

# **5<sup>th</sup> MERIDIANTECH-COVID19 Workshop**

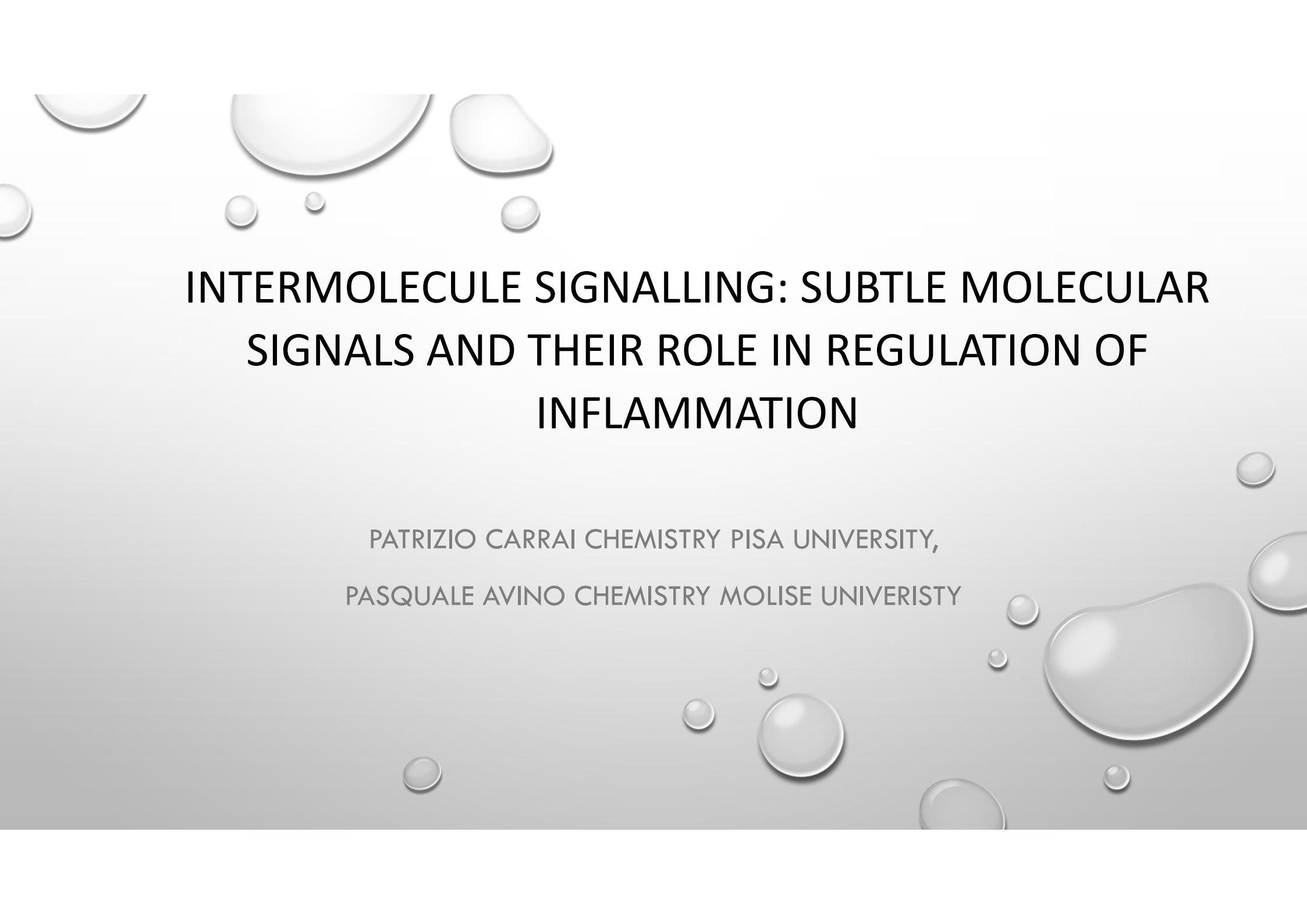
## **Bioelectrical Diagnostics & Coherent Therapy**

“COVID-19 clinical study protocols, Details of the PROGNOS<sup>®</sup> System & demonstration of PROGNOS<sup>®</sup> ViralExpress<sup>®</sup>”

**Saturday 09 May 17:00 Central European Summer Time**

**Hosted by**

**MEDPREVENT systems GmbH & Co. KG DE**

The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. Some are partially cut off by the edges of the frame.

