C0r0n@ 2 Inspect

Review and analysis of scientific articles related to experimental techniques and methods used in vaccines against c0r0n@v|rus, evidence, damage, hypotheses, opinions and challenges.

Tuesday, September 21, 2021

Wireless nanocommunication networks for nanotechnology in the human body

After the identification of GQD graphene quantum dots in blood samples from vaccinated people , crystallized graphene fractal nanoantennas, and hydrogel and graphene oxide swimmers , from C0r0n @ 2Inspect, the following question was posed What is the ultimate purpose of all This elements? Why is such a major media deployment needed in vaccines, as demonstrated by blood test results? Although previous entries warn what the ultimate goal could be , recent discoveries have led to a clear and forceful explanation of the objective, method and related protagonists, necessary, in the plot of the c0r0n @ v | rus.

Summary

Scientific evidences have been found that reliably link the graphene quantum dots " *GQD* ", observed in blood samples of vaccinated people, with the " *propagation models for nanocommunication nanowires* ". The abundant presence of GQD among other possible graphene derivatives is essential for the " *interconnection of hundreds or thousands of nanosensors and nanoactuators, located within the human body* " (Akyildiz, IF; Jornet, JM; Pierobon, M. 2010). In fact, it is discovered that the GQDs themselves can act as simple nanosensors in such networks. Among the possible nanocommunication networks, the molecular communication method (Arifler, D. 2011 | Akyildiz, IF; Brunetti, F .; Blázquez, C. 2008) and the nanoelectromagnetic communication method were postulated, which ended up imposing itself as the most advantageous for " *transmitting and receiving electromagnetic radiation in the Terahertz band, using transceivers made from novel nanomaterials such as graphene*" (Jornet, JM; Akyildiz, IF 2013) and in particular with the GQD graphene quantum dots and graphene nanoribbons. Since the communications nanoregrid is present throughout the body, and especially in the brain, it allows monitoring in time real of the neurotransmitters responsible for transmitting information in the nervous system, which, therefore, are responsible for stimuli, desire, pleasure, learning, conditioning, addiction, pain, feelings, inhibition, among others. This post explains the methodological procedure of the networks, necessary to achieve this, according to the scientific literature. On the other hand, it also addresses what could be the method / protocol of communication with nano-networks and nanoelectronics, based on graphene. TS-OOK communication,which will also be analyzed in a preliminary way.

Wireless Nanosensor Networks

One of the fundamental questions arising from the discovery of GQD graphene quantum dots in blood samples from inoculated people is, why is so much graphene nanomaterials necessary? If the blood samples from the previous entry are remembered , these quantum dots were present in almost all images in a high proportion. It should not be forgotten that the degradation of graphene nanosheets can result in the creation and dissemination of these graphene quantum dots (Bai, H .; Jiang, W .; Kotchey, GP; Saidi, WA; Bythell, BJ ; Jarvis, JM; Star, A. 2014). Therefore, if they are present throughout the body, what is their function? The solution to this question is in the investigation (Akyildiz, IF; Jornet, JM; Pierobon, M. 2010) concerning " *propagation models for nanocommunication networks* "Specifically, quantum dots serve to propagate wireless communications through the human body, in order to monitor and modulate its central nervous system. The study authors state that" *reducing the antenna of a classic wireless device to about a few hundred nanometers would require the use of extremely high operating frequencies, compromising the feasibility of electromagnetic wireless communication between nanodevices. However, the use of graphene to make nano-antennas can overcome this limitation*. "With this, it is confirmed in 2010 that the suitable material to propagate signals for wireless communication within the human body is graphene, because lower frequencies are required and probably not so harmful or invasive. This is very important, since researchers know the damage that high frequencies can cause. Therefore, the higher the frequency, the greater the damage (Angeluts, AA; Gapeyev, AB; Esaulkov, MN; Kosareva, OGGE; Matyunin, SN; Nazarov, MM; Shkurinov, AP 2014) and at lower frequencies, the effect of wireless nanocommunication occurs. With this information, the presence of fractal graphene nano - antennas in blood samples makes sense, which are responsible for receiving and transmitting signals / communications with the GQD graphene quantum dot network, spread throughout the bloodstream and organs of the human body. This is justified in the following paragraph, quoted verbatim from the work of (Akyildiz, IF; Jornet, JM; Pierobon, M. 2010) " *Recent advances in molecular and carbon electronics (based on graphene) have opened the door to a new generation of electronic nanocomponents such as nanobatteries, nanomemories, logic circuits at the nanoscale and even nano-antennas* ". In fact, the authors define these networks as " *the interconnection of hundreds or thousands of nanosensors and nanoactuators placed in places as diverse as within the human body*. "This makes it clear beyond any doubt the goal of graphene inoculation in vaccines. However, at the time the study was published, there were two approaches to achieving communication between nanodevices, " *namely, molecular communication, that is, the transmission of information encoded in molecules, and nanoelectromagnetic communication, which is defined as the transmission and reception of electromagnetic radiation from nanoscale components based on new nanomaterials* . "Obviously, the authors concluded that the Electromagnetic communication through GQD graphene quantum dots, had more advantages than molecular communication, since they did not depend so much on the fluidic medium, flow or turbulence. Under this premise the researchers (Akyildiz, IF; Jornet, JM; Pierobon, M. 2010) began their study to characterize the nanocommunication properties of graphene, discovering that " *the speed of wave propagation in carbon nanotubes (CNT) and graphene nanoribbons (GNR) can be up to one hundred times slower than the speed of light in vacuum, depending on the geometry of the structure, the temperature and the Fermi energy ... As a result, the resonance frequency of graphene-based nano-antennas can be up to two orders of magnitude smaller than nano-antennas built with carbon-free materials ... GNR-based nano-patch antennas like CNT-based nano-dipole antennas around 1 µm long resonate in the band Terahertz (0.1 - 10.0 THz) ... therefore, there is a need to characterize the Terahertz channel at the nanoscale ... thinking about nanoscale communication, it is necessary to understand and model the Terahertz channel in a very short range, that is, for distances much less than 1 meter* ". In these paragraphs it is found that nanocommunication with graphene occurs at a very short distance, almost always less than 1 meter. This means that the signal can propagate between the GQD graphene quantum dots, at distances suitable for the human scale, and even with the mobile phone if it is nearby or is carried in a pocket, for which hypothetically it could act as a network node or repeater (Balghusoon, AO; Mahfoudh, S. 2020).

