

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.

Friday, November 5, 2021

The 1450 Raman spectrum in the c0r0n @ v | rus vaccine vials. A review of the scientific literature

The technical report presented by the doctor (Campra, P. 2021) on November 2, 2021 shows an [exhaustive Raman spectroscopy analysis](#), with the aim of identifying the materials and objects observed in the c0r0n @ v | rus vaccines. The methodology used is flawless and the degree of complexity very high, taking into account the difficulties and impediments to its implementation, such as the lack of adequate means, personnel and resources, as well as the lack of support from health and government authorities. Despite these problems, Dr. Campra has managed to characterize and detect 28 graphene-compatible objects, out of the 110 observed in the vials of the Pfizer, Moderna and Jansen vaccines, which represents a success in the identification work, but also a problem of unimaginable proportions for the population and public health in general, both due to the consequences of the inoculation of these [toxic materials](#) (still unknown in the medium and long term), as well as everything that is still unknown in terms of components, and their true applications and intentions (which are already beginning to be speculated and proposed as [working hypotheses](#)).

In order to assist in the research initiated by Dr. Campra, C0r0n @ 2Inspect has carried out an expert search for one of the spectra observed in the evidence obtained on the objects of the vaccine vials. Specifically, it is the $\sim 1450 \text{ cm}^{-1}$ peak and its close values, which frequently appear together with graphene in many of the samples analyzed. Each of them are discussed below.

PVA Hydrogel (Polyvinyl Alcohol - Polyvinyl Alcohol)

PVA, known as Polyvinyl Alcohol, was one of the materials that presented a peak value coinciding with the observed samples, see figure 1. It has also recently appeared in a graphic identification of patterns in c0r0n @ v | rus vaccines, [in the form of bubbles or colloids](#) with which anisotropic colloidal rotor swimmers (more commonly called self-propelled nano-worms) can be composed. The PVA hydrogel has special properties that make it a biocompatible material, as it is capable of imitating the tissues of the human body, so it can be used as substitutes for soft tissues (Jiang, S.; Liu, S.; Feng, W . 2011). It can also be used in the replacement of cartilage (Stammen, JA; Williams, S.; Ku, DN; Guldberg, RE 2001), the manufacture of artificial corneas (Wang, J.; Gao, C.; Zhang, Y. ; Wan, Y. 2010), and even wound healing (Fan, L.; Yang, H.; Yang, J.; Peng, M.; Hu, J. 2016). However, when PVA hydrogel is combined with graphene or carbon nanotubes, the intentions of the applications are different. For instance, in the work of (Shi, Y.; Xiong, D.; Li, J.; Wang, K.; Wang, N. 2017) The objective of PVA is the repair of the reduced graphene oxide rGO, when it is irradiated by gamma rays or Either by degradation that generates the liberation of free radicals, which increases the resistance of the material.