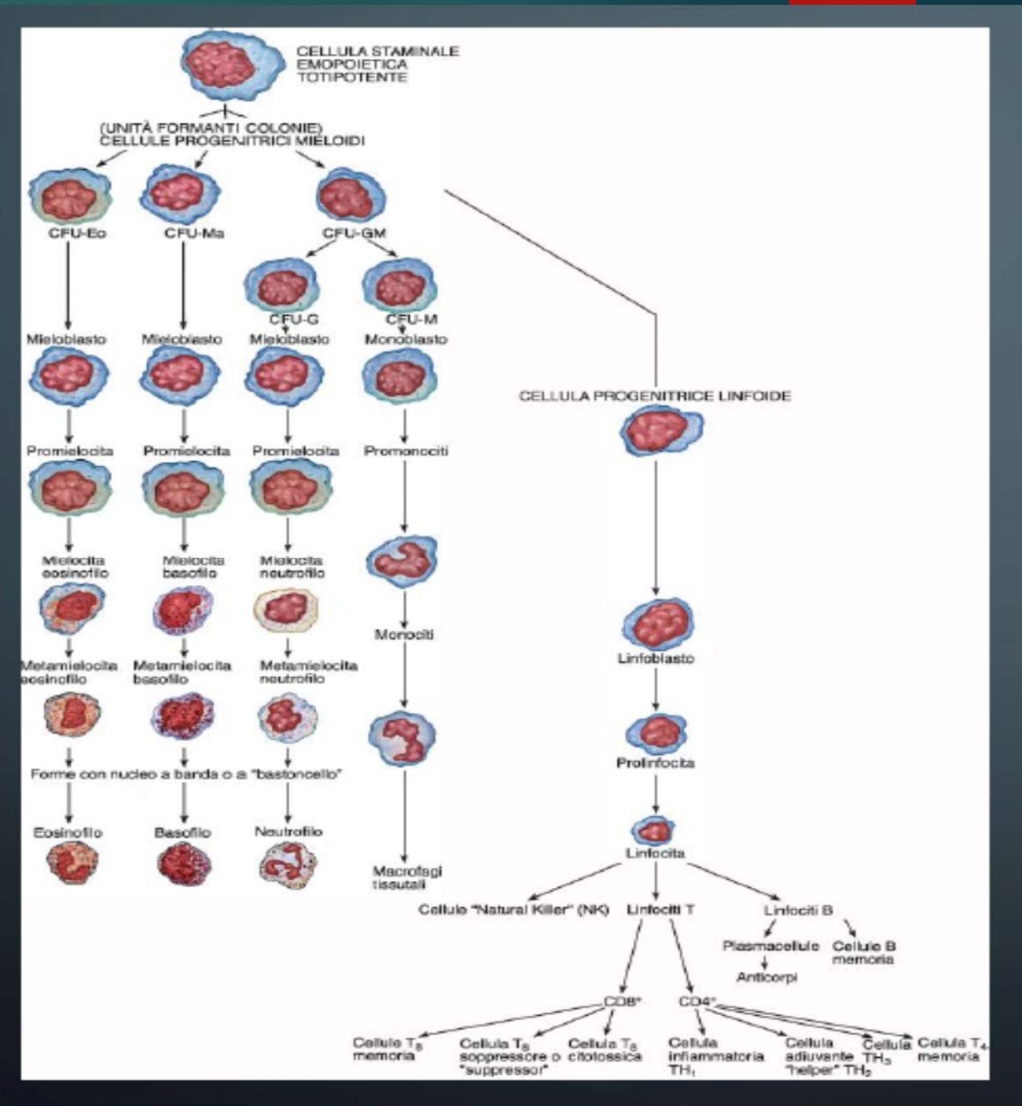
# INTERMOLECULE SIGNALLING: SUBTLE MOLECULAR SIGNALS AND THEIR ROLE IN REGULATION OF INFLAMMATION

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# brief introduction immune system