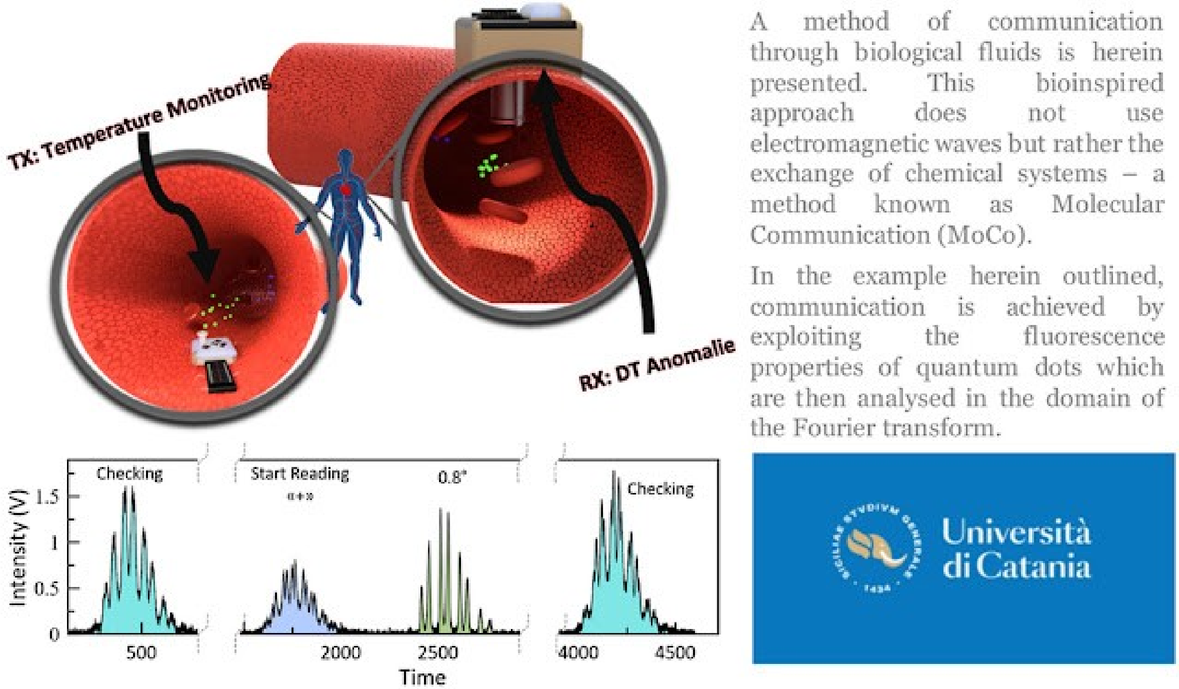

Fig. 1. Representation of the graphene quantum dots (fluorescent green dots) within the simulated artery, in which the digital communication experiment was carried out through the biological fluids of (Fichera, L .; Li-Destri, G .; Tuccitto, N. 2021). In this nanocommunication method, the propagation of the signal is by means of the molecular and non-electromagnetic communication method. This demonstrates the wide range of application of graphene, and especially of the GQD graphene quantum dots, within the human body, in order to monitor and control them.

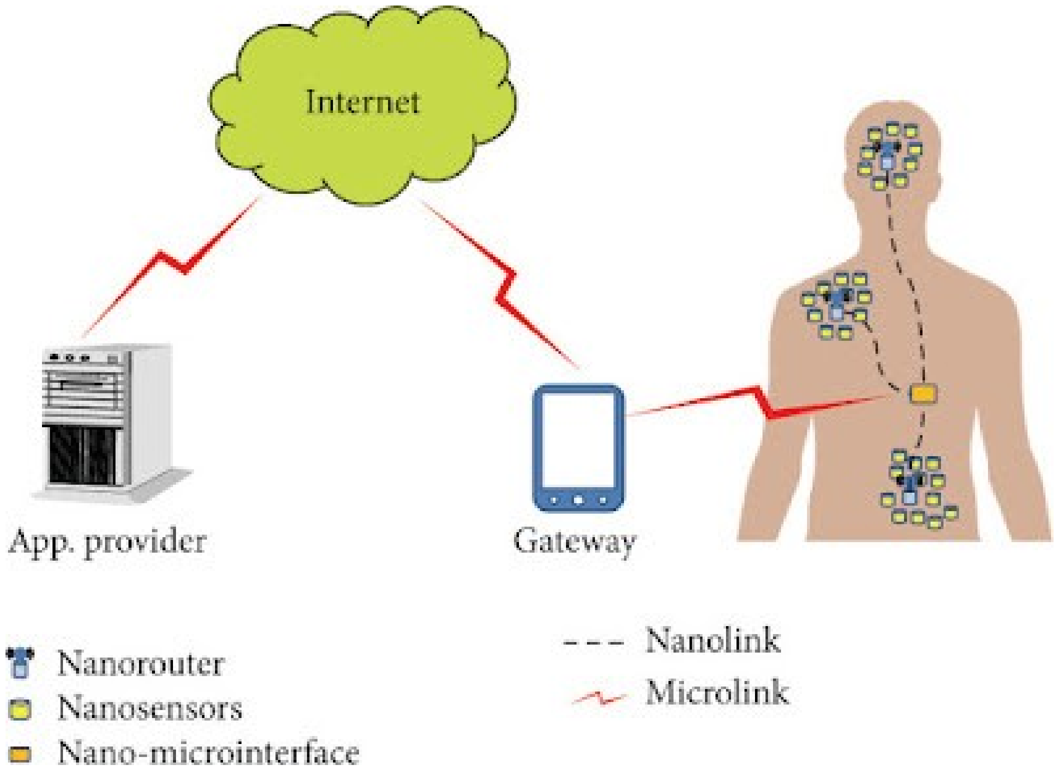

Fig. 2. Network architecture scheme for the Internet of Nano Things for biomedical applications. (Lee, SJ; Jung, C .; Choi, K .; Kim, S. 2015)

On the other hand, the researchers (Akyildiz, IF; Jornet, JM; Pierobon, M. 2010) discovered that nanocommunication is not operative in any frequency of the Terahertz channel, due to the dispersion and loss of trajectory of the electromagnetic waves in its spread through the body. This is referred to as follows " *The total path loss for a traveling wave in the Terahertz band is defined as the sum of the scattering loss and the molecular absorption loss. The propagation loss explains the attenuation due to the expansion of the wave as it propagates through the medium, and depends only on the frequency of the signal and the transmission distance. Absorption loss explains the attenuation suffered by a propagating wave due to molecular absorption, that is, the process by which part of the wave energy is converted into internal kinetic energy for some of the molecules found in it. the middle. This depends on the concentration and the particular mix of molecules encountered along the way. Different types of molecules have different resonance frequencies and, in addition,the absorption at each resonance is not confined to a single center frequency, but is distributed over a range of frequencies. As a result, the Terahertz channel is very frequency selective*. ". It is evidenced in this way, that the molecules of the cellular tissue and the fluids of the body, hinder the transmission and reduce the propagation distance of the waves emitted from the outside wirelessly. In fact, they affirm that " *Due to the propagation loss, the total path loss increases with distance and frequency regardless of the molecular composition of the channel, similar to conventional communication models in the megahertz or low gigahertz frequency ranges. However, the presence of various molecules along the path, and especially water vapor, defines various attenuation peaks for distances greater than a few tens of millimeters. The power and width of these peaks are related to the number of absorbent molecules. Assuming that its concentration is homogeneous in space, this number increases proportionally with distance, but we can also think of non-uniform concentrations or even sudden bursts of molecules that traverse the lattice*. "This means that although the signals emitted are counted in the Terahertz band, they are mitigated down to the megahertz level or a few gigahertz, which coincide with the frequencies used in 2G, 3G, 4G and 5G mobile telephony.. Another important detail is the fact that the propagation distance is reduced / attenuated, which means that, to maintain the quality of the signal and its propagation in the body, graphene is required to be present in the blood and tissues. , in sufficient quantity to create adequate bond distances. In other words, it is evident that wireless nanocommunication networks based on electromagnetism require GQD graphene quantum dots to serve as link nodes, in order to transmit data, information or modulation.

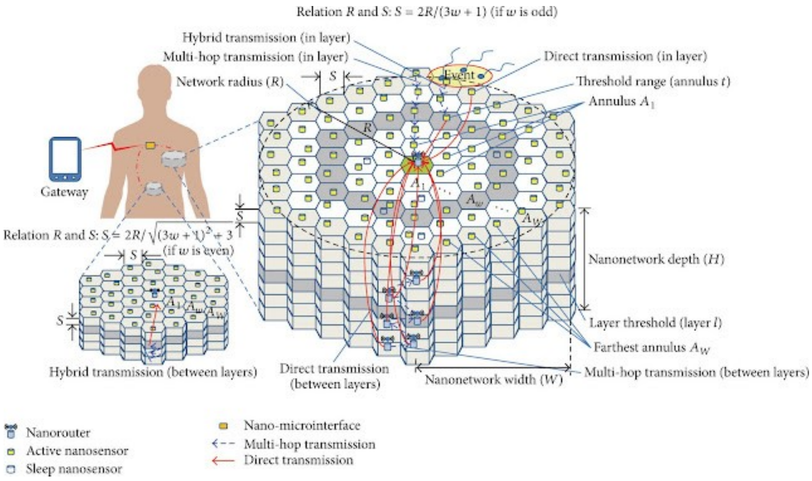

Fig. 3. Diagram of the hexagonal graphene "pole" designed in 2015, to act as a sensor and metamaterial defined by SDM software, also shown in figure X, corresponding to the non-hierarchical architecture in the network topology section. (Lee, SJ; Jung, C .; Choi, K .; Kim, S. 2015). Note that this type of nanocomponent has the shape of overlapping GQD graphene quantum dots, which act as sensor, router and antenna, being possible to program and configure them, as will be explained hereinafter.

