If a set of chemical reactions that arise in a living body to maintain its functioning correspond to its genetic norm, then the composition of the components of the mixtures, slightly changing, still remains, due to Homeostasis, within certain ranges.

If the metabolism is disturbed due to serious changes in the functioning of the epithelial tissue, which is a layer of cells lining the surface (epidermis) and body cavities (including the mucous membranes of the internal organs, the food tract, the respiratory system, the genitourinary tract, and the majority of the glands of the body) Then the composition of the components of the mixtures varies. **This deviation from the Norm is called Pathology.**

But the "hormonal norm", like the "hormonal pathology" should somehow be measured! To competently manage them and predict their change.

How to "digitize a patient"? And in general mammals?

It is known that the "hormonal norm" varies with both genetically determined sexual orientation, and with age. In other words, at different periods of a person's life, his hormonal-age classification characteristics, differ from year to year. And doctors must take this into account. How to take into account the state registration authorities, replacing the photograph in the passport. **So there is the idea of the Hormonal Sexual-Age Passport.**

All this leads to the need to find ways to measure **the composition of hormones** and correlate this composition with the measured physical (according to Rutherford) parameters.

Physicists are able to determine the physical parameters of mixtures. This can be the permittivity **(ε_r),** magnetic permeability **(μ_r)**, specific electrical conductivity **(σ_r)**) These physical parameters accurately determine the physical (according to Rutherford) parameters of the object (mixture). **As a fingerprinting.**

As in the case of the "Hormonal Norm", and in the case of "Hormonal Pathology." **So there is the idea of creating a Hormonal Sexual-Age Data Bank and a Hormonal Pathology Data Bank.**

The problems associated with the detection and elimination of pathological manifestations are especially important for physicians and their patients who are located at sites far from well-equipped medical institutions. This is, first of all, **the personnel of ships, personnel and servicemen of remote bases and oil platforms and astronauts**.

However, early diagnosis of pathology is necessary for each of us. In the near future, the implanted chip will transmit to the doctor's computer all the necessary parameters for the hormonal components of blood, lymph and urine. Of great importance is the early diagnosis of the selection and admission of personnel for the work of **people in strategically important positions in strategically important facilities.**

The present work is devoted to familiarizing physicians with the fundamentals of the combinatorial theory of mixtures, unitary symmetry of mixtures and the use of these concepts for predicting drug activity in pharmacology and early diagnosis of pathologies.

Keywords: mixtures, Unitary Symmetry of Mixtures, blood, lymph, urine, hormones, diagnostics of pathologies.

1. The combination of parts of the components gives rise to a mixture. Homology of mixtures. Unitary Symmetry of Mixtures

Consider three substances - A, B, C. Let's divide the total volume of each substance into 5 parts. We get 20% shares. Let's start combined shares of all three components. We obtain combinations with repetitions, among which, for example, the combination of CCCCC corresponds to 100% of the content of component C and the total absence of other substances A and B. The combination of, for example, AACBB corresponds to a mixture of 40% (A) + 20% (C) + 40% (B).

