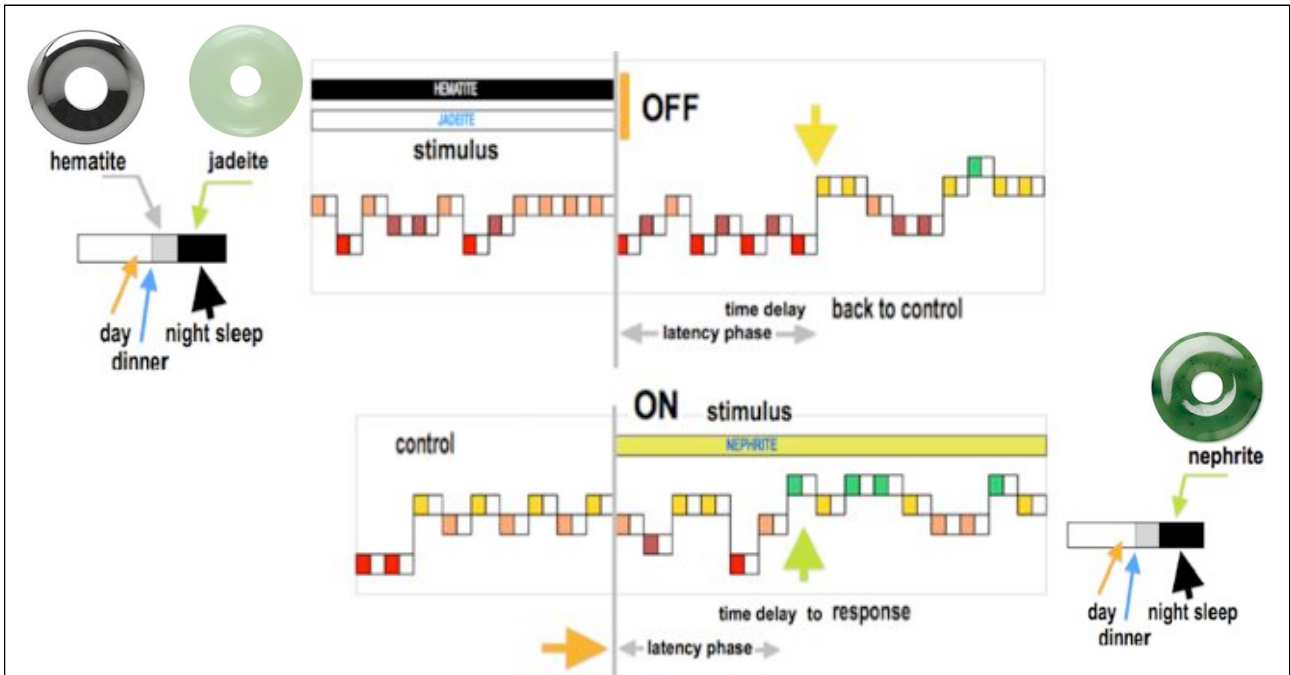


Figure 12. Shortening of the latency phase, a new Whole emergent property.

- end of a stimulation phase (top, left part): *stimulus* using false jadeite (aventurine) with no effect (or adverse one), right part: beginning of the following no-stimulus phase (OFF), back to control evidenced (yellow arrow),
- down, left part: end of a control phase, right part: beginning of a stimulation phase (ON) -stimulus with nephrite-,
- latency phases (greyed arrowed): time delay back to control (top) or time delay to response (down green arrow).