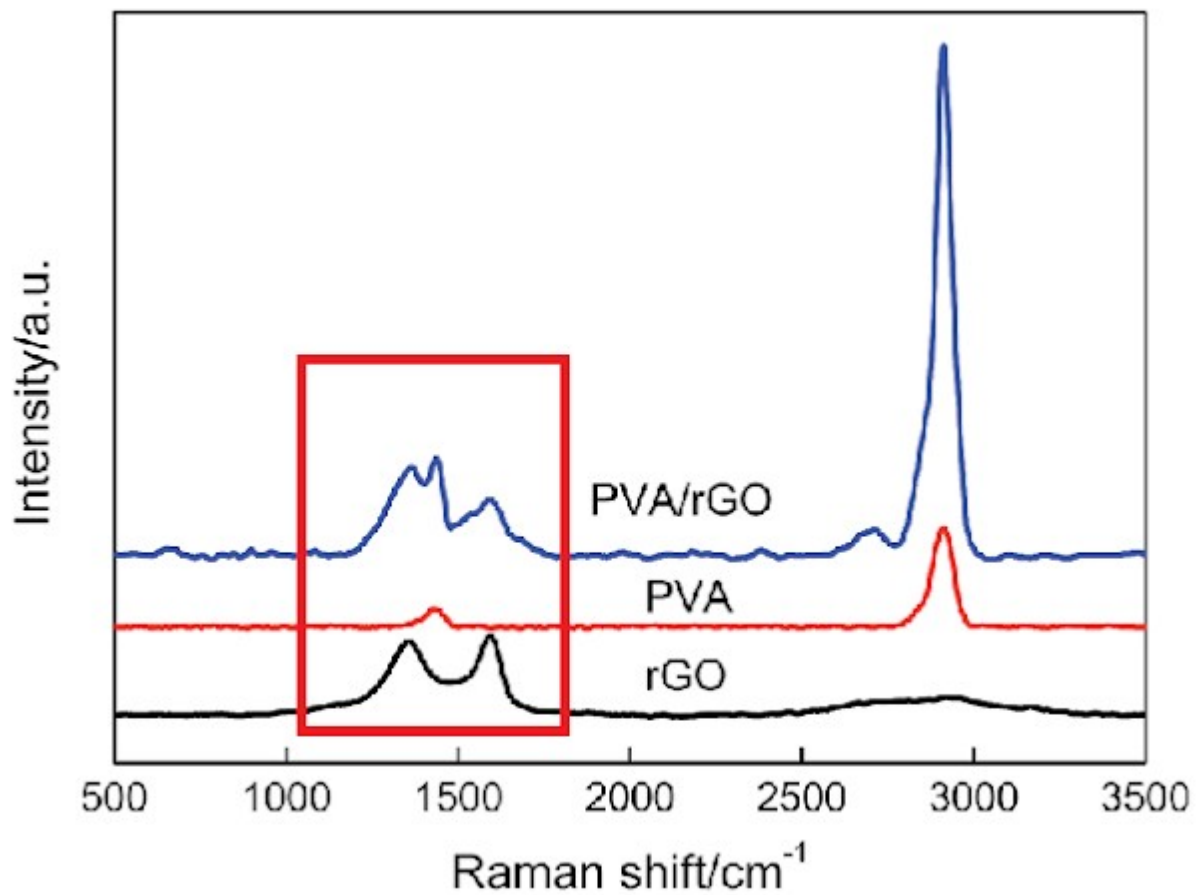


Fig. 1. Peak value of PVA in isolation and in combination with reduced graphene oxide. (Shi, Y.; Xiong, D.; Li, J.; Wang, K.; Wang, N. 2017)

This resistance is important, if it is to apply graphene or carbon nanotubes and derivatives, in the context of neural applications. There is evidence that the use of graphene together with hydrogels improves the biocompatibility of graphene, which adapts to neuronal tissue and astrocytes of the hippocampus (Martín, C.; Merino, S.; González-Domínguez, JM; Rauti, R.; Ballerini, L.; Prato, M.; Vázquez, E. 2017). These applications are corroborated in works such as that of (Zeinali, K.; Khorasani, MT; Rashidi, A.; Daliri-Joupari, M. 2021) related to the regeneration of nervous tissues, using PVA airgel solutions and graphene oxide, leading researchers to use these materials in neural tissue engineering. Proof of this is the development of artificial sensory neurons, as shown (Wan, C.; Cai, P.; Guo, X.; Wang, M.; Matsuhisa, N.; Yang, L.; Chen, X. 2020) where a type of artificial neuron is manufactured and characterized among whose fundamental materials are the carbon nanotubes (also identified in vaccine samples) and the polyvinyl alcohol hydrogel that has the function of serving as an ionic wire that transmits electrical stimuli "like the axon in an afferent nerve, that carries information from the two sensory channels" This allows to compose electrolyte-activated synaptic transistors that manage to imitate the synaptic plasticity of the neurological principles of learning and memory. In this line of research, it is worth highlighting the review work of (He, Y.; Zhu, L.; Zhu, Y.; Chen, C.; Jiang, S.; Liu, R.; Wan, Q. 2021) oriented to the development and evolution of emerging neuromorphic devices based on transistors, where PVA is the essential material to configure the proton electrolyte of the neuromorphic transistor and graphene as a superconducting material to enable the transmission of stimuli due to its superconducting properties. The ionic conduction capacity of hydrogels and specifically of PVA, seems to provide a wide coverage of bioelectronic applications than otherwise shape would not be possible. This is what is stated in the work of (Jia, M.; Rolandi, M.

2020). According to analysis, the ability to monitor, control or intervene in biological processes and especially neural and cardiac stimulation and recording depend, among others, on carbon materials such as carbon nanotubes (CNT) and graphene doped with other conductive polymers, including among others the PVA hydrogel. Also mentioned is the possibility that they can act as a transport for the release of drugs and biomolecules, in localized areas of the brain, according to the reception of electrical signals or the activation of certain brain regions. control or intervene in biological processes and especially neural and cardiac stimulation and recording depend, among others, on carbon materials such as carbon nanotubes (CNT) and graphene doped with other conductive polymers, including PVA hydrogel, among others. . Also mentioned is the possibility that they can act as a transport for the release of drugs and biomolecules, in localized areas of the brain, according to the reception of electrical signals or the activation of certain brain regions. Also mentioned is the possibility that they can act as a transport for the release of drugs and biomolecules, in localized areas of the brain, according to the reception of electrical signals or the activation of certain brain regions. Also mentioned is the possibility that they can act as a transport for the release of drugs and biomolecules, in localized areas of the brain, according to the reception of electrical signals or the activation of certain brain regions. Also mentioned is the possibility that they can act as a transport for the release of drugs and biomolecules, in localized areas of the brain, according to the reception of electrical signals or the activation of certain brain regions.