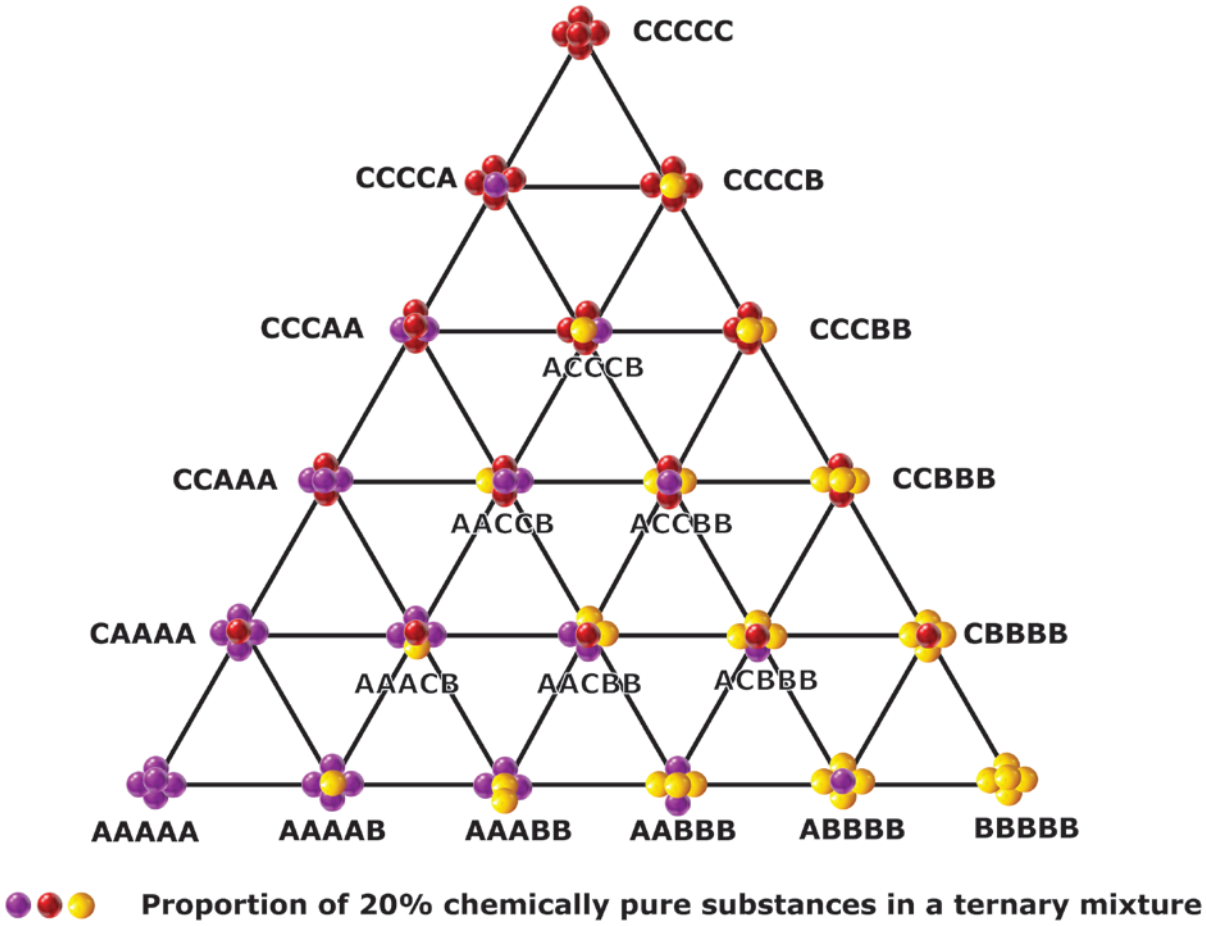

Fig.1. The total number of combinations with repetitions of three pure substances A, B, C by 5. Each of the lines indicates a homologous series, which in the case under consideration is the homology of substitution (in contrast to the widespread adherence homology). All substances are in the same phase state, at the same temperature and at constant pressure. Substances do not chemically react with each other. Mixtures with 20% concentration gradation are shown.

Obviously, the number of substances and the concentration gradation can be chosen in accordance with the problem being solved.

Earlier I theoretically proved [3, 4, 5, 6] and shown by examples [7, 8, 9] that for two-link homologies in the space of physical parameters, the phenomenon of their identical arrangement is observed, i.e., for example, for mixtures:

$$\mathbf{M(AAACB) - M(AACCB) = M(AACBB) - M(ACCBB),}$$

where M is the value of the physical parameter

In this simplest version, the fourth value is easily found from three points. For a multicomponent mixture, it is not difficult to construct a system of linear equations. This system of equations has a unique property-just a few experimental data compute the physical parameter values for the entire set of combinatorial objects. **The system of equations has a PREDICTABLE function, which is a natural consequence of Symmetry, as the main Paradigm of Nature.**

The very phenomenon described is called Unitarian symmetry, and the corresponding equations are called the law of conservation of differences of two-link homologies.

2. Mixtures of Sex Hormones. "Sex Hormonal -age" Passport

It is well known [2] that the combination of hormones in blood, lymph and urine is different for each person. It varies with age and depends on the combination (composition), primarily of the sex hormones. Therefore, the first step in identifying Pathology should be to identify a potential patient (read, mammal and human) identifying the composition of sex hormones for a certain age (see Figure 2).

As is known, the composition of sex hormones for a certain age determines the physiology and behavior of a person.

In this case, secondary sexual characteristics are determined by combinations with repetitions of all sex hormones. Any combination is manifested in the features of the development of the musculoskeletal system, the proportions of the body, subcutaneous fat and hair, the degree of development of the mammary glands, the timbre of the voice, the features of movement and behavior, and in many other ways.