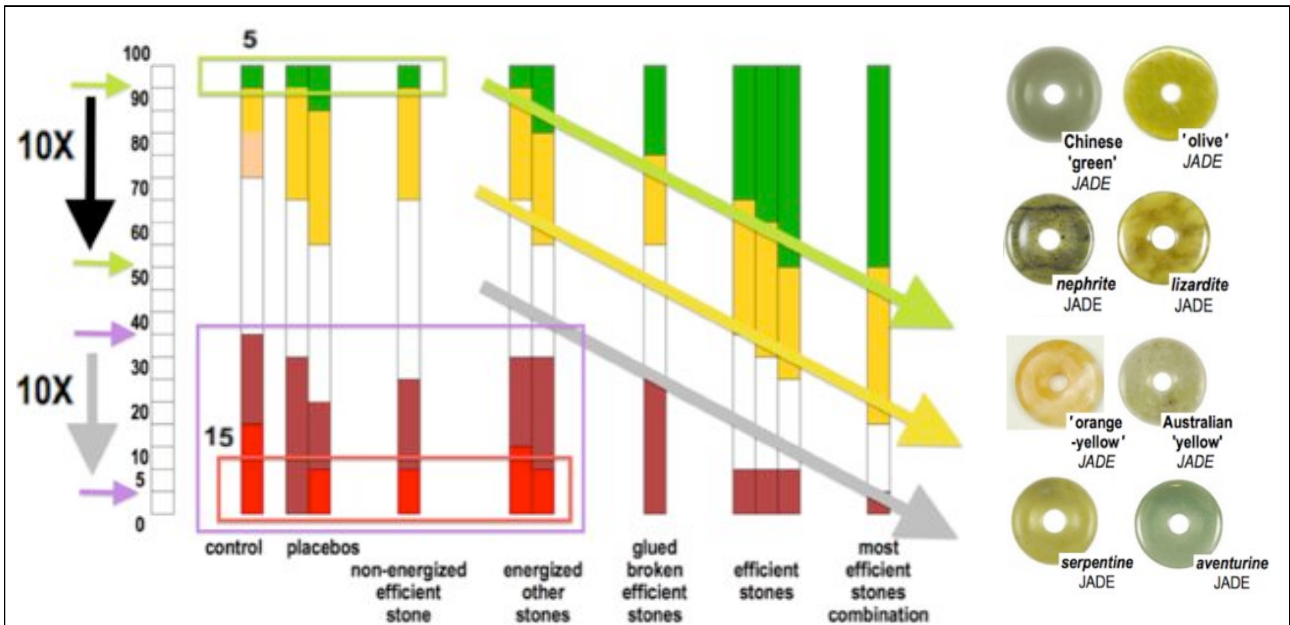


Figure 13. Governance of minerals effects to treat night urination difficulties.

0-100 percentage of each effect class, each in its green, yellow,..., red colour according to the global scale (figure 7), green for the best night quality, red for the worst one, the high amount of best night ranges from 5 (control) to 10 % (placebos), the highest amount of worse nights ranges from 15 (control) to 0% (placebos), only cleansed energized intact stones are efficient, efficiency depends on the stone (*pis tested* on the right: aventurine is placebo, most efficient stones are green translucent jade, nephrite, serpentine and lizardite), 10X net global increase for night quality.

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015

Conclusion

We must consider not only first order models for statistical use or second order ones [Bricage, 2013] but more... All living systems are *n cybernetic order system-of-systems*. Their endo-physiotopes and ecoexotopes are *juxtaposed and embedded as matryoshka dolls* [Bricage, 2002b]. The endophysiotope of a *i* level of organisation is an ecoexotope of survival for other *i-j* levels. The same *i* level ecoexotope is shared between endophysiotopes of different organisation levels [Bricage, 2001a, b, 2010].

Local problems always give rise to global systemic problems [Bricage, 2004].

Systemic solutions must arise both at local and global levels [Bricage, 2004].

Times are embedded and juxtaposed as spaces are [Bricage, 1986, 2002b, 2005]. A global healthcare, but for an individual welfare, requires to determine and respect individual endogenous clocks (figure 2) in adequacy with their respective exogenous calendars (figure 3) [Bricage, 2013].

Despite of their systemic adverse effects, herbicides, pesticides and antibiotics are always systematically used [Bhattacharya and Mukherjee, 2015]. Fortunately chronotherapy is yet used for knowing cancer origin and treatment [Zienolddiny et al., 2013] because it allows to reduce the amount of drugs and their side-effects [Lévi et al., 2008] and also because of the drugs increasing cost [Tarhini et al., 2015] ! Unfortunately *the usual thinking is not a holistic systemic one but an analytic, step by step, one and with escalate* in new drugs research for added treatments to treat adverse effects [Lolignier et al. 2015]. Both holistic and analytic methods, with bottom-up and top-down recursive ways, are necessary. Acupuncture is a common practise [Mazic-de Sonis, 2015] but lithotherapy is not. *Bis* of hematite and serpentinite are *affordable, easy to obtain*, and not subject to imitation. Lithotherapy, and massage with essential oils [Mirmohammadali et al., 2015], are *smooth ways for an individualised, easy to use, non-violent, and non-invasive therapy* to treat chronic pathologies, *helping people in their today way of life*. Of course we don't know what hematite property (figures 10 & 12) is acting on biorhythms frequency [Ulmer & Cornelissen, 2013] or what red jasper property (figure 11) is acting on effort intensity but it works.