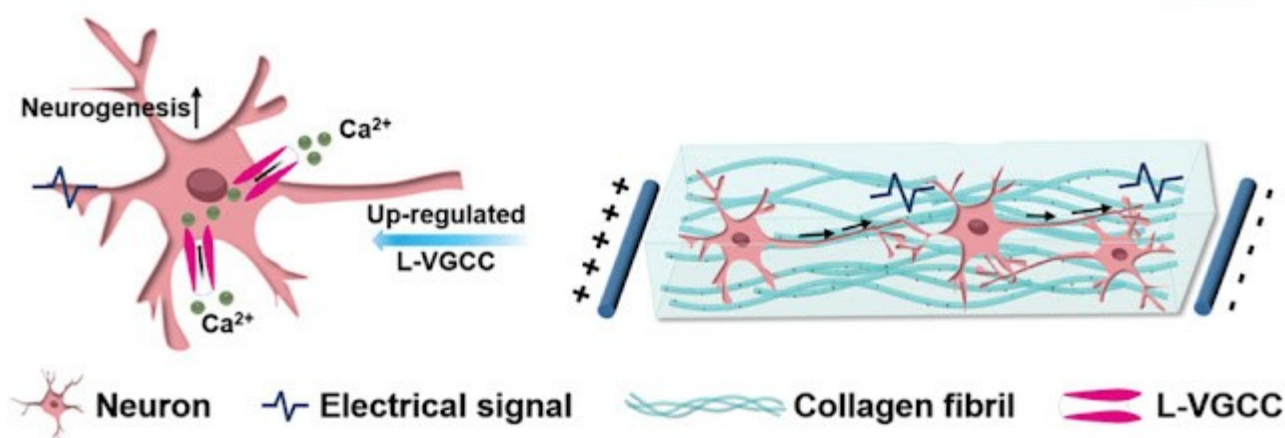


Fig. 2. Diagram of the conductivity of hydrogels in neuronal tissue. (Jia, M.; Rolandi, M. 2020)

Furthermore, it is stated that hydrogels can act as electrical conductors which increases the electrical activity of neuronal tissue and its interconnection. These facts, together with the ability of the material to overcome the blood-brain barrier (BBB), allow us to infer that there is a real possibility that the materials present in the vaccine vials may lodge in the neuronal tissue, opening the doors to the possibility of wireless neuromodulation and neurostimulation, as explained in previous posts [on the neural interface](#) and [communication networks for nanotechnology in the human body](#). Although the article by (Jia, M. ; Rolandi, M. 2020) does not mention the PVA hydrogel in cardiac applications, although it does so in relation to another hydrogel, gelatin methacrylate (GelMA) with carbon nanotubes, which acts "like functional heart patches, showing three times higher spontaneous synchronous beat rates and an 85% lower excitation threshold, compared to those grown in pristine GelMA hydrogels". It is very relevant, since it shows that hydrogels have an important role in cardiac muscle modulation. Because the presence

of these materials has been detected in c0r0n @ v | rus vaccines and by virtue of the observation of an increase in the cases of cardiac affections (see Annex 1), it is possible to think that there may be a cause-effect relationship, directly linked to the inoculation and deposition via the arterial route in the circulatory system.

Returning to the bibliographic review, it is found that the PVA hydrogel is also competent acting as biocompatible electrodes with living tissues, due to the properties already mentioned and the fact of having a rigidity " comparable to that of brain tissue, which greatly reduces measured the mechanical mismatch at the neural interface "(Liu, S .; Zhao, Y .; Hao, W .; Zhang, XD; Ming, D. 2020). This statement is coupled with the consideration that " improves the quality of brain monitoring signals. Which is an effective way to optimize neural interfaces"that remain stable in the long term (Oribe, S .; Yoshida, S .; Kusama, S .; Osawa, SI; Nakagawa, A .; Iwasaki, M .; Nishizawa, M. 2019). Graphene-based fibers and carbon nanotube-based structures are covered by the hydrogel, which allows their introduction into brain tissue, settling properly without having an immune response that causes rejection. (Adorinni, S .; Rozhin, P .; Marchesan, S. 2021) also links hydrogels with carbon nanotubes and graphene in neuronal reconnection applications, where carbon nanotubes (CNTs) act as a structural scaffold to link activity electrical tissue, by way of conductive cables.

