Vanilloid sensitivity

Scientific literature's notes on VANILLYL BUTYL ETHER

The vanilloid receptors are a subfamily of the non-selective ion channels existing in many body areas, among which skin and mucosae. The vanilloid receptors participate in important biochemical mechanisms, among which, as a reminder, the regulation of neuropathic pain and inflammations.

**Thermal action**

Action on local blood circulation in the skin leads to an increased ability to eliminate toxins, while in the muscles faster removal of lactic acid and its derivatives with a faster recovery of muscle function in facilitating a rapid resolution of inflammatory chronic conditions.

The increased circulation in the skin in turn (especially in the microcirculation) leads to an increased ability to eliminate toxins in the muscles and a more rapid elimination of lactic acid and its derivates with a faster recovery of muscle function, facilitating a rapid resolution of inflammatory and sub inflammatory chronic conditions.
Scientific literature’s notes on PHYSALIS angulata EXTRACT

In nature the Physalis is a corticoid-like agent with proven anti-inflammatory action. Its mechanism of action is the inhibition and modulation of the processes that generate the inflammatory cascade, that is the complex of phenomena in response to tissue damage. Its action becomes effective on the myalgic muscle, that muscle that is sore and contract because of trauma or stress, mostly.

In nature the Physalis is rich in vitamin A and niacin. The latter, also called vitamin B3 or PP, participates in the mechanism of cellular respiration and regulates many enzymatic processes.

*Technical and bibliographic references on the activity of corticoid-like Phisalis sp*

**PHYSAVIE modulates skin immunological and inflammatory response**
- Decrease pro-inflammatory cytokines (IL-1α, TNF-α, IL-6, IFN-γ), similar effects ad hydrocortisone (HC)
- Reduces inflammatory mediators and related enzymes (PGE2, LTB4, PA2, LOX e COX-2) like hydrocortisone (HC)
- Presents same hydrocortisone anti-histaminic effects
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Does not promote immunosuppression increase (IL-10)
Does not reduce Tissue Growth Factors level (TGF)

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The therapeutic properties of radioactive water

At biological level, the radioactive water has different effects according to the minerals it contains.
The oligomineral radioactive water stimulates diuresis while salt-bromine-iodine radioactive water is a great cure against inflammations.

The benefits of radioactivity translate into a higher energy supplied to the tissues such as consequent occurrence of phenomena like excitation and ionization. The radioactivity has an analgesic and soothing effect in the nervous system.

This is due to the increase of the activity of cholinesterases, the enzymes through which it is possible to estimate the hepatic function in nerve transmission, which causes the acetylcholine to inactive more rapidly, (acetylcholine: a molecule which acts as chemical mediator of the transmissions of the nervous system impulses), involving a reduction of the excitability of the nervous system.

The soothing properties of the radioactive water are an advantage for the cure of some neurologic and osteoarthromuscular pathologies. Following some experiments, it has been possible to verify that the organisms affected by pathologies such as allergic asthma, treated with therapies which use radioactive water, are less prone to risk of anaphylactic shock when compared with organisms treated with non-radioactive water.

It has been scientifically proven that radioactive water has also effects in the female genital apparatus.
Radioactive water has been mainly used in balneotherapy, mud therapy, irrigation, inhalation and hydro massage sessions.
Musculoskeletal pain and traumatic inflammation

ARTICULATIONS are the union point between the bones and allow us to move, the MUSCLES are bound to the bones through ligaments.

ARTICULAR or MUSCULAR PAIN originates mainly from inflammation phenomena, wear or tissue trauma related to several causes with ACUITY or CHRONICITY characteristics and represents a problem which may become a true “social phenomenon”, rather than individual, and may be part of the temporary or permanent labour “incapacity”. Pain is a signal which travels from the affected organ to the C.N.S. (Central Nervous System), where it is assessed and where an adequate response is formulated and issued. It may be classified in various ways, from a temporal point of view or in relation to its pathogenesis. The pain can be acute or chronic.

The nociceptor is an amielinic termination of the sensorial neurons which signals a tissue damage to the CNS. The synapsis is the contact point between the neurons. The harmful stimulus represents an offense caused to the tissue, able to cause cell destruction and consequently to release biochemical substances which activate specific receivers sensitive to warmth, cold, to the mechanical stimuli or chemical mediators.