Noise and molecular absorption determine the capacity of the nanocommunication network, that is, its " *usable bandwidth of the Terahertz channel* ", a fact corroborated by (Chopra, N .; Phipott, M .; Alomainy, A .; Abbasi, QH; Qaraqe, K .; Shubair, RM 2016). Therefore, the researchers defined their mathematical models to calculate the appropriate channel and the ideal transmission distance, depending on the application environment, which clearly addressed the human body and especially the neuromodulation capacity (Pierobon, M .; Akyildiz, IF 2011). According to these models, the authors (Akyildiz, IF; Jornet, JM; Pierobon, M. 2010) concluded that " *within a nanonetwork, it is unlikely to achieve single hop transmission distances greater than a few tens of millimeters ... Within this range, the available bandwidth is almost the entire band, from a few hundred to gigahertz to almost ten Terahertz. As a result, the predicted channel capacity of wireless nanosensor networks in the Terahertz band is very promising, on the order of a few terabits per second*."It seems clear that the data and information transfer capacity is quite remarkable, suppose that the network is capable of effectively communicating 1.5 Terabits per second. This would be equivalent to 187 Gigabytes per second. That, coupled with biosensors, would convert to people in an information source or product, capable of being exploited, registered and monitored.

Graphene-Based Plasmon Nanoanthenas for Nanoregrid

The work of (Jornet, JM; Akyildiz, IF 2013) continues the progress in the development of wireless communication nano-networks, focusing on plasmonic nanoanthenas, in the form of graphene nanopatches, as shown in figure 2. As indicated " *graphene-based plasmonic nano-antennas can operate at much lower frequencies than their metallic counterparts, for example, the Terahertz band for a length of one micrometer. This result has the potential to allow EM (electromagnetic) communication in nano-networks . a exploiting the high compression factor of the SPP mode (surface plasmon polariton waves - polaritons surface plasmon) in GNRs (Graphene Nanobelts), graphene-based plasmonic nano-antennas can operate at much lower frequencies than their metallic counterparts, for example, for the Terahertz Band for a ten-nanometer wide micrometer* . " importance of nano-scale graphene nano-antennas to enable the reception of electromagnetic waves and thus wireless communication. In addition, it mentions " *plasmonic nano-antennas* ", which are those capable of operating with high frequencies of Terahertz, thanks to their optical properties, with which they can " *couple to electromagnetic radiation with a specific wavelength*". This concept was already noticed in the post about crystallized graphene fractals, found among the patterns of blood samples from vaccinated people. Specifically, around the reference of (Fang, J .; Wang, D .; DeVault, CT; Chung, TF; Chen, YP; Boltasseva, A .; Kildishev, AV 2017) on improved graphene photodetectors with fractal surface , capable of operating and developing dendritically at a temperature similar to that of blood, forming structures similar to a snowflake. In other words, graphene-based plasmon nanoanthenas, which initially have the form of graphene patches, assimilable to the quantum dots of graphene GQD, evolved to dendritic morphologies of graphene, which increase the signal emission and reception capacities and that by nature are formed in the blood medium, as could be observed.

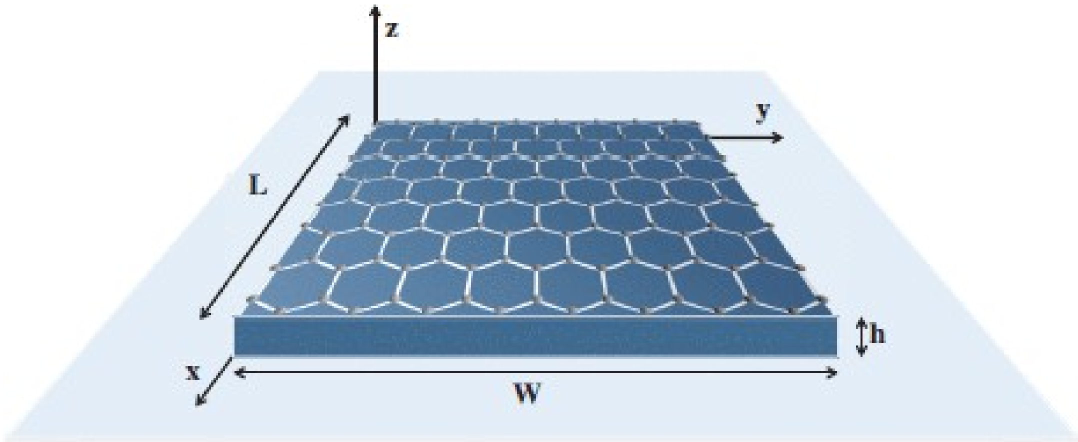

Fig. 4. Graphene nanopatches can have varying dimensions and thickness, which means that GQD graphene quantum dots, graphene nanosheets, and any other form that uses graphene can perform the functions of a nano-antenna. (Jornet, JM; Akyildiz, IF 2013)

Reviewing the work (Jornet, JM; Akyildiz, IF 2013), it also explains the resonance and coupling model of nanoantennas, in the following terms " *the nanoantenna is modeled as a resonant plasmon cavity and its frequency response is determined. The results show that, by exploiting the high-mode compression factor of SPP (Surface Plasmon Polaritons) waves in GNRs (Graphene Nanobelts), graphene-based plasmonic nano-antennas can operate at much lower frequencies than their metallic counterparts, for example, the Terahertz band for a length ten nanometers wide ... For example, a dipole antenna one micrometer long would resonate at approximately 150 THz. The available transmission bandwidth increases with the resonance frequency of the antenna, but so does the loss of propagation ... Due to the very limited power expected from nanodevices* . "In this explanation it is relevant to know the concept of SPP or " *Surface plasmon polaritons* ", which are the electromagnetic waves that propagate through the graphene nano-antenna, which infer in the oscillations of its electrons and therefore in its charge and electromagnetic field, resulting in the signal reception or transmission Due to the scale of the nano-antenna, the bandwidth capacity is optimal for data transfer.

Alveolar nanocommunication and skin penetration

Although graphene is the key nanomaterial for nanocommunication networks, other studies address the propagation of wireless networks through the air contained in the pulmonary alveoli, as explained in the work of (Akkaş, MA 2019). Its introduction is very explicit when placing as early as 1960 (Feynman, RP 1959), the idea of developing nanotechnology to measure and record events and changes in the human body. One of the objectives of this area of knowledge is the creation of nanosensors that can operate in a coordinated way at the nanometric scale, in order to transmit information and data on people's health status, or develop complex biomedical applications. For these purposes, it is necessary to deploy a nanocommunication network for nanosensors,also known by its acronym WNSN (Wireless Nanosensors Networks). In the words of the researchers, such a network needs nano-scale antennas, operating with antennas compatible with bands in the THz range, capable of effectively propagating the signal, without loss. In this way, the nanosensors are interconnected in the wireless network for their coordinated action, transmitting data to a gateway node, which can be the mobile phone or any telephone antenna, which would automatically send the information to the Hospital through the Internet, see figure 5.The nanosensors are interconnected in the wireless network for their coordinated action, transmitting data to a gateway node, which can be the mobile phone or any telephone antenna, which would automatically send the information to the Hospital through the Internet, see figure 5.The nanosensors are interconnected in the wireless network for their coordinated action, transmitting data to a gateway node, which can be the mobile phone or any telephone antenna, which would automatically send the information to the Hospital through the Internet, see figure 5.