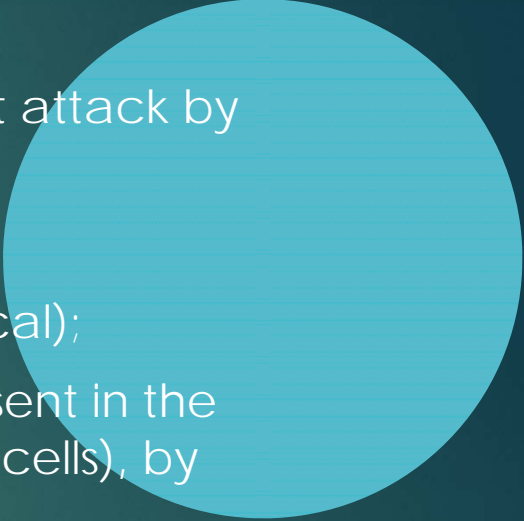


Evolution immune system orderly and regulated sequence of events



# Cytokines Cascade

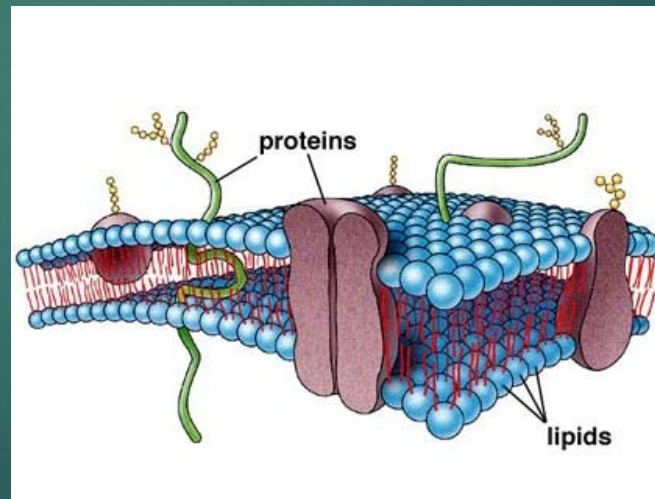


- ▶ Innate immunity represents the first line of defense against attack by pathogens and toxins. It's composed by:
  - ▶ External barriers (physical, biochemical and microbiological);
  - ▶ Internal barriers, represented by cellular components present in the circulation and in tissues (phagocytes, Natural Killer or NK cells), by molecular components consisting of plasma proteins (the complement system), soluble factors with antimicrobial activity and a complex system of molecules - called cytokines
- 



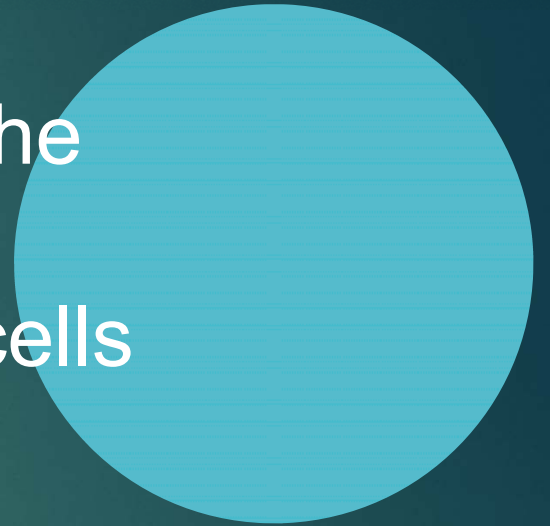
# Membrane potential

- ▶ the presence of a membrane potential in living cells allows a charged double layer at the membrane interface to exist and may be polarized by an electric field



# communication

- ▶ this electric field spreads through the clusters of the extracellular matrix creating communication between cells



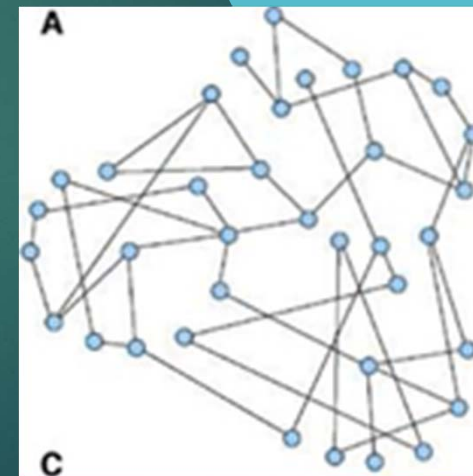
then what happens ?