A new way of research is opening.

Asbestos mining existed more than 4,000 years ago, but large-scale mining began only one century ago, for using asbestos for insulation because of its desirable physical properties (sound absorption, resistance to fire, heat, electrical and chemical damage) and its affordability... until the carcinogenic effects (1) of asbestos dust caused its effective demise as a mainstream construction and fireproofing material in most countries (100,000 people in the United States have died, or are terminally ill, from asbestos (or *amiantos*) exposure related to cheap building). Health issues related to asbestos exposure can be found in records dating back to Roman times. Surprisingly serpentinite *bis* act as a solution for urination problems... in a similar way of homeopathy? And maybe as inhibitor of prostate growth? Today cancer therapies are still *extremely violent and invasive* [Bhattacharya & Mukherjee, 2015; Lu et al., 2015]. *A new way of research is opening.*

Lithotherapy is used in cosmetology and “modern“ medicine but only with special minerals for special uses [Hecht et al., 2010]. *New holistic oriented approaches versus partial analytic ones* are on the way [Karabeg et al., 2011] but experimental testing must to be designed. New sample analysis methods should be used or developed [Hu et al., 2015]. *A new way of research is opening.*

The discovery of the emergent property (figure 12), -which is a great advantage for living systems survival-, that an interactive network of clocks (the whole) has a reduced latency phase compared to clocks separately (the parts), allows to spent less time for waiting before an effect.

Chronobiology is a way of thinking not only for knowing diseases causes [Kripke et al., 2013] and to elaborate treatments (figure 13), but also for apprentice assisted learning (figures 3 & 4): *the right interaction, at the right place and the right time, for the right person, with the right person.*

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015

New ways of research have just emerged.

A toxic “cocktail effect” has been discovered with “beneficial” drugs (Delfosse et al., 2015).

We are just now knowing that everyone has got an innate endophysiotope temporal structure [Bricage, 2014a, 2015] with a unique pattern of ageing [Belsky et al., 2015] and that our birth date may influence, all our life long, the kind of diseases we are sensitive or resistant [Boland et al., 2015]. We now know we need an “individualized handcrafted medicine” [Bricage, 1995] and no more a mass industrial unsustainable one.

Whatever the therapy we will use “***there are never advantages without disadvantages***” [Bricage, 2014b], but “***The creation of a sustainable society depends on emergence and application of innovative systems thinking***” [Bricage, 1997, 2001c].