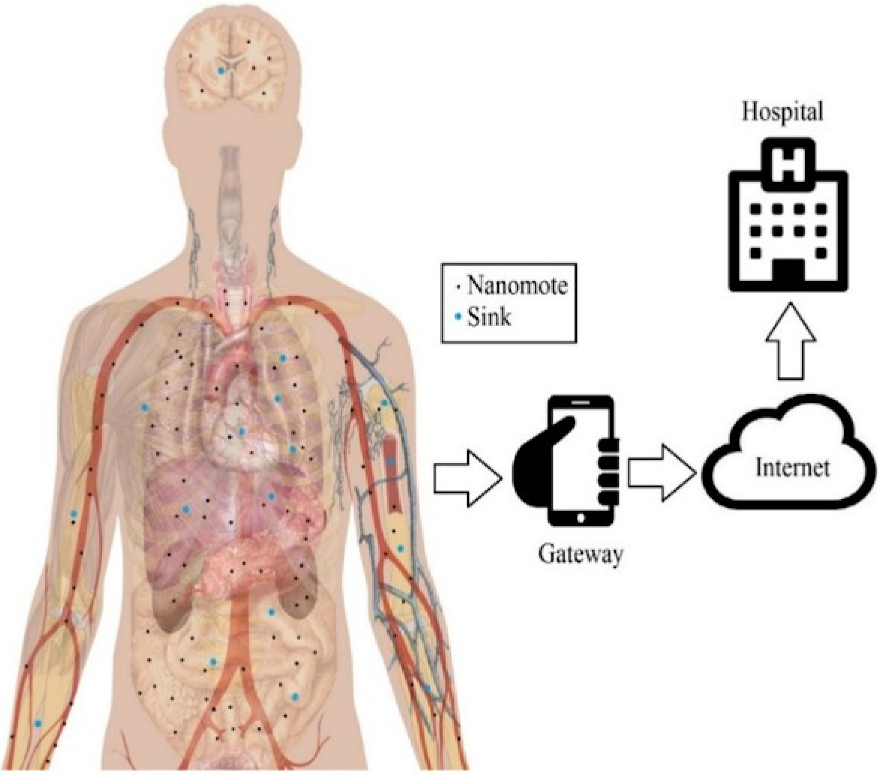

Fig. 5. Internet of bio-nanocoses via WNSN for intra-corporeal applications (Akkaş, MA 2019). Note that the researcher represents the nanosensors distributed throughout the body. Curiously, this coincides with the distribution of the GQD graphene quantum dots according to what has already been observed in the blood tests of vaccinated people, which results in a fairly realistic representation of what was intended.

According to this context (Akkaş, MA 2019) proposes a less invasive method than the GQD graphene quantum dots (at least a priori), to develop the wireless network of nanosensors, this is using the gases and fluids present in the lungs and therefore extension of the circulatory system (CO2, O2, H2O) for the propagation of signals. Although it is not a new idea, it does provide relevant information on the characterization of the wireless THz channel model necessary to achieve the propagation of EM electromagnetic waves in the lungs, alveolar spaces and capillaries and blood. Specifically, three frequency windows stand out: " *ω1 = [0.01 THz - 0.5 THz], ω2 = [0.58 THz - 0.74 THz] and ω3 = [0.77 THz - 0.96 THz]* Although it is recognized that the research is in its early stages, studies are being proposed to analyze and confirm the data obtained from mathematical models with human tissue, in order to quantify the effect of noise and thermodynamics on the human body. This corroborates the methodological procedure followed for graphene in the network propagation studies already described (Akyildiz, IF; Jornet, JM; Pierobon, M. 2010 | Jornet, JM; Akyildiz, IF 2013) and confirms the interest of Science in perfect it.

Another fundamental challenge for wireless nanocommunication networks is the access barriers to the human body, that is, the skin. This is due to the characteristics of the dermis, made up of various layers that diffuse the signal, causing it to lose the path of the channel in nanoelectromagnetic communication. With this approach, the work of (Chopra, N .; Phipott, M .; Alomainy, A .; Abbasi, QH; Qaraqe, K .; Shubair, RM 2016) studies which is the appropriate THz band to penetrate the skin without the signal is lost, until reaching the gateway nano-interface inside the body (graphene / nano-antenna nanodevice, explained later). It is recognized that nanocommunication protocols and models are clear, stating that " *using the EM paradigm; transmission capacity can reach up to Tera-bits per second (Tb / s) at the millimeter level. The IEEE 1906.1 protocol is dedicated to maintaining and defining communication standards at the nanoscale, where molecular and electromagnetic communication are the two modes of communication* . "However, the properties of communication from the outside of the body to the inside pose problems for the distortion that it produces in the signals, which forces to determine the appropriate band and frequency, referring that " *the existing data on human skin are restricted to magnitudes of GHz, while only a few have been published relative to the order of THz. To enrich the database with the parameters of biological tissues in the THz band, emphasis is placed on spectroscopy and modeling of biological tissues. Time Domain Spectroscopy (TDS) THz has a typical range of 0.1 ─ 4 THz, providing the opportunity for broader spectral analysis* . "In conclusion, the authors are able to model the appropriate propagation band and scheme. to minimize noise and discover the cause of communication penetration problems, pointing out that "*the absorption of water (hydration of the skin), the propagation distance and the frequency range affect the loss of trajectory that ends up blurring the signal and with it the message ... Therefore, to pass through human skin, it needs to link communication between antennas and nanodevices present in people's bodies* . "These details fit perfectly with the description of the protocol for nanocommunication networks, which will be explained later.

Routing protocols for wireless nanosensor networks in the IoNT

The propagation of wireless nanocommunication networks, nano-antennas and nanosensors inevitably lead to routing protocols for wireless nanosensor networks in the IoNT or the Internet of Nano Things. Every communication network, even on a nanoscale, requires protocols that allow it to take advantage of its capacity, transmit and receive data in a standardized way. In this sense, there is the reference of (Balghusoon, AO; Mahfoudh, S. 2020) that provides a complete review of protocols, their characteristics and applications to nanocommunications, especially those related to the health system, see figure 6.

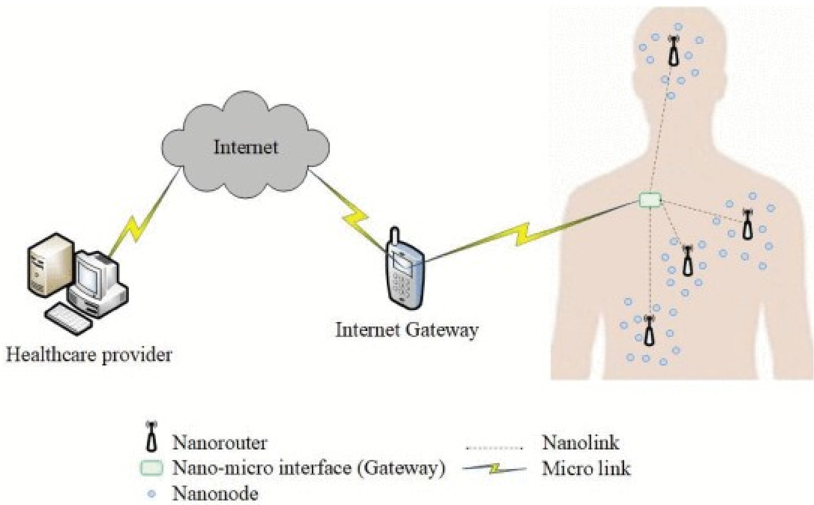

Fig. 6. IoNT architecture in the healthcare system (Balghusoon, AO; Mahfoudh, S. 2020). Note that the same pattern as that shown in figure X-1 is repeated. Nanosensors are observed in the human body and nano-antennas that serve as a repetition of the signals transmitted from the outside, through a gateway or communications node, that is, the mobile phone or a telephone antenna. Data received from the human body is transmitted over the Internet to a medical data provider or server.

