CHLORINE DIOXIDE MECHANISM OF ACTION

PHARMACOKINETICS OF CHLORINE DIOXIDE IN THE FORM OF CDS
Pharmacokinetics studies the processes through which a drug passes through the body, focusing on the pattern and rate of absorption, distribution, metabolism and elimination. The actions of all drugs are influenced by their pharmacokinetics, so it is important to understand pharmacokinetics in order to make informed clinical decisions. This is achieved through the following points:

- **Absorption: how the drug enters the bloodstream.**
- **Distribution: how the drug is distributed throughout the body tissues.**
- **Metabolism: how the drug is processed and transformed in the body.**
- **Excretion: how the drug is eliminated from the body.**

CDS release, CDS is a chlorine dioxide gas extremely soluble in water, due to its small size and V-shaped water molecule-like structure, able to create an ensemble due to a molecular angle of 117.6° that matches the 104.45° of H_2O in such a way that it creates hexagonal structures.

This is a very interesting electro-molecular effect, and it can be observed in microscopy after applying chlorine dioxide in blood Rouleaux with low oxygen after a few minutes. This phenomenon is fascinating as it demonstrates the ability of CDS to form ordered, hexagonal structures in a biological environment.

Furthermore, the ability of CDS to rapidly dissolve in water and create these unique assemblies demonstrates its potential to be used in various fields, such as medicine and biotechnology. Studies have shown that CDS has antimicrobial oxidant and as well antioxidant properties due to its ORP oxidation-reduction potential (e.g., against OH* hydroxyl radicals, despite being an oxidant)**. This makes it a promising candidate for the development of new medical treatments.**

In summary, CDS is a fascinating substance with unique and promising scientific and medical qualities.

ABSORPTION OF CDS
Once an amount of 30 mg of CDS dissolved in water has been ingested, the gas is released by evaporation in the stomach due to its temperature of approximately 36.5° Celsius. It is important to keep in mind that CDS evaporates at 11° Celsius, unlike sodium chlorite which evaporates at 170°C.

Since the human body contains a significant amount of water, the mucous membranes of the stomach absorb this dissolved gas immediately. Because of its size, CDS easily diffuse the stomach walls according to Fick's gas diffusion laws and moves through the blood system into the interstitium. Subsequently, it is transported to all parts of the body where water is present, being an extremely small molecule compared to the macromolecules of conventional drugs.

DISTRIBUTION IN THE BODY
Thanks to its high solubility and small size of only 160 nm in water without hydrolysis, the CDS molecule is distributed randomly in the body, following Fick's second law of conservation of mass in the absence of any chemical reaction.

Chlorine dioxide (ClO_2) **transports oxygen:**

1 mg of ClO_2 contains 0.48 mg of oxygen.

1 mg of ClO_2 is equivalent to 1.49 x 10-5 moles.
1 mg of ClO_2 potentially contains 8.97 x 1018 molecules of O_2.
1 mole of O_2 occupies 22400 ml under normal conditions.
1 mg of ClO_2 can potentially release 0.334 ml of O_2.
Each ml of concentrated 0.3% CDS (3000 ppm) contains 3 mg of ClO_2.

The amount of oxygen carried by chlorine dioxide is of great interest. It is pertinent to mention that the molecular weight of ClO_2 is 67 g/mol, while the molecular weight of O_2 is 32 g/mol. Therefore, oxygen constitutes 48% of the molecular weight of ClO_2. In this sense, it can be inferred that approximately 0.48 mg of oxygen is found in 1 mg of ClO_2.

Considering that 1 mg of ClO_2 is equivalent to 1.49 x 10-5 moles, it can be deduced that in 1 mg of ClO_2 there are potentially about 8.97 x 1018 molecules of O_2. Under normal conditions, 1 mole of O_2 occupies 22.400 ml. Therefore, in 1 mg of ClO_2 could release approximately 0.334 ml of O_2.

Considering the protocol for COVID-19, which consists of 10 ml of CDS at 3000 ppm, each ml of concentrated 0.3% CDS contains 3 mg of ClO_2.

It is relevant to note that 1 ml of CDS can release 1.44 mg of O_2 an amount equivalent to 1 ml of dissolved O_2 in plasma. This figure is similar to the oxygen carried by 0.72 grams of hemoglobin under a partial pressure of oxygen of 100%. Therefore, 10 ml of CDS could provide 10 ml of molecular oxygen in blood after fully reacting in approximately 2-3 hours.

It is important to emphasize that oxygen binds to the chlorine dioxide molecule without being consumed, until it reaches the problem area and dissociates in the presence of excess protons, as is the case with coronavirus capsids, which are oxidized by denaturation. In this way, oxygen first reaches the most acidic cells and their compromised mitochondria in the body, then eliminates pathogens or acidic toxins and restores pH balance.

A beneficial side effect of this is cellular oxygenation. In relation to the amount of oxygen present in the blood, it is relevant to mention the partial pressure of oxygen, known as PO_2. In the pulmonary alveoli, PO_2 is 100 Torr, while in the capillaries it is 40 Torr. In interstitial tissue, PO_2 is only 10-20 Torr, at the cell membrane level it is 10 Torr and in the cell cytosol it is 2 Torr. In the mitochondria, the PO_2 is only about 0.2 Torr.

1 ml of CDS releases 1.44 mg of O_2, equivalent to 1 ml of dissolved O_2 in plasma.

10 ml of CDS can provide 10 ml of molecular oxygen in blood after fully reacting within 2 hours.

Oxygen is bound to the chlorine dioxide molecule without being consumed and dissociates in the presence of excess protons in the problem area.