![Diagram](image-url)
Perception of pain: nociceptors

The nociceptors are nervous receivers sensitive to harmful or potential stimuli. They represent the free nerve endings which exist in the basal layers of the epidermis, in the dermis, in the periosteum, in the articulations and many other locations of the human organism. It is not known how these nervous terminations are stimulated: the phenomenon is probably due to substances released from impaired cells. The answer to the stimulation of nociceptors is a reflex action which consists in a contraction of the flexor muscles of the stimulated part, and in a contemporary inhibition of the extensor muscles. The mentioned reflex has the purpose of removing part of the damaging stimulus.

**PROCESS:**

1. When the nervous impulse occurs in the synaptic bouton, the vesicles therein contained, rich in chemical messengers (neurotransmitters), merge with the cellular membrane, releasing its own content in the synaptic fissures.

2. The neurotransmitters are collected by specific receivers placed in the postsynaptic membrane, modifying their permeability to the passage of ions. A potential postsynaptic depolarizing is thus generated (opening of the ionic channels, with resulting excitation), or hyperpolarizing (closing of the ionic channels, with resulting inhibition).
**Endorphins**

Endorphins are a group of substances produced in the brain, also provided with analgesic properties. As local hormones, they spread among the nervous cells: present in tissues and are released in particular conditions, also linked to stress factors, among which PAIN. The expression “endorphin rush” is actually known for indicating a feeling of weariness due to pain.

Our body is able to relieve pain by producing and using these neurotransmitters which:

1. stimulate the nervous structures (brain and spinal cord)

2. preside over modulation and control of the feelings of pleasure, wellbeing, euphoria and analgesia

3. modify the intensity of perception of pain until it is suppressed

The word “endorphin” stands for “morphin of the body” (endo=”inside the body”, orphin=”morphin”). The endorphins are proteins produced in the pituitary gland and in the hypothalamus. They are connected to the opioid receptors of the brain cells, especially in the thalamus and the limbic system, inhibiting the peripheral nociceptive transmissions (pain) to the central nervous system and influencing the sensibility and behaviour. Endorphins were discovered in the interior of the body and have been named such in 1975.
Presently, four different classes of endorphins are known, namely “alpha”, “beta”, “gamma” and “delta”.

Synthetized also in the hypophysis, in the adrenals and in some of the tracts of the digestive system, these peptides have their receptors in several zones of the central nervous system where they are mainly concentrated in the areas assigned to pain perception. Besides increase tolerance to pain, endorphins are also involved:

1. in the secretion of other hormones such as GH, ACTH, prolactine, catecholamines and cortisol
2. in the sensations of wellbeing and satisfaction after a positive event
3. in the control of appetite and the gastrointestinal activity
4. in the thermoregulation
5. in the sleep regulation

An increase of the plasmatic concentration of these substances during analgesic therapies containing mostly oligoelements has been demonstrated.

In this matter, it is important to mention that the essential oligoelements indispensable to life are: Fluorine, Selenium, Cobalt, Chromium, Copper, Iron, Manganese, Molybdenum, Nickel, Vanadium, Zinc and Silicon.
Endorphin release mechanism

When a nervous impulse reaches the spinal column, endorphins are released, influencing many biological mechanisms, among which the perception of pain. The warmth, by expanding the blood vessels, accelerates the blood towards painful muscles and damaged tissues and stimulates the production of endorphins, seeking a natural feeling of wellbeing.

The active passage of H2O (water) through the integument ensures the maintenance of two energetic balances: the electrical and the thermal. The consequent metabolic activity also produces an increase of the convection capacity and thermal conduction.

The stratum corneum absorbs L.E.C. - K+ - Na+, and the gaseous exchanges occurred from the pulmonary respiration can be correlated to the transcutaneous electrical exchanges.
Main signs of inflammation

There are several known causes related to transitory pathologies in which typical characteristics of inflammation are found:

1. PAIN (dolor) due to local biochemical alterations
2. SWELLING (tumor) due to edema
3. RASH (rubor) due to a higher blood influx to the affected area
4. INCREASE of temperature in the affected area (calor) as a consequence of local hyperemia and of the increase of cellular metabolism
5. Compromised FUNCTIONALITY (function laesa), inhibition of the functionality of the struck area (especially in case of articulation) because of pain and the imbalance induced by pain facilitation mechanisms (ex. edema) in the integrity of the inflamed structures

In this case the topical intervention with the utilization of mud, medical device, in cold or warm application (according to specific needs), has a suitable and effective result, which is very significant in terms of physiatric rehabilitation therapies.
Clay

CLAY belongs to fluosilicates (from the Greek phyllon, leaf). The silicates are characterized by a layered structure and tetrahedral symmetry in which every tetrahedron tends to connect with others via three oxygen bridges. The members of this family generally have a lamellar or flaked (scale) aspect, with well-defined exfoliation. They are based in layers of SiO$_4$ tetrahedra indefinitely extended.