In the words of the authors, the IoNT in the biomedical domain, allows for example, the " *monitoring of medical care, intelligent drug administration, nanobionics, regenerative tissue engineering, intracellular or nanoscale surgeries, detection and management of epidemic spread, biohybrid implant and body cell repair, non-invasive imaging tools, morphing stem cells, immune system support, genetic engineering, nanodiagnosis, etc.* ". The allusion to the " *management of the spread of epidemics*" is curious and the omission of neuromodulation as one of the main biomedical applications, as demonstrated in the following works (Wirdatmadja, S .; Johari, P .; Balasubramaniam, S .; Bae, Y .; Stachowiak, MK; Jornet, JM 2018 | Cacciapuoti, AS; Piras, A .; Caleffi, M. 2016 | Malak, D .; Akan, OB 2014 | Suzuki, J .; Boonma, P .; Phan, DH 2014 | Ramezani, H .; Khan, T .; Akan, OB 2018) that will be the subject of an entry in this blog. In their introduction (Balghusoon, AO; Mahfoudh, S. 2020), they also mention relevant applications in the agricultural sector and environmental monitoring, which also coincides with the introduction of graphene in fertilizers and biocides (already explained in several posts on this blog , even in a specialized patent catalog), see figure 7.

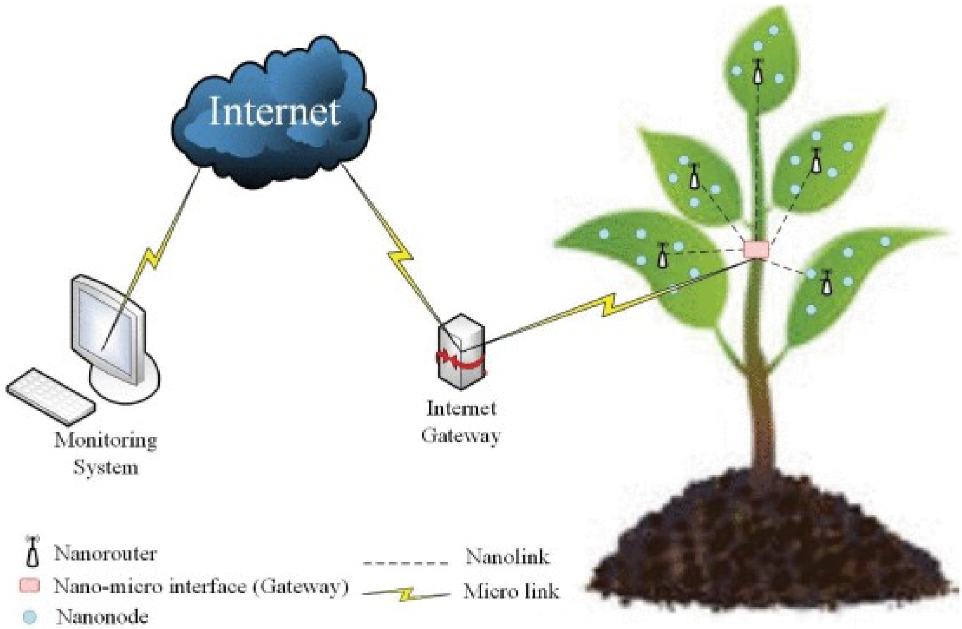

Fig. 7. IoNT architecture for monitoring plants and crops. (Balghusoon, AO; Mahfoudh, S. 2020). Note that the plants also consist of nano-antennas and sensors. The coincidence in the presence of graphene in the blood of vaccinated people and in the patents of fertilizers and biocides for agricultural use is very revealing. In the case of plants, graphene is absorbed by the roots of the plants or through the leaves, given the transdermal properties of graphene, which ends up facilitating its control and monitoring.

In fact, the great parallelism between the networks in the human body and in plants is not accidental. In the words of (Balghusoon, AO; Mahfoudh, S. 2020) the IoNT in the biomedical and agricultural area is made up of the same elements, namely " nanodes, nanorouters, nano-interface and Internet gateway ". Given the interest that their definition has, they are presented in the following list:

- **Nanonodes** . They are defined as " *small and simple nanodevices that can act as nanosensors or actuators, dedicated to detection, measurement, signal processing and storage, with limited capacities. Their location can be fixed (for example, attached, or dynamic, with capacity to target target targets* . "Nanodes could be equated to GQD graphene quantum dots, which spread through the human body, nervous and circulatory system through blood, via inoculation, inhalation, or transdermal contact (Amjadi , M .; Sheykhansari, S .; Nelson, BJ; Sitti, M. 2018).

- **Nanorouter** . According to the definition provided, they are " *nanocontrollers with a size greater than nanodes, whose function is to collect and process the data obtained through the nanodes, taking care of sending, receiving and propagating the information to the gateway nano interface. It is also capable of controlling and coordinating the behavior of nanodes* ". The nanorouters or nanocontrollers could be assimilated to the swimmers or graphene nanoribbons already detected in the patterns of the observed blood samples, due to their larger size compared to the GQD graphene quantum dots, which act as nannodes.
- **Nano interface (Gateway-Gateway)** . It is defined as " *a hybrid device in charge of capturing the signals emitted from the outside and transmitting them inside. It uses the communication of TB (Terahertz Band) to communicate with the nano side (inside the human body or the plant) and the paradigm classic communication with the outside world* ". Therefore, its function is to capture the signals from the outside to modulate the functioning of the nanorouters and nanodes inside the human body. As the nanodes obtain data or information, it propagates in an upward reverse direction towards the nanorouter and finally the nano gateway interface that transmits it to the outside. This component is essential for two-way communication. Nano gateway interface can be assimilated to fractal graphene nano-antennas together with graphene nanoribbons, due to their special characteristics for the reception and emission of signals in the Terahertz bands, although any other component could also do so, due to its composition of graphene at the nanoscale, whether they are graphene quantum dots or nanoribbons. , as will be explained later with the possible network topologies.
- **Internet gateway (Gateway)** . Finally, for the massive data (big-data) to be collected in databases of remote servers, an Internet gateway is needed. In the authors' words, it is defined as " *a device that controls the entire system remotely through the Internet. It is responsible for collecting data from the nano-networks and transmitting them to monitoring devices through the Internet* ." This element can be a mobile phone or any mobile phone antenna, especially 5G, given the bandwidth necessary to collect the magnitude of data per second, which can be obtained from thousands of people inoculated with the compound.

The topology of WNSN networks (Wireless Nanosensor Networks) in which the IoNT is applied, according to what the authors indicate (Balghusoon, AO; Mahfoudh, S. 2020), can be of two types: a) Non-hierarchical architecture and b) Hierarchical architecture.