The oxygen reaches the most acidic cells and their compromised mitochondria first, and the chlorine ion eliminates pathogens or acidic toxins and restores pH balance. A beneficial side effect is cellular oxygenation.

When we breathe oxygen diffuses through the capillary bed of the alveoli, 97% is bound to hemoglobin, while only the remaining 3% remains dissolved in the plasma. Red blood cells function as oxygen batteries that release oxygen mainly in the presence of lactic acid, a phenomenon known as the Bohr effect.

Blood flow is approx. 5 l/min and provides us with an O_2 flow of 15 ml/min, carried in arterial blood. This figure is less than 6% of resting O_2 consumption.

However, blood has the capacity to transport a much larger amount of oxygen, thanks to its reversible combination with hemoglobin. Consequently, 1 mole of tetrameric hemoglobin combines with 4 moles of O_2. One gram of hemoglobin will combine with 1.39 ml of O_2 and, considering that in 100 ml of normal blood there are 15g of hemoglobin, a total of 15 * 1.39 = 20.85 ml of O_2 can be transported. It is important to keep in mind that this 20.85 ml of O_2 represents the best case scenario and would only be achieved if all the hemoglobin were bound to oxygen, i.e., if the saturation of Hb by O_2 were 100%.

10 ml of CDS 0.3% provides 10,700,000 molecules of oxygen for each red blood cell. It should also be noted that hemoglobin saturation depends on the partial pressure of oxygen, following a sigmoid, non-linear curve. This means that a person with a saturation of 60% only has a partial pressure of oxygen of 30%. This is the reason why COVID-19 patients experience a very rapid recovery when they present symptoms of dyspnea.

METABOLISM

Metabolism or inactivation of CDS. Unlike conventional drugs, chlorine dioxide as CDS does not need to be inactivated by the body's metabolism and its cells are consumed. Excretion of CDS Due to the high presence of sodium in the human body, it can be assumed that the chlorine ion, when reacted with an acid, can only be converted into a small amount of sodium chloride (NaCl sodium salt)**, which forms an essential part of our metabolism and is excreted naturally through sweat and urine.**

The process of metabolism or inactivation of CDS is very different from that of conventional drugs. While the latter need to be processed by the body to be eliminated, chlorine dioxide as CDS is consumed directly by the cells without needing to be inactivated by metabolism. This means that CDS can act faster and more efficiently in the body, as there is no delay or loss of efficacy due to metabolization.

EXCRETION

In relation to the excretion of CDS, it is important to note that its sodium content does not play a relevant role. When the chloride ion reacts with an acid, sodium chloride (sodium salt NaCl) **is formed, which is essential for our metabolism. The amount present is so minimal that it is hardly detectable in a venous blood gas measurement and therefore does not adversely affect the renal or hepatic system.**

On the contrary, the oxygen present in ClO_2, released during its dissociation, improves renal mitochondrial function by activating it. what has been evidenced by the reduction of creatinine in venous blood gas analysis. The minimum sodium salt is excreted naturally through sweat and urine, thus contributing to sodium balance in the body. In summary, CDS offers a unique advantage in terms of metabolism and excretion compared to conventional drugs. Its ability to be consumed directly by cells and its natural excretion through sweat and urine make it an effective and safe option for the treatment of various conditions.

PHARMACODYNAMICS

Pharmacodynamics is the study of the biochemical and physiological effects of drugs, as well as their mechanisms of action and their impact on an organism. This encompasses the interaction of the drug with its specific receptor.

However, the question arises: who is the oxygen receptor?

The main organelle in the body that consumes oxygen is the mitochondria, where it is essential for the production of ATP and thus for the energy of all cells in the human body. The primary effect is the elimination of pathogens or metabolic acids through oxidation with chlorine ion (not to be confused with chlorine)**. Numerous direct therapeutic effects of chlorine dioxide have been documented with thousands of cases.**

No unwanted residues are produced from CDS, as it is broken down into essential body products, such as oxygen and a small amount of common salt, which do not accumulate and are essential to the body.

In over 17 years of research, no serious adverse effects have been observed. In Dr. Manuel Aparicio's study with 1370 patients, it was observed that in 6% of the cases there were mild and transient reactions (Herxheimer), **mainly in polymedicated patients, and a rapid recovery of COVID-19 symptoms, as well as the reduction of other co-infections or chronic diseases, such as diabetes and hypertension. Once blood values are normalized, thanks to CDS, it is important to take into account the possibility of reducing the use of common and toxic medications, such as insulin or Warfarin. This will avoid putting the patient's health at risk with unnecessary medications.**

Table 1: Inactivation of viruses by chlorine dioxide (ClO_2)***.***
From: Kinetics and Mechanisms of Virus Inactivation by Chlorine Dioxide in Water Treatment: A Review
At this point, after millions of deaths, we implore the World Health Organization and national regulatory bodies, instead of absurd misinformation, to establish a relationship with the COMUSAV physicians and researchers who have successfully used CDS, especially since they have no licensed remedy with similar efficacy.

The COMUSAV International Association is present in over 24 countries and has more than 5000 registered physicians who have applied CDS under Helsinki protocol 37, with oral and intravenous consent of patients. So far, COMUSAV has registered many thousands of cases of complete remission and recovery from COVID-19 within a few days and with absolute success, with no serious side effects. These cases are supported by PCR tests before and after treatment. It has also obtained excellent results in Long Covid and mRNA genetic vaccine damage, helping thousands of cases, including Guillen Barre and cancer, all clinically documented.