In fact, this or that combination of sex hormones is the **hormonal passport of the individual**, including his propensity for some form of **homophilia.** Therefore, before analyzing the dependence "hormonal composition of the mixture - pathology," it is necessary to determine the composition of the sex hormones of the individual.

The first step is the creation of the **General Bank of the Mixtures of Sexual Hormones (GBMSH)** using the accumulated experimental material. These data allow us to find from the entire possible combinatorial population the limit values of the number of repetitions ***(k)*** of the components of hormones that are combined in the "Norma" within the framework of the real Homeostasis.

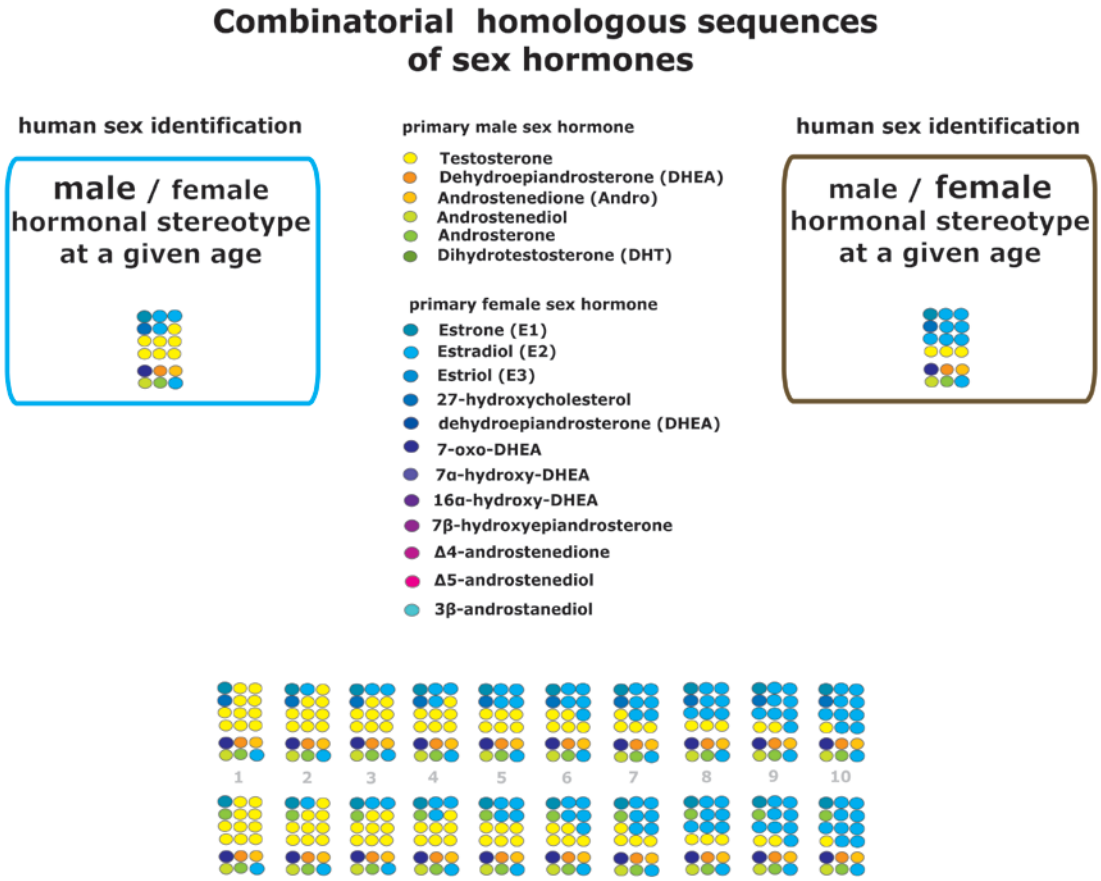

Fig.2. Combinatorial variants of sex hormones. The lower part of the figure shows a model version of two combinatorial homologies of sex hormones.

Generating combinations of 18 sex hormones with ***(k)*** repetitions it is possible to obtain a system of homologies similar to those shown in Fig.1

The next step is to compose equations. Earlier [8,9], using the example of a well-studied class of halogen-substituted methane, it was shown how combinations of halogens in halogenmethanes are generated (see Figure 3) and similar equations (see Table 1).