- ▶ only chemical mediators act or there is something else?
- ▶ the cells do not act by single action, but as a connected and complex system



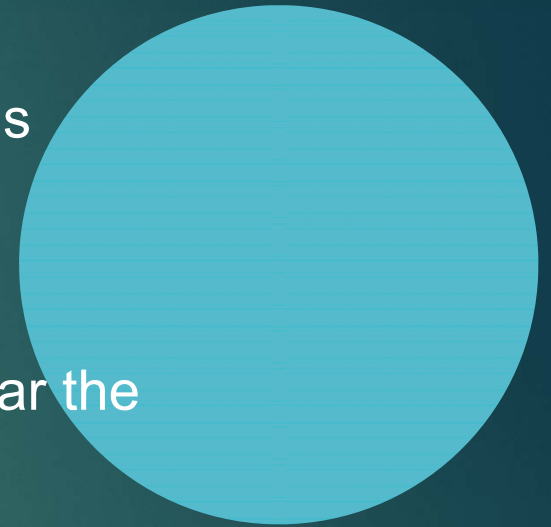
# Why?

- ▶ What is a complex system?
- ▶ Complex derives from the Latin (cum + plexere) and means
- ▶ "Woven together"
- ▶ **in other words all is connected**



# complex

- ▶ Organized behavior emerges from local interactions
- ▶ between the elements of the system.
- ▶ a complex system can only be understood
- ▶ considering it "as a whole" and observing in particular the
- ▶ interactions between its elements.





# What kind of interaction?

- ▶ Our body is an open system
- ▶ and open systems exchange matter and energy with their environment so they may reach a steady state or equilibrium
- ▶ **BUT LIFE IS AN EVOLUTION SYSTEM** not steady state and operates far from equilibrium
- ▶ Let me mention Glansdorff and Prigogine:
- ▶ once the system operates sufficiently far from equilibrium and when its kinetics acquire a nonlinear nature, the steady state may become unstable



## For example

- ▶ Feedback regulatory processes and cooperativity are two major sources of nonlinearity that favor the occurrence of instabilities in biological systems.
- ▶ Some of the main types of cellular regulation associated with rhythmic behavior are listed in Table III.
- ▶ Regulation of ion channels gives rise to the periodic variation of the membrane potential in nerve and cardiac cells for a recent review of neural rhythms
- ▶ Regulation of enzyme activity is associated with metabolic oscillations, such as those that occur in glycolysis in muscle cells.



# exemple

TABLE I  
Main Biological Rhythms

Biological Rhythm	Period
Neural rhythms <sup>a</sup>	0.001 s to 10 s
Cardiac rhythm <sup>a</sup>	1 s
Calcium oscillations <sup>a</sup>	sec to min
Biochemical oscillations <sup>a</sup>	30 s to 20 min
Mitotic oscillator <sup>a</sup>	10 min to 24 h
Hormonal rhythms <sup>a</sup>	10 min to 3–5 h (24 h)
Circadian rhythms <sup>a</sup>	24 h
Ovarian cycle	28 days (human)
Annual rhythms	1 year
Rhythms in ecology and epidemiology	years

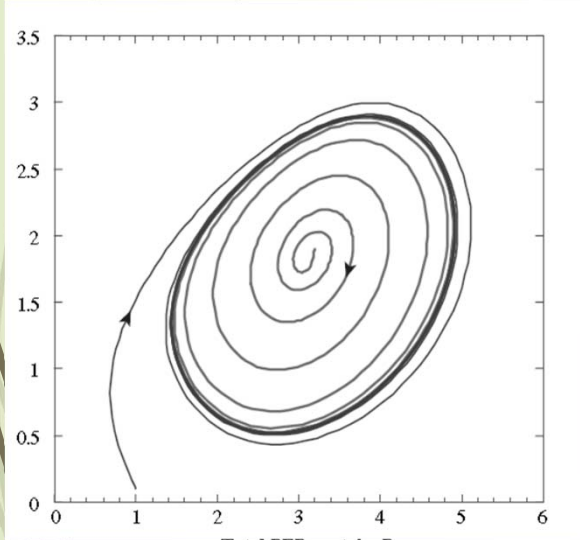
<sup>a</sup>These rhythms can already occur at the cellular level.