Polyacrylamide Gel (Polyacrylamide)

Another possible candidate for the 1450 cm⁻¹ peak value is gelatin / polyacrylamide gel, commonly used for magnetic resonance imaging radiation dosimetry (Baldock, C .; Rintoul, L .; Keevil, SF; Pope, JM; George , GA 1998). The Raman values can be checked in figure 3.

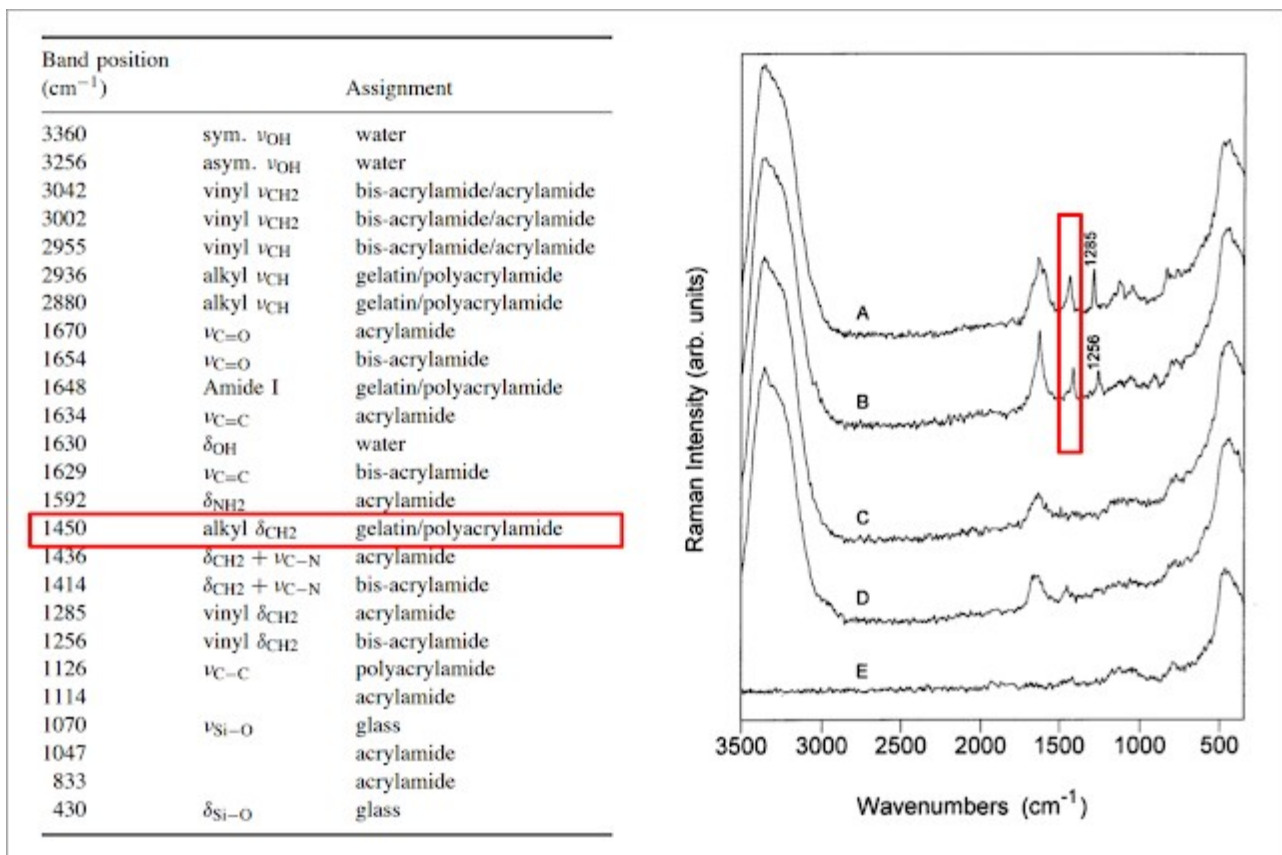


Fig. 3. Table of Raman values linked to polyacrylamide and its spectrographic representation. (Baldock, C .; Rintoul, L .; Keevil, SF; Pope, JM; George, GA 1998)