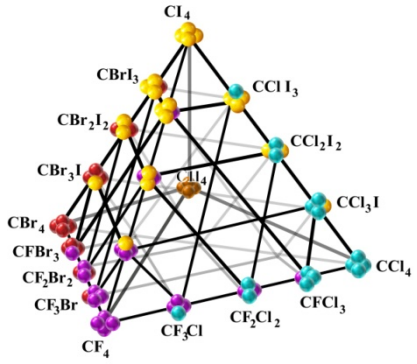

Fig.3. The homology structure of halogenmethanes, as well as molecules with the general formula $Y_oH_jF_kCl_mBr_nI_p$, where Y_o is an atom of the carboxylic subgroup or any other immutable "core" of the molecule.

Table 1. System of equations for the replacement of the fluorine atom by the hydrogen atom (F-H). Before each chemical substance, the value of the physical parameter is omitted.

	Replacement: F ⟷ H
1	CF3C1 - CF3Br = CH3C1 - CH3Br
1*	CHF2C1 - CHF2Br = CH2FC1 - CH2FBr
2	CF3Br - CF3I = CH3Br - CH3I
2*	CHF2Br - CHF2I = CH2FBr - CH2FI
3	CF3C1 - CF3I = CH3C1 - CH3I
3*	CHF2C1 - CHF2I = CH2FC1 - CH2FI
4	CF2C12 - CF2Br2 = CHFC12 - CHFBr2 = CH2C12 - CH2Br2
5	CF2C12 - CF2I2 = CHFC12 - CHFI2 = CH2C12 - CH2I2
6	CF2Br2 - CF2I2 = CHFBr2 - CHFI2 = CH2Br2 - CH2I2
7	CFC13 - CFBr3 = CHC13 - CHBr3
8	CFBr3 - CFI3 = CHBr3 - CHI3
9	CFI3 - CFC13 = CHI3 - CHC13

Based on the equations obtained and the available scattered experimental data collected in **(GBMSH),** a mutually agreed set of a measurable physical parameter can be obtained for the entire set of combinations of Sexual Hormones with a reasonable number of repetitions of components for a particular age interval. This data set can be graphically represented in the form of the dependence of a certain measured physical parameter on some calculated physical parameter of the mixture, for example, the molecular mass of a mixture of hormones.

After this simple procedure, any individual who has turned to **(GBMSH)** can, according to the measured physical parameter of the mixture of sex hormones, obtain his specific hormone composition (and vice versa

- to get the physical parameter of the mixture according to the hormonal composition), i.e. find their place on the homo-heterophilic scale of secondary sexual characteristics (see Fig.4). After all, quite generally speaking, the treatment of a woman and the treatment of a man imply various pharmacological agents and their dosages.

Thus, any potential patient is digitized.

Determination of the composition of sex hormones is not just "hormonal fingerprinting." This is **the way to select the appropriate composition of pharmacological agents for a particular patient with the help of the corresponding Unitarian symmetry invariants.**