- In the **non-hierarchical architecture** there are " *identical nanodevices with the same characteristics and capabilities, all being comparable or equivalent, because their electromagnetic properties can be reconfigured by software* ". This topology model is highly probable, according to the evidence of the presence of graphene in vaccines (Campra, P. 2021), the microscopy images that were provided, the characterization of graphene and the tests of the patterns observed in the samples. of blood, especially the GQD graphene quantum dots. In fact, in the research of (Abadal, S.; Liaskos, C.; Tsioliaridou, A.; Ioannidis, S.; Pitsillides, A.; Solé-Pareta, J.; Cabellos-Aparicio, A. 2017) entitled " *Computing and communications for the software-defined metamaterial paradigm: a context analysis "describes that" graphene is inherently tunable, a SDM (software-defined metamaterial) can be created allowing the drivers to change the electrostatic bias applied to the different areas of the graphene sheet ... maintaining their physical (optical) characteristics and thus adding a logical structure*"This statement is essential to understand that graphene can be programmed and controlled as if it were software, as shown in figure 8.

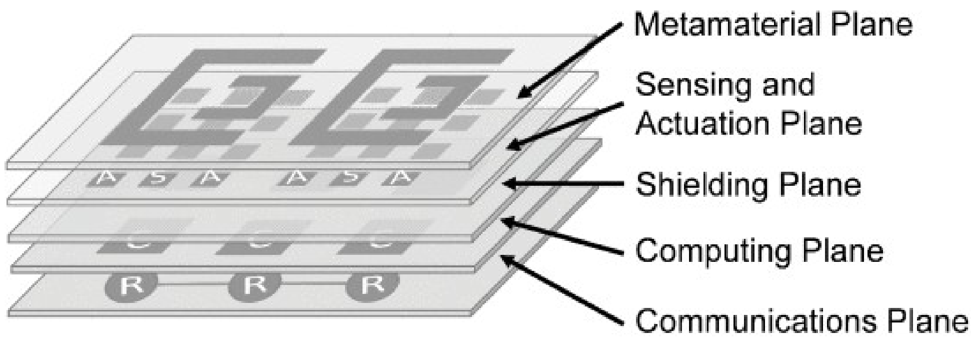

Fig. 8. Scheme of the logical structure of a software-defined metamaterial, graphene being the metamaterial expressly cited by the authors (Abadal, S.; Liaskos, C.; Tsioliaridou, A.; Ioannidis, S.; Pitsillides, A. ; Solé-Pareta, J.; Cabellos-Aparicio, A. 2017)

As can be seen in the figure, this model could be conformed " *to a micrometric or nanometric scale"* using several layers of graphene, which would perform the functions of sensor, actuator, router and communication antenna. A physical characterization is also described that matches with the EM electromagnetic wavelength ranges that have been mentioned, specifically 6GHz and the compatibility with the use of antennas operating in the Terahertz band (0.1-10 THz) In this same work, that of (Abadal, S.; Liaskos, C.; Tsioliaridou, A.; Ioannidis, S.; Pitsillides, A.; Solé-Pareta, J.; Cabellos-Aparicio, A. 2017), it is indicated that one of the simplest methods for modulation and control of these software-defined graphene metamaterials (SDM) is the coding of delay time activation and deactivation TS-OOK, which represents logic pulses for binary encoding of 0 and 1. For example, "a *logical 0 (1) is represented by silence (short pulse), respectively, with a relatively long time between transmissions. This simplifies the receiver and reduces the probability of collisions. Furthermore, this approach can be opportunistically combined with low-weight coding and rate division multiple access to maximize its efficiency* ." Therefore, the" *TS-OOK*", "is the appropriate activation method with which the request-response / client-server mechanisms are enabled in this type of network. On the other hand, analyzing the article by (Abadal, S.; Liaskos, C.; Tsioliaridou, A.; Ioannidis, S.; Pitsillides, A.; Solé-Pareta, J.; Cabellos-Aparicio, A. 2017) is the answer to one of the strangest phenomena that have been observed in people inoculated with the vaccine of the c0r0n @ v | rus. It is the phenomenon of the MAC address that is observed when searching for devices connected by bluetooth. This is because the authors implicitly recognize the inherent existence of the media access control protocol, also known as MAC, expressed in the following words " *Energy harvesting is another pillar of the nanoregrid, as it can enable the concept of perpetual networks. Its impact on the design of the protocol stack of nano-grids has been the subject of intense research in recent years, covering aspects such as power consumption policy or the media access control (MAC) protocol and evaluating performance. network potential. perpetual networks. The metamaterials community could benefit from these contributions, as an important milestone is making SDMs reconfigurable without compromising their autonomy*." This confirms without a doubt that the phenomenon of the MAC address localized through bluetooth is perfectly feasible. This is fully corroborated when the research of (Mohrehkesh, S.; Weigle, MC; Das, SK 2015) with its DRIH-MAC model which is a media access control protocol " *initiated by the receiver for communication between nanodes in a wireless electromagnetic nanoregrid* "that fully matches the electromagnetic environment of graphene and is based on " *the following principles: a) communication begins through the receiver with the aim of maximizing energy use; b) the distributed scheme to access the medium is designed based on the coloring of the graph (distributed and predictive technique); c) communications programming work in coordination with the energy harvesting process* ". For more information, the authors indicate in their conclusions that the DRIH-MAC protocol was *evaluated in comparison with the MAC" in the context of a medical monitoring application. The simulation results showed that DRIH-MAC used energy better ... In the future, we will investigate the use of DRIH-MAC in other applications such as Internet of Nano-Things or a network of nano-robots. Both the traffic model and the application requirements are different in these nanoregrid applications. A possible solution could be a hybrid design of centralized and distributed topologies to address the needs of such networks* . "These findings fully confirm the application of MAC, its use in software-defined graphene nanomaterials (SDM), and the existence of the packet and data protocol as shown in Figures 9 and 10.

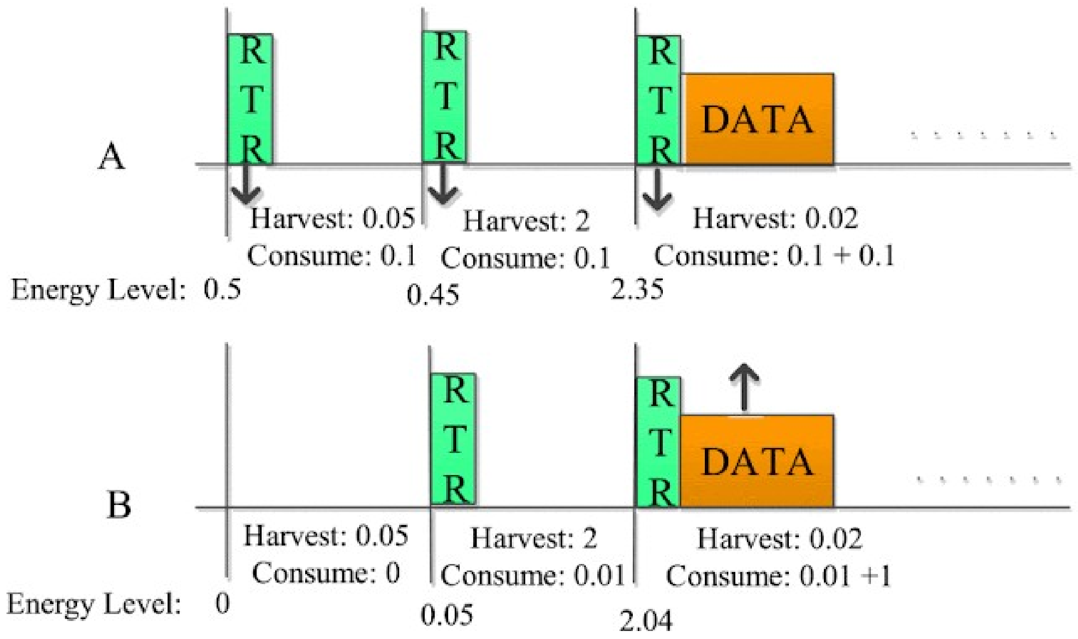

Fig. 9. Scheme of the exchange of data packets, RTR headers (ready to receive) and their optimized energy consumption. (Mohrehkesh, S.; Weigle, MC; Das, SK 2015)