Curiously, the polyacrylamide gel already appeared in an [article previously analyzed on the in-vivo interactions of graphene oxide in the blood](#), in which the toxic effects and pathologies that it could cause in the lungs, blood, liver and kidneys, were concluded. only 7 days after inoculation, see (Palmieri, V.; Perini, G.; De-Spirito, M.; Papi, M. 2019). In this publication, it is also added that graphene oxide "GO-polyacrylamide"(GO-PAM), among other hydrogel combinations, is a powerful protein absorbing agent, with an efficiency slightly higher than 90%, generating a "biomolecular crown", which causes the inhibition of hemolysis and thus thrombosis, see figure 4. GO-PAM also causes the release of cytokines in its interaction with macrophages, which in a massive way has come to be called the "cytokine storm." This is corroborated by (Zhang, X.; Wei, C.; Li, Y.; Li, Y.; Chen, G.; He, Y.; Yu, D. 2020) that describes the possible ability of graphene oxide nanofilms to regenerate bone tissue, although with a high risk of cytotoxicity, dependent on the induced dose.

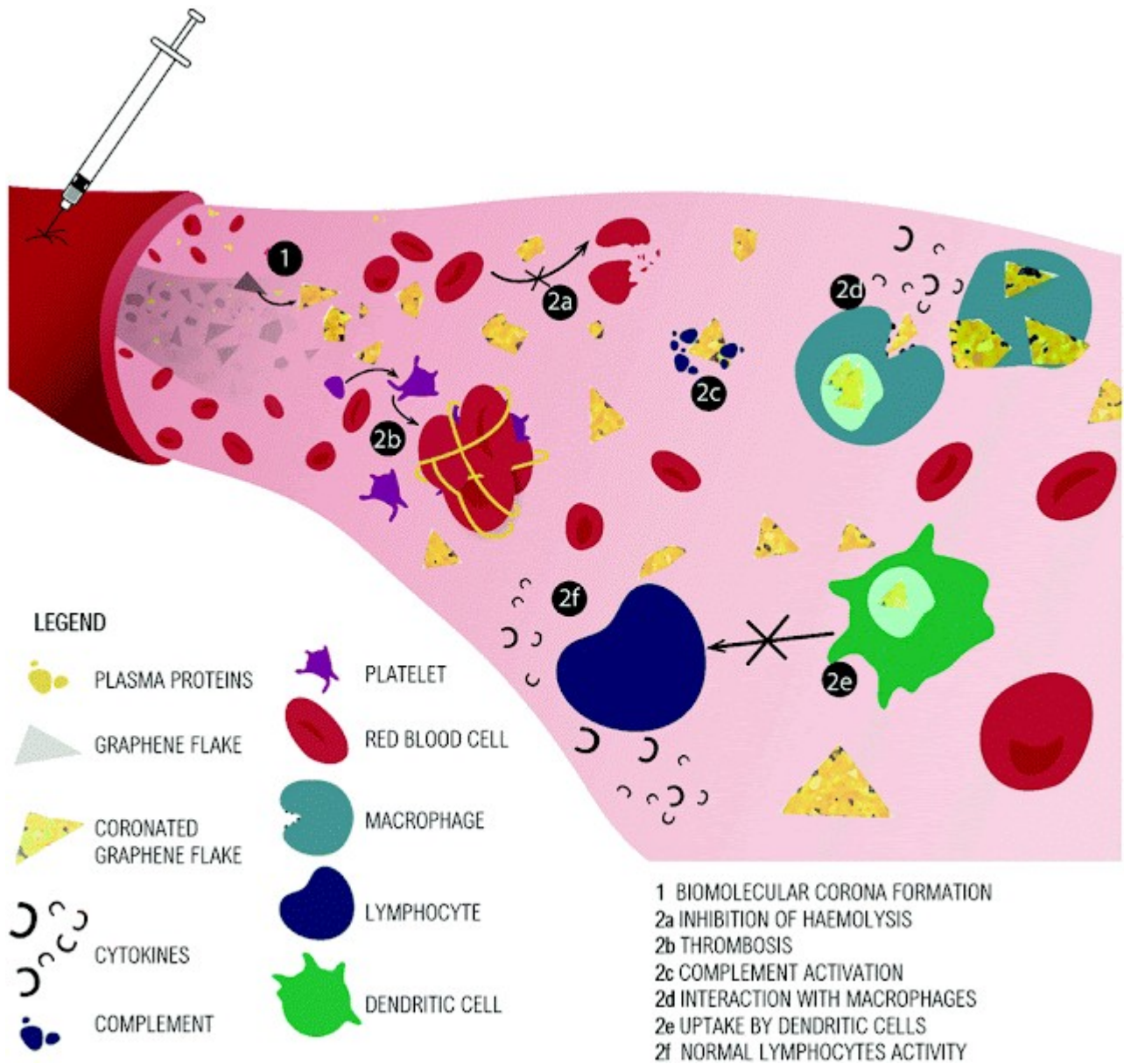


Fig. 4. Scheme of the effects of the GO-PAM graphene flakes mentioned in the publication of (Palmieri, V.; Perini, G.; De-Spirito, M.; Papi, M. 2019)