References

- Belsky D.W., Caspi A., Houts R., Cohen H.J., Corcoran D.L., Danese A., Harrington H.L., Israel S., Levine M.E., Schaefer J.D., Sugden K., Williams B., Yashin A.I., Poulton R. & T.E. Moffitt (2015) *Quantification of biological aging in young adults*. P.N.A.S. E4104-E4110.
- Bhattacharya B. & S. Mukherjee (2015) *Cancer Therapy Using Antibiotics*. Journal of Cancer Therapy 6: pp. 849-858.
- Boland M.R., Shahn Z., Madigan D., Hripsak G. & N.P. Tatonetti (2015) *Birth Month Affects Lifetime Disease Risk: A Phenome-Wide Method*. J Am Med Inform Assoc 22(5): pp. 1042-1053.
- Bricage P. (1985) *Chronobiology of the multiple molecular steps and pathways of in situ anthocyanin biosynthesis of Lathyrus macrorhizus Wimm leaves*. Bull. Groupe Études Rythmes Biologiques, Paris, France, 17: pp. 16-17.
- Bricage P. (1986) *Isoperoxidases, markers of surrounding and physiological changes, in situ in leaves and in vitro in calli of Pedicularis tithymaloides L. variegatus: cell compartmentation and polyfunctionality, control of activity by phenols, specific roles*. Molecular & Physiological Aspects of Plant Peroxidases, Univ. Genève, Suisse, pp. 261-265.
- Bricage P. (1988) *Action des micro-ondes (fréquences, intensités, durées) sur les systèmes biologiques : quels effets et quand ? Systèmes BioÉnergétiques "Structure, Contrôle et Évolution"*. Congrès International Société de Chimie Biologique, Bombannes, France, 64 p.
- Bricage P. (1993) *Are the lunar, radiative and position, cycles responsible for the entrainment of the periodic awakenings of the man night sleep?* In Biological Rhythms: from Cell to Man. Société Francophone de Chronobiologie, Polytechnica, Paris, France, pp. 183-190.
- Bricage P. (1997) *Influence de la lune sur les rythmes biologiques*. Le Ciel 116: pp. 71-75.
- Bricage P. (1995) *Migraine et stress : la prévention passe par la chronobiologie*. Coll. Internat. Activités physiques & Situations extrêmes. École Inter-Armées des Sports, Fontainebleau, France, CC-Licence, 2 p.
- Bricage P. (1998a) *Connaître son agenda du sommeil pour améliorer ses performances*. Coll. Internat. Activités physiques & Environnements extrêmes. École Inter-Armées des Sports, Fontainebleau, France, CC-Licence, 2 p.
- Bricage P. (1998b) *Effet du passage à l'heure d'été ou à l'heure d'hiver sur le sommeil et la performance*. Coll. Internat. Activités physiques & Environnements extrêmes. École Inter-Armées des Sports, Fontainebleau, France, CC-Licence, 2 p.
- Bricage P. (1999) *Variabilité individuelle de la périodicité des crises migraineuses et des circonstances les favorisant (études longitudinales)*. Congrès Internat. Société Francophone de Chronobiologie. Univ. Bordeaux, France, Bull. GERB 31: pp. 3-4.
- Bricage P. (2001a) *La nature de la décision dans la nature ? Systèmes biologiques: Production, consommation, croissance et survie. Quelles règles ? Quels degrés d'exigence ? Quels bilans ? (Déterminismes écologique, physiologique et génétique de l'adaptation aux changements et de la survie, aux différents niveaux d'organisation des systèmes vivants.)*. La décision systémique : du biologique au social, Journées Internationales AFSCET, Andé, France, CC-Licence, 16 p., <http://www.afscet.asso.fr/Decision.pdf>
- Bricage P. (2001b) *Pour survivre et se survivre, la vie est d'abord un flux, ergodique, fractal et contingent, vers des macro-états organisés de micro-états, à la suite de brisures de symétrie*. Atelier AFSCET Systémique & Biologie, Institut International Administration Publique I.I.A.P., Paris, France, CC-Licence, 11 p., <http://www.afscet.asso.fr/ergodiqW.pdf>

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015

Bricage P. (2001c) *A new evolutionary paradigm: the Associations for the Mutual Sharing of Advantages and of Disadvantages*. In The creation of a sustainable society depends on Innovative Systems Thinking. 100th Anniversary of Karl Ludwig von Bertalanffy's International Conference on Systems Thinking "Unity through Diversity", Vienna, Austria, 1 p., <http://armsada.eu>

Bricage P. (2002a) *Héritage génétique, héritage épigénétique et héritage environnemental : de la bactérie à l'homme, le transformisme, une systématique du vivant. Évolution du vivant et du social : Analogies et différences*. Journées Internationales AFSCET, Andé, France, CC-License, 28 p., <http://www.afscet.asso.fr/heritage.pdf>

Bricage P. (2002b) *The Evolutionary "Shuttle" of the Living Systems*. EUS-UES European Systems Science Congress, Hersonissos, Crete, Greece, CC-License, *Res. Systemica* 2: pp. 1-6.

Bricage P. (2002c) *Only sustainable development can ensure both care of the environment and intra-generational equity*. In Global Ethics for a Humane World, 2.5. Environmental care, intra-generational equity, inter-generational justice, good governance leading to solidarity and equity., Globus Conference, Amsterdam, Netherlands, 1 p.

Bricage P. (2004) *La gouvernance du vivant. Les acteurs et les systèmes*. Colloque International AFSCET gouvernance systémique, Andé, France, CC-License, 26 p., <http://www.afscet.asso.fr/pbAnde04GV.pdf>

Bricage P. (2005) *Modelling of time modularity of living systems: time delay, time duration, time lag and rhythms*. EUS-UES European Systems Science Congress, Paris, France, CC-License, *Res. Systemica* 5: pp. 1-11, <http://www.afscet.asso.fr/resSystemica/Paris05/bricage2.pdf>

Bricage P. (2010) *Associations For the Reciprocal and Mutual Sharing of Advantages and Dis-Advantages (ARMSADA). The Way to be Resilient and Self-Sustainable the Living Systems Are Running Through*. ISSS 54th International Congress "Governance for a Resilient Planet", Waterloo, Ontario, Canada, CC-License, 12 p., <http://journals.issis.org/index.php/proceedings54th/article/view/1491>