Source: Goldbeter [31].



effect

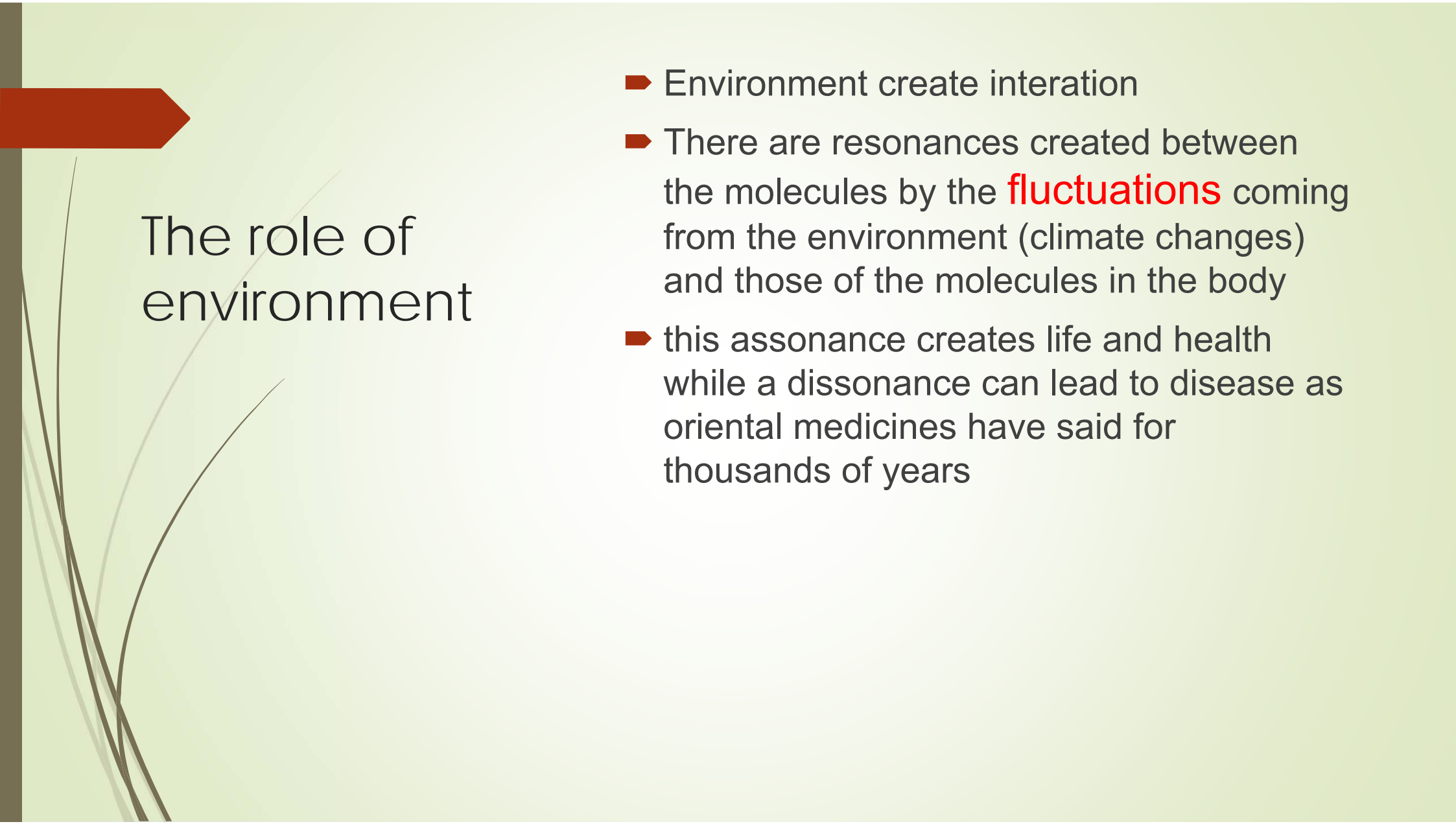
- ▶ The effect is that when the steady state becomes unstable, the system moves away from it and often undergoes sustained oscillations around the unstable steady state.
- ▶ oscillations resulting from the regulation of enzyme activity, receptor function, transport, and gene expression.
- ▶ In the phase space defined by the system's variables, sustained oscillations generally correspond to the evolution toward a limit cycle like this
- ▶ If we have periodic oscillations we have the structure of life and biological rhythms





# carriers

- ▶ So intercellular communication is the wave arising by oscillation in cellular membrane which is carried by interstitial water through the clusters that surround the cells with hydrogen bonds, and form the intercellular matrix
- ▶ In the body occur non-balance reactions with a multiplicity of catalytic reactions that have large-scale correlations similar to oscillating reactions.
- ▶ this could be the way to communicate and to form stable structures
- ▶ the signals of the oscillation waves form those frequencies that cause enzymes, hormones and other to arrive at the right points by resonance