Paradoxically, molybdenum disulfide synthesized with polyacrylamide (CPAM / MoS₂) has been shown to be an effective compound for the removal of graphene oxide from aqueous solutions, as stated (Wang, J .; Zhu, M .; Chen, Z .; Chen, Y .; Hayat, T .; Alsaedi, A .; Wang, X. 2019) in his scientific work. This effect was achieved by the effect of electrostatic attraction and the capture (absorption) of the hydrogen bonds of graphene oxide "GO". It is worth noting that the authors of the study mention graphene oxide as " *contamination that must be managed*", responding to the need to develop decontamination methods in various fields such as biomedicine and environmental pollution, even stating that " *there is evidence that shows that GO is the most toxic graphene-based material and can damage various organisms, including bacteria, animals and humans* ", which leaves no doubt of its dangerousness.

Polyacrylamide graphene oxide hydrogels (PAM / GO) have multiple applications such as neuronal differentiation (Zhao, Y .; Wang, Y .; Niu, C .; Zhang, L .; Li, G .; Yang, Y. 2018), tissue engineering (Liu, X .; Miller, AL; Waletzki, BE; Lu, L. 2018), and even more importantly, the development of glial interfaces of graphene (Fabbri, R .; Saracino, E .; Treossi, E .; Zamboni, R .; Palermo, V .; Benfenati, V. 2021). This latest study is the scientific proof that polyacrylamide, together with graphene oxide, can be used to create a gateway with the neuronal synapse, which allows neuromodulation and neurostimulation. It is shown that PAM / GO and other derivatives of graphene oxide "GO" can be used to treat epilepsy, Alzheimer's and even Parkinson's, due to their radio-modulable characteristics, acting as electrodes for the glia of neurons. However, this statement is contradicted by previous studies that explain the toxic effect of graphene oxide, [capable of causing neurodegenerative diseases](#) (Chen, HT; Wu, HY; Shih, CH; Jan, TR 2015 | Dowaidar, M. 2021 | Alpert, O .; Begun, L .; Garren, P .; Solhkhah, R. 2020), which comes to be defined as an excuse to justify the investigation and pursuit of other more ambitious objectives. In fact, the following statements are made in the conclusions section: " *We provide evidence that highlights the critical importance of selective investigation of molecular signals and physiological processes underlying the functionality of glial cells and networks. Novel devices that allow the control and modulation of glial signaling may have significant potential in the study and treatment of neurodegenerative diseases that affect the CNS, PNS, or sensory functions such as vision and balance. We suggest, using recent results, that the interconnection of graphene nanomaterials with glial cells may be the optimal strategy to achieve a combination of selectivity, resolution, mechanical flexibility, and biocompatibility to be successfully exploited in nanoscale glial interface engineering ...Glial engineering based on graphene and glial interfaces may be helpful in uncovering the unexplored domain of the role of glial cells in the brain and sensory circuits, where deepening our understanding of the role of calcium signaling, ion channels, and aquaporins, we can achieve a broader understanding of glial functionality in an attempt to trigger and control their mechanisms and functional properties in brain function and dysfunction. we can achieve a broader understanding of glial functionality in an attempt to trigger and control its mechanisms and functional properties in brain function and dysfunction. we can achieve a broader understanding of glial functionality in an attempt to trigger and control its mechanisms and functional properties in brain function and dysfunction. However, graphene-based glial engineering and glial interfaces may generate a new class of bi-directional brain-machine interfaces for the diagnosis and therapy of clinically intractable neuropathological conditions. Consequently, graphene-based glial interfaces may represent a new bioelectronic approach .* "This shows, once again, the interest in using graphene nanomaterials and hydrogels for neuromodulation, neurostimulation and monitoring of brain areas, with the justification therapeutic treatment, which has already left the door open to other not so noble and licit uses, such as neuronal interference, in people inoculated with graphene oxide / PVA / PAM hydrogels.