Bricage P. (2013) *Time Management by Living Systems: Time Modularity, Rhythms and Conics Running Calendars. Methodology, Theory and Applications*. Systems Research and Behavioral Science 30: pp. 677-692. (World Conference on Complex Systems, Agadir, Morocco)

Bricage P. (2014a) *Local versus global and individual versus whole competition between and within living systems. ARMSADA emergence and breaking*. EUS-UES European Systems Science Congress, Valencia, Spain, CC-License, 15 p., <http://aes.ues-eus.eu/aes2014/AES4s02pBricage.pdf>

Bricage P. (2014b) *Survival Management by Living Systems. A General System Theory of the Space-Time Modularity and Evolution of Living Systems: Associations for the Reciprocal and Mutual Sharing of Advantages and DisAdvantages (ARMSADA)*. World Conference on Complex Systems, Agadir, Morocco, CC-License, 19 p., <http://hal-obsppm.ccsd.cnrs.fr/GIP-BE/hal-01065974>

Bricage P. (2015) *L'organisation spatiotemporelle des systèmes vivants: atemporalité, temporalité et intemporalité*. Temps et Systèmes, Journées annuelles AFSCET, Andé, France, 25 p., CC-License, <http://www.afscet.asso.fr/Ande15/pbTimesAnde2015.pdf>

Brogårdh T. & A. Johnsson (1974) *Effects on lithium on stomatal regulation*. Z. Naturforsch. 29c: pp. 298-300.

Ciarleglio C.M., Ryckman K.K., Servick S.V., Hida A., Robbins S., Wells N., Hicks J., Larson S.A., Wiedermann J.P., Carver K., Hamilton N., Kidd K.K., Kidd J.R., Smith J.R., Friedlaender J., McMahon D.G., Williams S.M., Summar M.L. & C.H. Johnson (2008) *Genetic differences in human circadian clock genes among worldwide populations*. J. Biol. Rhythms 23(4): pp. 330-340.

Delfosse V., Dendele B., Huet T., Grimaldi M., Boulahtouf A., Gerbal-Chaloin S., Beucher B., Roecklin D., Muller C., Rahmani R., Cavaillès V., Daujat-Chavanieu M., Vivat V., Pascussi J.M., Balaguer P., & W. Bourguet (2015) *Synergistic activation of human pregnane X receptor by binary cocktails of pharmaceutical and environmental compounds*. Nature Communications OnLine 6:8089, 10p.

Doolotkeldieva T., Bobusheva S. & M. Konurbaeva (2015) *Effects of Streptomyces Biofertilizer to Soil Fertility and Rhizosphere's Functional Biodiversity of Agricultural Plants*. Adv. in Microbiology 5: pp. 555-571.

Fukuda H., Murase H. & I.T. Tokuda (2013) *Controlling Circadian Rhythms by Dark-Pulse Perturbations in Arabidopsis thaliana*. Scientific Reports 3: 1533, 7 p.

Hecht K. et al., Editors (2010) *Application of Natural Zeolites in Medicine and Cosmetology*. International Academy of Science H&E, International Conference ZEOMEDCOS Proceedings, Baku, Azerbaijan, SWB. Baku-London, 164 p. (ISBN-978-9952-451-09-2)

Hu Y., Guo D., Fan Z., Dong C., Huang Q., Xie S., Liu G., Tan J., Li B. & Q. Xie (2015) *An Improved Algorithm for Imbalanced Data and Small Sample Size Classification*. J. Data Anal. Informat. Proc. 3: pp. 27-33.

Systemic Solutions for Systemic problems

IASCYS World Conference on Complexity in Chengdu (P.R. China), 22-26 October 2015

Karabeg D., Raković D., Arandjelović S. & M. Mićović, Editors (2011) *Quantum-Informational Medicine. Partial versus Holistic Oriented Approaches*. “Knowledge Federation“, Round Table Proceedings, Belgrade, Serbia, 247 p. (ISBN 978-86-913659-3-6)

Kostov R.I. (2010) *Review of the Mineralogical Systematics of Jasper and Related Rocks*. Archeometriai Műhely 3: pp. 209-213.

Kripke D.F., Nievergelt C.M., Tranah G.J., Murray S.S., Rex K.M., Grizas A.P., Hahn E.K., Lee H.J., Kelsoe J.R. & L.E. Kline (2013) *FMRI, circadian genes and depression: suggestive associations or false discovery?* Journal of Circadian Rhythms 11: pp. 3-13.