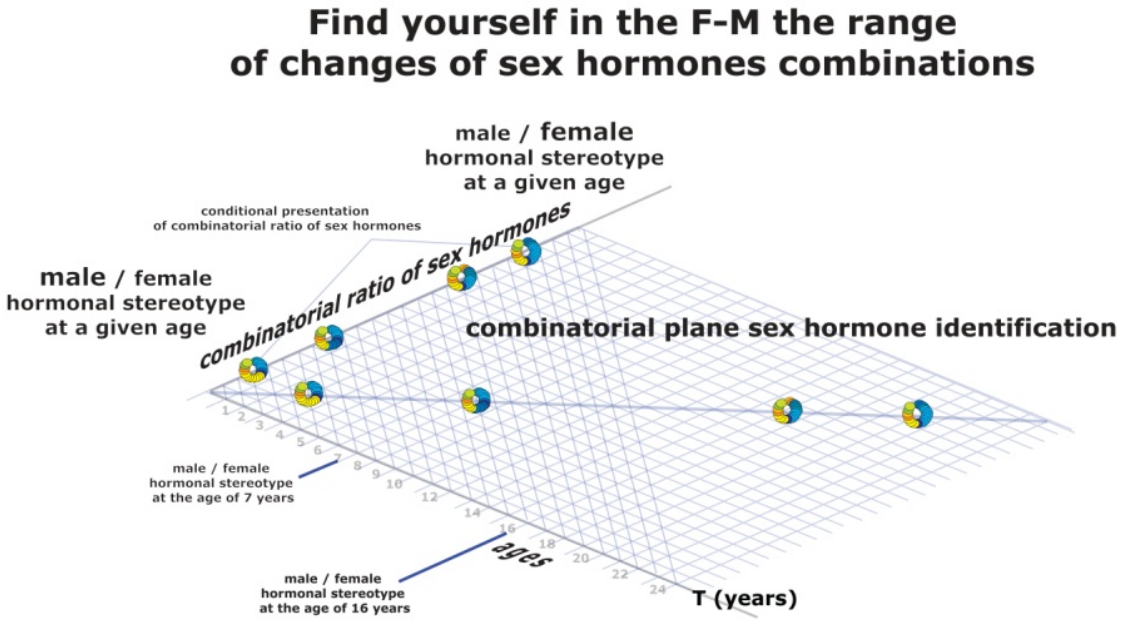

Fig.4. The combinatorial plane of the ratio "sex hormone composition - age"

The next step in diagnosis should consist in finding the correspondence of the sex hormone-age composition of sex hormones with the hormonal composition of venous blood, arterial blood, lymph and urine (separately) in the version of "No-pathogenic Norm".

But first of all, it is necessary, right from today, to oblige all physicians to measure the composition of 57 hormones in four media and to indicate the patient's presumptive diagnosis.

So it should be formed "United hormonal Data Bank and related pathologies" (UHBP).

So the pathology is digitized.

In fact, by measuring the physical parameter of a mixture of hormones in each medium and comparing the value of this parameter with the composition of the mixture (using the Unitarian symmetry invariant equations), we can use the **United Hormonal Data Bank and related pathologies** to determine the pathology of a particular gland.

Moreover, the "early" detection of pathology depends almost entirely on the ability of the physical apparatus to measure the parameters of the mixture. Well, and the reliability of the Data Bank, of course,

which is easily verified and corrected due to the self-consistency of the system of invariant equations of unitary symmetry of mixtures.

An example of such an analysis in a schematic version is shown in Fig.