By way of clarification for new readers, graphene oxide is a nanomaterial capable of absorbing electromagnetic waves (microwaves) and propagating them through the human body (when inoculated), thereby transmitting TS-OOK signals with which data packets in which the data collected by biosensors graphene configured encapsulated quantum dots graphene , nano-graphene transistors , graphene SDM, etc. Given the properties of graphene and carbon nanotubes to Overcoming the blood-brain barrier , the nanomaterial can lodge in brain tissue, covering neurons, glia and astrocytes, promoting their interconnection, but also adding an interaction layer (here called glial interface) with which electromagnetic signals (microwaves) that are propagated by the rest of the graphene components (forming a nano-communications network). This allows the brain of inoculated people to be susceptible to wireless neurostimulation., his neuromodulation, monitoring, interfering in his natural functioning, causing the unfailing loss of freedom and free will, being subjected to external stimuli that are alien to him and he cannot control. Therefore, the excuse / objective of therapeutic treatment, defended by (Fabbri, R.; Saracino, E.; Treossi, E.; Zamboni, R.; Palermo, V.; Benfenati, V. 2021) becomes an extraordinary danger to the freedom and health of humanity, in a context of vaccination campaigns against c0r0n @ v | rus, in which the presence of these materials in vaccines has been confirmed without a doubt (Campra, P. 2021) and possibly all kinds of injectable compounds, as it is patented for the production of Overcoming the blood-brain barrier as studied in the patent (KR20210028062A. 2020).

Polymer PQT-12

The 1457 spectrum of the PQT-12 polymer is very close to the 1450 value sought in the review of the scientific literature. This can be found referred to in the Raman spectroscopy studies of (Pandey, RK; Singh, AK; Prakash, R. 2014 | Pandey, RK; Singh, AK; Upadhyay, C .; Prakash, R. 2014), as can observed in Figures 5 and 6. Interestingly, by way of a note, these references present PQT-12 as a polymer that facilitates molecular self-ordering (that is, self-assembly) and improves the performance of organic electronic devices.

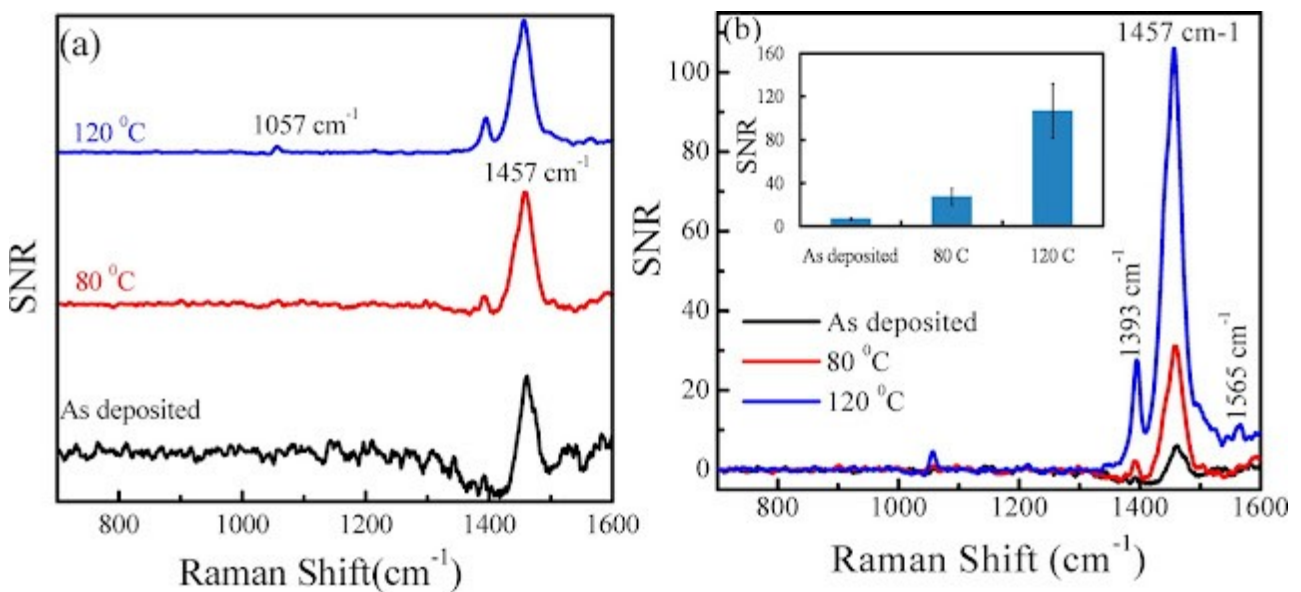


Fig. 5. Normalized Raman spectra of the analyzed PQT-12 films. (Pandey, RK; Singh, AK; Prakash, R. 2014)

