MICRODEFORMATION OF MOLECULAR AND CELL STRUCTURES IS THE MECHANISM OF THE THERAPEUTIC AND ULTRALOW DOSES OF PHYSICAL AND CHEMICAL EFFECTS ON THE BIOLO-GICAL TISSUES (PHASE TRANSITIONS, CHEMICAL REACTIONS, TUMOR GROWTH, AGING, ADAPTATION TO STRESS AND MEDI-CAL TREATMENT ARE INCLUDED). A REVIEW

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The true, unique goal of science is the discovery of not the mechanism, but the unity... The question is not whether the nature is unique but in what way it is unique.
Anri Poincare, "Science and Hypothesis" (1902)

Recent investigations irrefutably show that real crystals, glasses, melts, liquids, gases al-ways contain nuclei and nanoclusters of various phases. Due to the interface mismatch only thin films-layers of the surrounding matrix reproduce the morphology of these substrates (the phase nuclei) during the epitaxy.The interface stresses due to structural and mechanical mismatch between phases play the key role in phase transitions. The first important goal of this work (the request for the invention) is the universality of the deformation and relaxation mechanisms (DRM) during phase transitions in solids, glasses, liquids, melts, polymers, gases and biological tissues [1]. This is confirmed by the correlation of transition parameters for various materials: shear moduli, viscosity, surface tension, activation energies of deformation and heat of phase transitions, hysteretic character of their variation, the influence of phase prehistory, the similar reactions to physical and chemical effects, the similarity of kinetic curves for crystal-lization from the melt or glass state (solidificated gases are included), redox reactions, diffusion, electrical conductivity, electrochemical deposition, adsorption-desorption, martensitic and structural transformations, etc. [1]. Mechanical, electromagnetic and optical treatments of phase systems induce some of them to grow at the expense of the others up to chemical compounds forming (mechanical alloying, acoustochemistry, etc.). Second important finding based on the comprehensive analysis of literature data shows that the phase modulated effects of low and ultralow doses (ULD) of physical and chemical influences (chemical agents, light, irradiation of particles and electromag-netic fields, etc.) on solids, liquids, melts, chemical reactions and cells of biological tissues (BT) are of the same nature and so they can be explained by their microde-formations (MD) at the interfaces of phase transitions (IPT).
These effects are due to MD hardening/softening on the scales of observation from atomic (molecular) to mesoscopic (structural or viscosity transitions in liquids, cell structures, etc.), macroscopic (diverse organisms and populations are included) and up to cosmic structures at the IPT of different phases (the nuclei of ULD, DNA, cells of BT, etc.) [1]. It is worth stressing that these MD (hardening-softening, HS, for micro- and macrodeformation, fracture in single and nanocrystals, liquid solutions and biological tissues and organisms, for various types of adaptation to stress [2] and physical and chemical impacts (chemical agents, the irradiation of particles, and electromagnetic fields, drugs, etc.), apoptosis and proliferation of cells [3], aging, etc.)) generally have the same V-shaped form of the dependences on the values of matrix prehistory properties, pulse time and amplitude, pulse stress rate (the rate of material deformation -irradiation power, the rate of therapeutic and ULD injections of drugs, etc.), dwell time between the pulses (repetition frequency), temperature, impurity concentration, irradiation dose of particles, electromagnetic fields, currents, etc.

These HS effects are the parts of well-known time-spatial components of their physical/chemical developments in the body of the material (BT) volume. So, fine grinding of nuclei during the preparation of ULD (periodic milling-shaking in homeopathy, interrupted irradiations-deformations by the ULD of particles, currents, electromagnetic fields, drugs, etc.) changes the hardening/softening of IPT, matrix and foreign phases thus strengthening/weakening the effect of various doses and ULD on the matrix (BT, tumors, solids, liquids, polymers, etc.).

The common non-monotonous concentration dependencies of the size distributions of foreign nuclei and the other effects also explain the same non-monotonous concentration effect of low doses and ULD on physical, chemical, physiological and biochemical reactions in solids, liquids, polymers, solutions, BT, etc.

Of specific note is the fact that DRM unravel all the features of tumor growth and meta-static processes, adaptation mechanisms to different types of stress and medical treatment for biological systems, etc.

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DEFORMATION OF MOLECULAR AND CELL STRUCTURES IS A GENERAL MECHANISM OF STRESS, ADAPTATION, CANCER GROWTH, AGING AND EVOLUTION IN THE SPECIES

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Recent investigations irrefutably showed that real so-called solid solutions of crystals, glasses, melts, liquids, gases, plasma always contain nuclei and nanoclusters of various phases. So, the interfacial stresses due to structural and mechanical mismatch between phases, the universal mechanisms of plastic deformation and relaxation (PDR) on all scale lengths play the decisive role in the origin and development of phase transitions in solid, liquid, gaseous, plasma and biological forms of matter including chemical reactions, chronic endogenous diseases (cancer, aging, etc.), adaptation, origin of species, social behavior and even history [1]. This is confirmed by the correlation of transition parameters for various materials: shear moduli, viscosity, surface tension, activation energies of deformation and heat of phase transitions, hysteretic character of their variation, the influence of phase prehistory, the similar reactions to physical and chemical effects, the similarity of kinetic curves for crystallization from the melt or glass state, redox reactions, diffusion, electrical conductivity, electrochemical deposition, adsorption-desorption, martensitic and structural transformations, etc. [1]. Mechanical treatments of phase systems induce them to grow at the expense of the others up to chemical compounds forming (homeopathy, mechanical alloying, sonochemistry, etc.). Of specific note is the fact that PDR unravel all the features of tumor growth and metastatic processes, adaptation mechanisms to different types of stress and medical treatment for biological systems, etc. Second important finding based on literature data shows the same PDR nature of the effects of ultralow doses (ULD) of physical (temperature drops, the