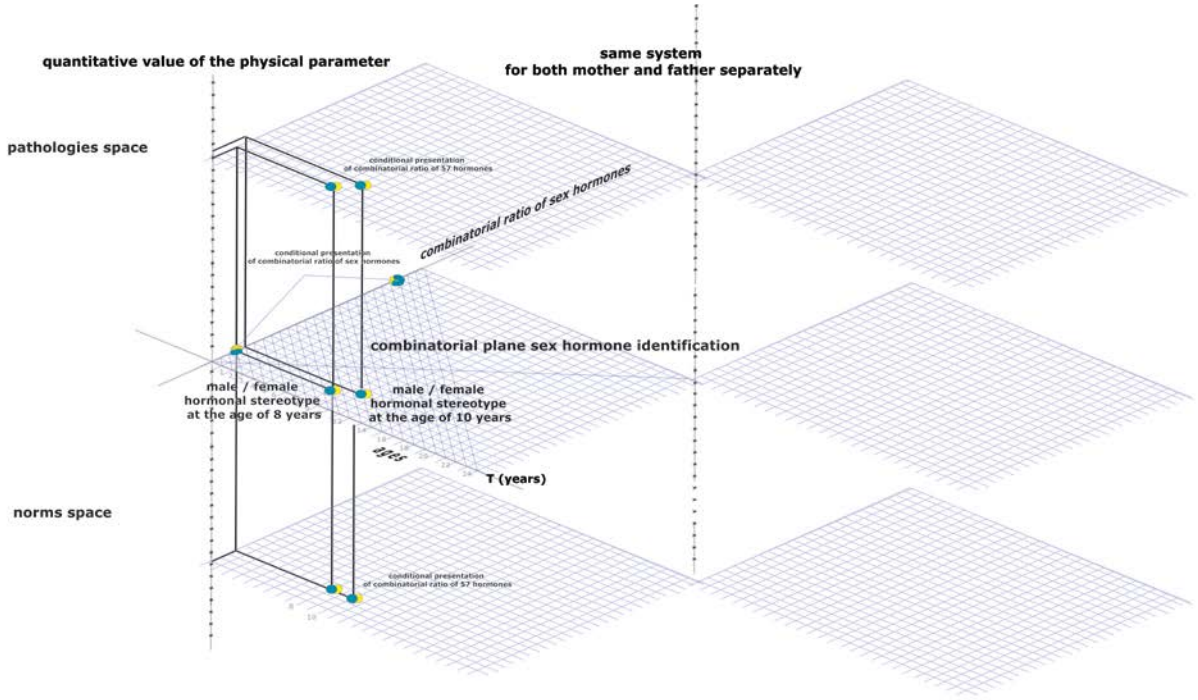

Fig.5. Combinatorial homologous system of diagnosis **"composition of the mixture of sex hormones, the age of the patient, the composition of hormones from the site of synthesis n - pathology"** for one of the 18 hormonal producers. On the right, the possibility of comparing the combinatorial composition of a patient with a similar combinatorial composition of the hormones of the parents is shown. It is certainly possible to find the invariants of the hormonal relationship between relatives.

Tracking the hormonal composition in time will predict the development of Pathology in time.

So, what is such a combinatorial taxonomy attractive about?

If from the whole set of combinations of 18 sex hormones with a certain number of repetitions (a mixture of sex hormones):

- to determine those of them that correspond to the homeostasis of the human body
- to choose for mixtures of this kind certain physical parameters (for example, dielectric permeability **(ε_r)**, permeability **(μ_r)** and conductivity **(σ)**) that accurately determine the mixture of human hormones (as in fingerprinting)
- to calculate the physical parameters for all real mixtures by equations of the type that are presented in Table. 1.
- to measure the physical parameters of a mixture of hormones of a particular patient who has consulted a doctor,

Then in the space "the composition of the mixture of sex hormones, the age of the patient, the composition of hormones from the site of synthesis ***n*** (the value of the physical parameter of the mixture corresponding to this composition and the corresponding attribution of the mixture of a particular pathology"), we get a characteristic point (see Fig. 5).

If from the entire set of basic hormones - 57:

- to isolate and group them according to the "place of synthesis"
- to identify and group them on the basis of possible participation in the formation of pathology
- to generate within each group the appropriate number of combinations of hormones with the appropriate number of repetitions
- to determine those of them that correspond to the homeostasis of the human body
- to choose for mixtures of this kind certain physical parameters (for example, dielectric permeability **(ε_r)**, permeability **(μ_r)** and conductivity **(σ)**) that accurately determine the mixture of human hormones (as in dactyloscopy)
- to calculate the physical parameters for all real mixtures by equations of the type that are presented in Table 1
- to measure the physical parameters of a mixture of hormones specific, turned to the doctor, the patient, then in the space **"the composition of the mixture of sex hormones, the age of the patient, the composition of hormones from the site of synthesis n (the value of the physical parameter of the mixture corresponding to the given composition and the corresponding attribution of the mixture of a particular pathology")** we get as the result a characteristic point (see Fig. 5).

According to the accumulated experimental data, the age dependence of the sexual determinant (a patient with a characteristic composition of sexual hormones) is "normal":

- Can be calculated from the corresponding invariants (such as Table 1) to calculate the "blended course" (evolution of the mixture) in time, i.e. **Predict the emergence and development of pathology.**
- It is possible to detect **the reaction** of the mixture composition **to pharmacological and physiotherapeutic effects.**

The accuracy of the predictions is determined by the accuracy of measuring the concentrations of the components of the mixture.

It should be noted that such an analysis can be carried out both for mixtures of blood hormones, and for mixtures of hormones in lymph and urine. This will significantly increase the diagnostic accuracy of pathological changes and their temporal orientation.

Very interesting is the problem of correlation of invariants of mixtures of hormones of children and their parents.

3. Conclusion

Paradigm **"a set of elements - a combination of elements - combinatorial homology - homologous invariants - a system of equations for invariants - finding a physical parameter for the whole class of combinations with a limited number of experimental values"** is the prevailing paradigm of Natural phenomena - from elementary particles, through nuclei, atoms, simple molecules, Complex molecules, both in their individual consideration, and in the form of mixtures.

In this case, the mixtures can be considered both in the equilibrium state and in the kinetic variant. In the latter case, the mixture passes through the stages, for example, during photodissociation, from the parent molecule through the formation of radicals and the formation of their stable products.

The Paradigm in question fundamentally changes both the research itself and the educational process of natural science [10].

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