## The role of environment

- ▶ Environment create interation
- ▶ There are resonances created between the molecules by the **fluctuations** coming from the environment (climate changes) and those of the molecules in the body
- ▶ this assonance creates life and health while a dissonance can lead to disease as oriental medicines have said for thousands of years

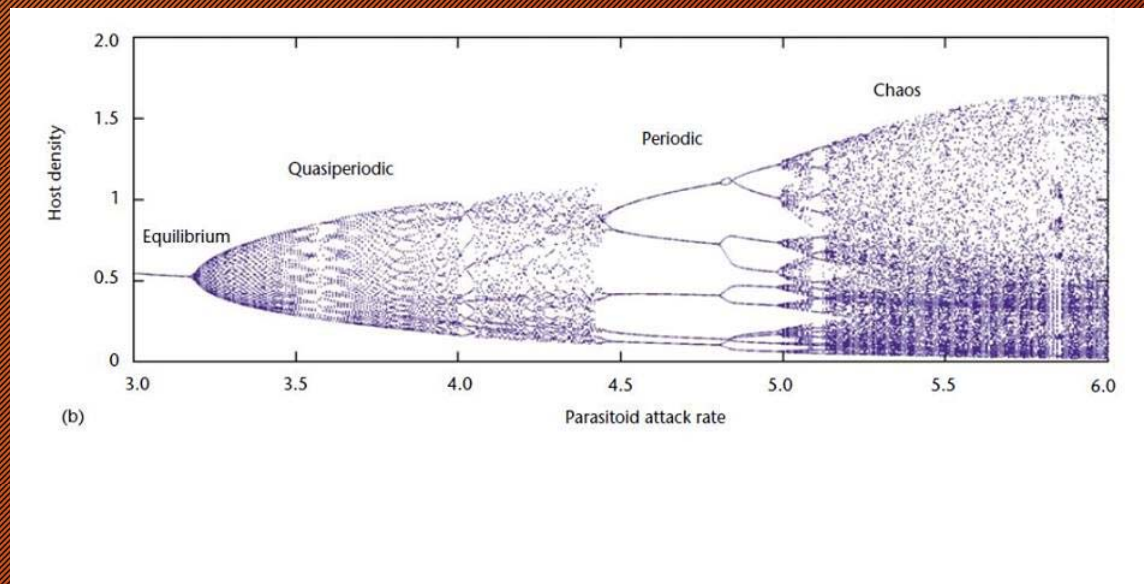


# the disease

- If the oscillating reactions of the cells, that act with non-equilibrium reactions, are disturbed by anomalous frequencies such as electromagnetic waves or virus and bacteria lead to a destabilization of the system and arises chaos that can evolve towards a stable attractor (healing) or towards a permanent instability (disease and death)

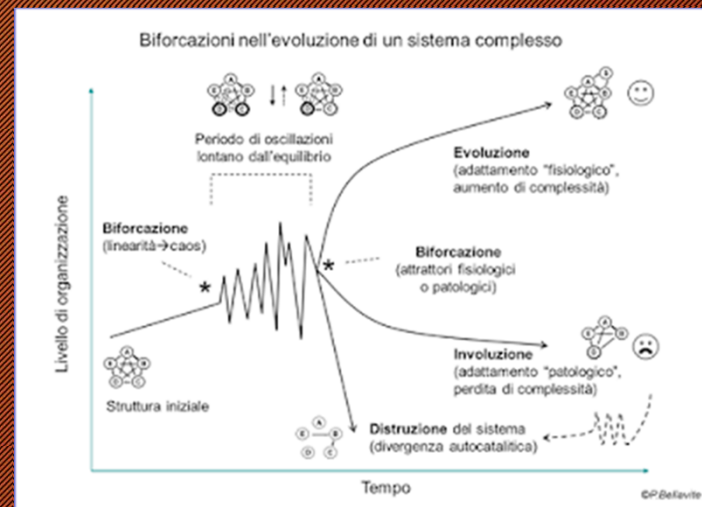


# caos





# bifurcations and evolutions of a complex system





All is connected, everything teaches

### FIVE ELEMENT THEORY







all you need is love



Thank you