	8 bits
1-2	Packet Sequence ID
3-4	Node ID
5-6	Destination ID (0 reserved for broadcast)
7	Number of Neighbors
8	Maximum Known Degree
9-10	Current Amount of Energy
11	Mode of Comm.
12-14	Ack (optional)
15	Link Color
16-17	Rotation Offset Numbers
18-25	Payload

Fig. 10. RTR header packet preceding the data packet. (Mohrehkesh, S.; Weigle, MC; Das, SK 2015)

Among the quantitative conclusions, the DRIH-MAC method presents an improvement in energy use of 50% compared to the typical MAC protocol, which is essential in nanogrids, due to its limitations linked to scale and the application environment. . Other evidence on MAC in this sense can be found in the work of (Ghafoor, S.; Boujnah, N.; Rehmani, MH; Davy, A. 2020) on " *protocols for nanocommunication in Terahertz* ", the work of (Mohrehkesh, S.; Weigle, MC 2014) on " *optimization of energy consumption in Terahertz band nanowires* " and the article by (Jornet, JM; Akyildiz, IF 2012) on " *communication analysis and joint energy harvesting for perpetual wireless nanosensor networks in the Terahertz band* ", especially relevant because it matches in all cases with the already mentioned Terahertz band of (0.1-10 THz) and for raising the virtually infinite energy target for components of the wireless nanosensor network (WNSN) in the biomedical context of " *intracorporeal drug administration or surveillance networks for the prevention of chemical attacks*." Returning to the non-hierarchical architecture, it is essential to cite the works of (Liaskos, C.; Tsioliaridou, A.; Ioannidis, S.; Kantartzis, N.; Pitsillides, A. 2016 | Tsioliaridou, A.; Liaskos, C.; Pachis, L.;Ioannidis, S .; Pitsillides, A. 2016) since they also mention directly or indirectly as related work the specifications of the physical layer of graphene antennas, necessary for the control of the nanodes and the MAC layer with which to identify the headers and data packets that are transmitted in the network, as well as the basic signal protocol TS-OOK for the transmission and reception of the information, also coinciding with all the characterization already described.

- In the **hierarchical architecture**, there is a three-level network made up of nannodes or nanosensors at the lowest level, nanorouters at the second level, and the nano gateway interface already described above, see figure 11.

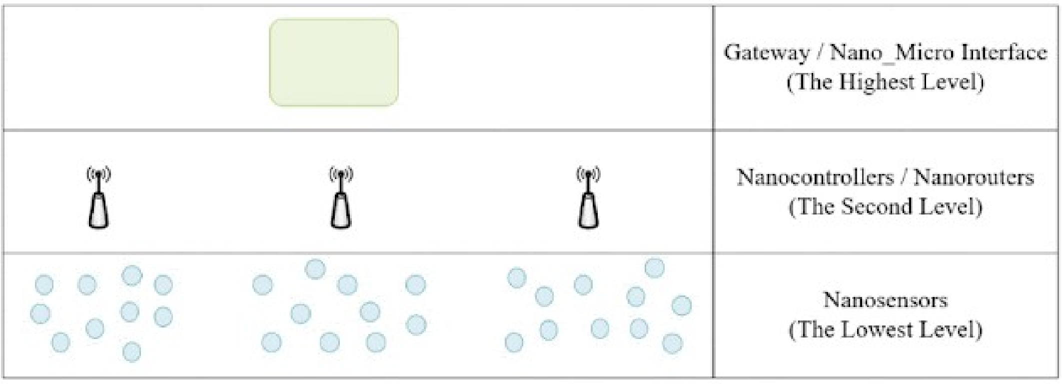

Fig. 11. Components of the nanocommunications network at three levels. (Balghusoon, AO; Mahfoudh, S. 2020)

As can be deduced from the topologies of the nano-networks for the IoNT, it is highly probable that the graphene patterns identified in the blood samples of vaccinated people respond to a hierarchical, non-hierarchical or both at the same time. Although solving this question is difficult in the absence of an in-depth analysis and the collection of more evidence, it does seem to be clear and demonstrated that graphene inoculated in vaccines can perform the functions described here and in effect develop a MAC layer. which is evidenced in the search for bluetooth devices, due to the peculiarities and characteristics of the protocol.

Routing schemes for WNSN

One of the most interesting aspects collected in the protocol review of (Balghusoon, AO; Mahfoudh, S. 2020) and in the works of (Rikhtegar, N.; Javidan, R.; Keshtgari, M. 2017 | Lee, SJ; Jung , C.; Choi, K.; Kim, S. 2015) are the routing schemes for WNSN nanosensor wireless networks. Considering the presence of GQD graphene quantum dots in the observed blood samples, it will be agreed that their location in the circulatory system and in general in the body, is difficult to determine, as it is dynamic, variable, dependent on blood flow and blood flow. Body's movement. This drawback requires that these simple nanosensors / nanodes are capable of transmitting and receiving information from the closest or closest nanorouters / nanocontrollers (given their previously mentioned range limitations),in order to optimize the energy required for data traffic and signal propagation. This is especially the case in hierarchical topologies, as shown in the following figure 12.

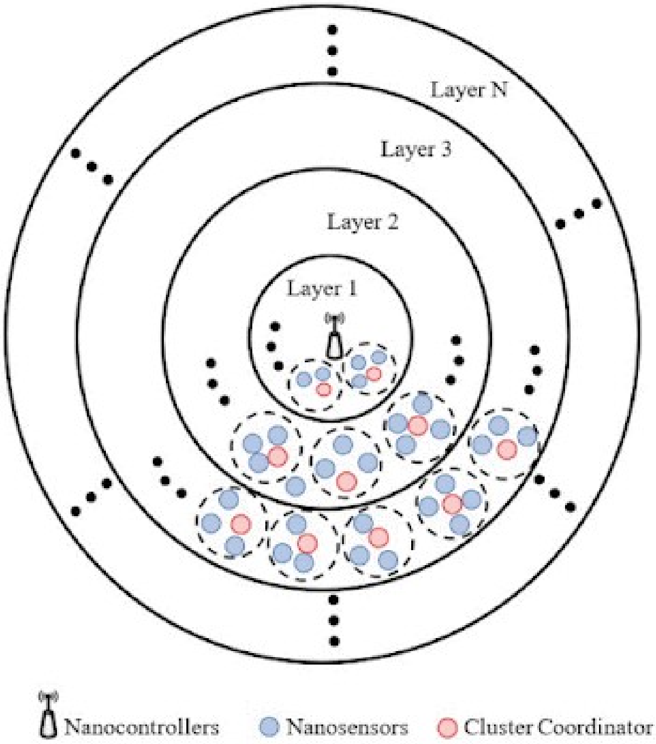

Fig. 12. Note the organization of the nanosensors through clusters in which the information is transmitted through a coordinator node, which reaches the closest group coordinator by proximity, until reaching the nanorouter / nanocontroller that transmits the information outside the body.

This routing model ensures the delivery of the data packets to the gateway nano-interface that is responsible for transmitting / repeating the information outside the body, including in its header the MAC identification, necessary to differentiate the origin of the data

Information transmission with TS-OOK pulses

The transmission of data / information from the nanosensors, as well as the external reception of the modulation / management / programming instructions of the nanoregrid, operate with short pulse protocols such as TS-OOK, called " *activation coding and time propagation deactivation*. " (Jornet, JM; Akyildiz, IF 2011). This is confirmed by the following statement " *graphene-based nano-antennas can radiate these pulses at the frequency of TB (Terahertz Band). In addition, it allows nanodevices to communicate at a very high speed, which allows a very high transmission speed. high in the short range and reduces the possibility of collisions*", also corroborated in the master article by (Wang, P.; Jornet, JM; Malik, MA; Akkari, N.; Akyildiz, IF 2013). TS-OOK encoding is very simple, since it is based on binary values, where a 0 is a silence or omission and a 1 is a fast pulse, see figure 13.