The base chemical formulae are $A_3Si_2O_5(OH)_4$ and $A_3Si_4O_{10}(OH)_2$ where A represents an ion which could be Calcium, Magnesium, Aluminum, Sodium, Iron, Lithium or Barium. They are generally tender, with low specific weight, and the lamellar exfoliation can be flexible or elastic.

Most of the phyllosilicates contain hydroxyl (OH), positioned in the interior of the hexagonal rings of the tetrahedron, on the same level as apex oxygens which are not part of the hexagons.

The main diagenetic process (of formation) is compaction: the porosity of the clay mud before burying is considerably high (70-90% in volume); under a load of a thousand meters, the porosity is reduced to 30%.

Apart from the mechanical process of compaction, the processes of chemical nature which consist in adsorbing and ionic exchanges are also important.
Characteristics of lamellar clay in medical devices

The fundamental characteristic of this type of clay is that it has a crystalline structure of multi-layered lamellar type which confers to it particular thixotropic and viscoelastic properties when wet (inserted in aqueous medium).

The most interesting of these properties is that of being able to absorb large quantities of water (up to 50 times its own weight in attapulgites) and to absorb ions and organic substances reversibly.

This characteristic is a direct function of its lamellar structure which is able to expose a very large surface of interface between lamellae and lamellae, up to the level in which the effects of the ionic charges of the atoms of aluminium, iron and potassium are produced, from which its crystal lattice is constituted and which allows the determination of the above mentioned phenomena of absorption and adsorption.

An example of the use of lamellar clay in the therapeutic field is the utilization of clay compresses (poultice) for the treatment of inflammatory localized articular edema.

By taking advantage of these peculiar characteristics of the lamellar clay and selecting adequate proportions of clay silico-aluminates according to the reaction’s PH, it has been possible to create a set of lamellar silico-aluminates charged with minerals and organics ions in order to fulfil the specific thermal activity.
Mud therapy, natural medicine

A millenial tradition

The long history of the Abano Terme and Montegrotto Terme thermal baths merges with the history of the Euganean people and with the ancient cult of Aponus, god of thermal water and of healing virtues. The aponian thermal culture is the most ancient in Europe, and has been able to overcome the empiricism by studying the efficacy of the raw materials through research and scientific evidence.

Abano, along with the Euganean Thermal Basin, is the greatest worldwide location for prevention and cure of arthrosis and many pathologies related to muscles and articulations, and also in the aftermats of trauma and fracture. In most of chronic pain, the inflammation is the base of the pain symptoms.

It is the case of, for example, articular pain and rheumatic pain, which have origin in the nervous terminations, of which the cartilage that covers the surfaces in contact with articulations is rich in. When these terminations perceive a surrounding inflammation, they send their painful signal which sometimes may degenerate into a neuropathic chronic pain. A primary action of thermal cure is the anti-inflammatory action, such as the one verified by numerous scientific papers on water and mud from the Euganean Thermal Basin, which has reduction of pain as an indirect reflex.

There is therefore an internal component of our organism, the aforementioned endorphins, which represents a true and unique natural analgesic. Their production (and thus, their effect) is potentiated by the action of the substances contained in mud and water from the territory.
These endorphins, up to now exclusively considered anti-stress molecules, may have an important analgesic action in addition to the anti-inflammatory action.

The simple and natural answer to the demand for health and psycho-physical wellbeing of today’s individual: the mud therapy is a natural method to improve the quality of life. The mud therapy causes profound and intricate shifts in the organism.

The thermal mud carries out its healing action through certain stimuli, according to its special structure, which are in particular: caloric actions, mechanical stimuli, physic-chemical and chemical actions.

The absorption, thanks to the peculiar clay, of all the beneficial substances present in the mud and the stimulation of endorphin production render it an effective and long lasting alternative therapeutic protection.

The physical action of the mud’s warmth also determines a hiperemiantic action linked to the effect of vasodilatation, which is manifested by reddening of the skin, thus seeking a benefit for the components of the locomotive system.

Regarding the caloric component, there is no other substance as mud which comprises in itself the physical and physic-chemical properties which allow it to bear as much warmth and to slowly release it without causing thermal discomfort.
In addition, internal exchanges at cellular level are generated, variations of the excretory function of the skin, especially regarding the uric acid, which increases its elimination thus favouring a detoxifying action.