Lévi F., Altinok A., Clairambault J. & A. Goldbeter (2008) *Implications of circadian clocks for the rhythmic delivery of cancer therapeutics*. Phil. Trans. R. Soc. A, 366: pp. 3575–3598.

Lim A.S., Chang A.M., Shulman J.M., Raj T., Chibnik L.B., Cain S.W., Rothamel K., Benoist C., Myers A.J., Czeisler C.A., Buchman A.S., Bennett D.A., Duffy J.F., Saper C.B. & P.L. De Jager (2012) *A common polymorphism near PER1 and the timing of human behavioral rhythms*. Ann. Neurol. 72(3): pp. 324-334.

Lolignier S., Bonnet C., Gaudioso C., Noël J., Ruel J., Amsalem M., Ferrier J., Rodat-Despoix L., Bouvier V., Aissouni Y., Prival L., Chapuy E., Padilla F., Eschalier A., Delmas P. & J. Buserrolles (2015) *The Nav1.9 channel is a key determinant of cold pain sensation and cold allodynia*. Cell Rep. 11(7): pp. 1067-1078.

Lu D., Lee J.J., Lee A.J. & R.M. Lee (2015) *Development of a New Approach for the Therapy of Prostate Cancer with SPOP Mutations*. Journal of Cancer Therapy, 6: pp. 841-848.

Mazic-de Sonis A. (2015) *Acupuncture in the Multimodal Biopsychosocial Pain Management. Towards a New Model in Clinical Practice*. Health 7: pp. 884-895.

Mirmohammadali M., Hosseini-Baharanchi F.S., Dehkordi Z.R., Bekhradi R. & M. Delaram (2015) *The Effect of Massage with Oils on the Growth of Term Infants: A Randomized Controlled Trial*. Open Journal of Pediatrics, 5: pp. 223-231.

Mohssine E.H., Bounias M. & J.M. Cornuet (1990) *Lunar phase influence on the glycemia of worker honeybees*. Chronobiologia 17(3): pp. 201-207.

Müller W.A., Faloona G.R., Aguilar-Parada E. & R.H. Unger (1970) *Abnormal Alpha-Cell Function in Diabetes. - Response to Carbohydrate and Protein Ingestion*. New England J. Medicine 283: pp. 109-115.

Nagorny C. & V. Lyssenko (2012) *Tired of Diabetes Genetics? Circadian Rhythms and Diabetes: The MTNR1B Story?* Genetics 12(6): pp. 667-672.

Ren R., Zhou X., He Y., Ke M., Wu J., Liu X., Yan C. Wu Y., Gong X. Lei X., Yan F., Radhakrishnan A. & N. Yan (2015) *Crystal structure of a mycobacterial Insig homolog provides insight into how these sensors monitor sterol levels*. Science Vol. 349, no. 6244, pp. 187-191.

Saper C.B. (2015) *Biology of sleep and circadian rhythms in the neurology resident*. Annals of Neurology 78(1): pp. 1-2.

Schwarzenbach D. (1983) *La forme de l'analemme*. Orion 196: pp. 86-87.

Steinmeyer C., Kempnaers B. & J.C. Mueller (2012) *Testing for associations between candidate genes for circadian rhythms and individual variation in sleep behaviour in blue tits*. Genetica 140(4): pp. 219-228.

Tarhini A., Corman S.L., Rao S., Margolin K., Ji X., Mehta S. & M.F. Botteman (2015) *Healthcare Resource Utilization and Associated Costs in Patients with Advanced Melanoma Receiving First-Line Ipilimumab*. Journal of Cancer Therapy 6: pp. 833-840.

Ulmer W. & G. Cornelissen (2013) *Coupled Electromagnetic Circuits and Their Connection to Quantum Mechanical Resonance Interactions and Biorhythms*. Open Journal of Biophysics 3: pp. 253-274.

Zienolddiny S., Haugen A., Lie J.A., Kjuus H., Anmarkrud K.H. & K. Kjærheim (2013) *Analysis of polymorphisms in the circadian-related genes and breast cancer risk in Norwegian nurses working night shifts*. Breast Cancer Research 15(4):R53, 16 p.

(1) This work is dedicated to Prof. Dr. Ranulph Glanville our late IASCYS Vice-President, and founding member of the International Academy for Systems and Cybernetic Sciences, who died, after a lot of pain, from a ravaging prostate cancer.