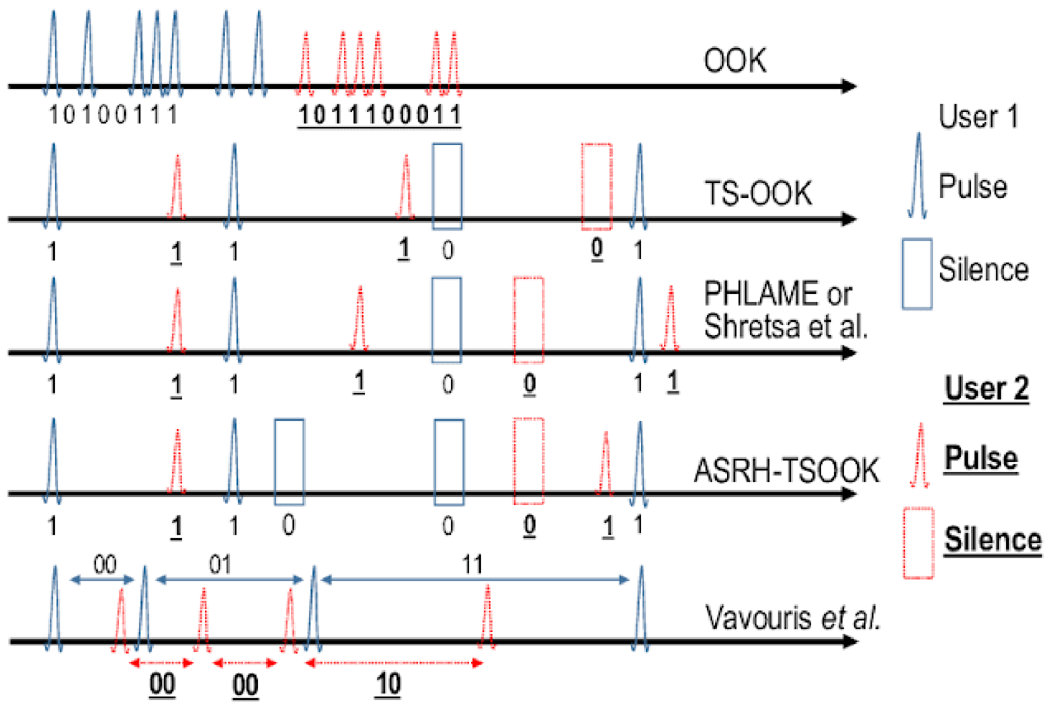

Fig. 13. Comparison between various pulse signals, among which is the TS-OOK and other derivatives. (Lemic, F.; Abadal, S.; Tavernier, W.; Stroobant, P.; Colle, D.; Alarcón, E.; Famaey, J. 2021)

It has the advantage that it is compatible with most of the routing protocols available, including the one related to the WNSN of the IoNT, it can be verified in (Lee, SJ; Jung, C .; Choi, K .; Kim, S. 2015 | Rikhtegar , N .; Javidan, R .; Keshtgari, M. 2017 | Neupane, SR 2014). On the other hand, it also has advantages when it comes to recovering the signal and interpreting it without noise or interruptions, given its operational simplicity. Therefore, knowing these characteristics, it would not be difficult to identify TS-OOK type emissions, using the available measurement instruments.

Feedback

1. In accordance with the above, wireless nanocommunication networks are essential to operate the ecosystem of graphene-based sensors in the human body, in order to modulate and transfer data and information. GQD graphene quantum dots, graphene fractal nano-antennas, and swimmers or graphene nanoribbons, observed in blood samples from vaccinated people, are referred to in scientific literature as nanodes, nanosensors, nanocontrollers, nanorouters, and nano gateway interfaces. . This verifies the presence of graphene-based nano-grids in the people inoculated with the vaccines.
2. It has been demonstrated that the components of the nanoregrid are communicated through the effect of signal propagation, using the nanoelectromagnetic communication method, although it cannot be completely ruled out that molecular nanocommunication is being used, also used for neuromodulation purposes. optogenetics, according to the scientific literature consulted. In the context of nanoelectromagnetic communication, the appropriate Terahertz band is in the range (0.1 — 10.0 THz). To cross the barrier of human skin, a range of (0.1 — 4 THz) is defined. For the propagation of the signal through the blood and gases resident in the lungs, the range is (0.01 — 0.96 THz). This ensures that signals transmitted from outside (e.g. 5G cell masts and mobile phones),they can interact with the nano-networks present inside the body of people inoculated with the c0r0n @ v | rus vaccines.

3. It has been demonstrated that the components of the nanoregrid can be programmed, not only by the physical characteristics and functional distribution of its layers in GQD graphene quantum dots or similar, but also by being capable of receiving and transmitting TS-OOK signals with which they encode. data packets and headers with binary codes 0 and 1, according to the communication protocols of the IEEE (Institute of Electrical and Electronic Engineers). The electro-optical-magnetic properties of graphene make it possible to create simple computer programs for its operation and functionalities in the human body. The most likely applications of these programs, in the context presented here, is the administration of drugs (extensively cited in all the articles consulted) and neuromodulation,by overcoming the blood-brain barrier and depositing graphene nanodes in neuronal tissue. Nor can we rule out the possibility of inferring the functioning of muscles such as the heart, which could explain symptoms of arrhythmias, inflammation and heart attacks. However, this aspect is being analyzed to confirm the hypothesis.
4. It has been demonstrated that nanowires with graphene quantum dots and other derivatives are used for many different purposes and applications, including the monitoring of the human body and its main organs, with all that that entails, especially neuronal activity and the nervous system. central. For this objective, molecular communication is postulated as the most appropriate, due to its ability to measure the charge of electrons in neurotransmitters, with which it is possible to determine such relevant aspects as the sensation of pain, happiness, reward, conditioning, stimuli. , learning, addiction, etc. There have also been direct addresses to the use of these technologies in the monitoring of plants, crops and ultimately the agricultural sector,which confirms the hypothesis of the introduction of graphene in plants through fertilizers and phytosanitary products, as has already been warned in this blog.
5. It has been shown that every nanoregrid inoculated through vaccines is composed of nanodes that operate, either in hierarchical topology mode (in which case the quantum dots of graphene and other elements found, transmit information from bottom to top to nanorouters or nanocontrollers), or in the non-hierarchical topology mode that implies that graphene components are autonomous in the recording of data and signals, their transmission, activation and programming.
6. It has been shown that graphene nanodevice nanowires operate with data protocols and with MAC addresses, which necessarily implies MAC protocols (already widely cited in this post), with which the sending node of the electromagnetic signals is identified with the data obtained through graphene nanosensors (call it graphene quantum dots) and the recipient, see the header of the data packets in Figure 10. Therefore, it is evident that the phenomenon of the MAC addresses of vaccinated people, which appear at the activating the search for Bluetooth devices on the mobile phone is a real phenomenon, which demonstrates in itself the presence of a nano-network that transmits data and information from its carrier and receives signals, for the operation of the nanodes and biosensors provided in said network. In order to abstract the concept, people inoculated with the so-called c0r0n @ v | rus vaccine, would have installed the necessary hardware for their remote and wireless control without knowing it, being identified with a MAC address, which allows differentiating the transmission of data from some individuals to others. The TS-OOK protocol can transmit the headers of data packets in a similar way to how the client / server communication model would on the Internet. The data sent with the MAC identifier of each person is probably received by their mobile phone and sent through the Internet to a server with a massive database, for management and administration with Big-Data and Artificial Intelligence techniques.

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