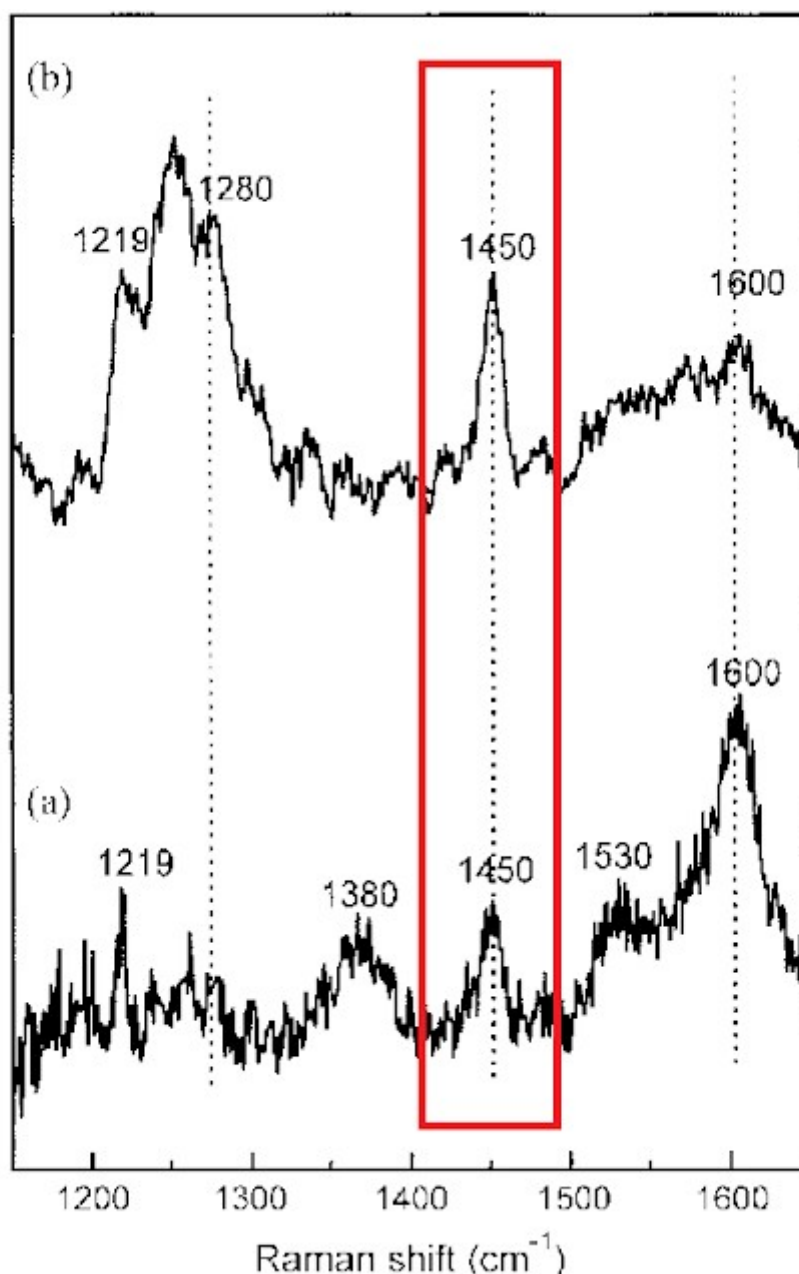


Fig. 8. Raman spectrum of *N*-Dimethyl Aminobenzoic Acid. (Choe, JG; Kim, YH; Yun, MJ; Lee, SJ; Kim, G.; Jeong, SC 2001)

CH2-CH3

The *N*-Dimethyl Aminobenzoic Acid appears with a 1450 spectrum in the scientific literature, as observed in figure 8, corresponding to the work of (Choe, JG; Kim, YH; Yun, MJ; Lee, SJ; Kim, G.; Jeong, SC 2001) on intramolecular charge transfer of aqueous cyclodextrin solutions of Dimethyl Aminobenzoic acid. However, there are almost no articles related to graphene or other known materials present in carbon nanotubes, at least so far. Relationships with perovskites were obtained, as mentioned in the work of (Bonabi-Naghadeh, S.; Luo, B.; Abdelmageed, G.; Pu, YC; Zhang, C.; Zhang, JZ 2018), what that allows inferring the hypothesis that it could be used in the production of electronic devices.

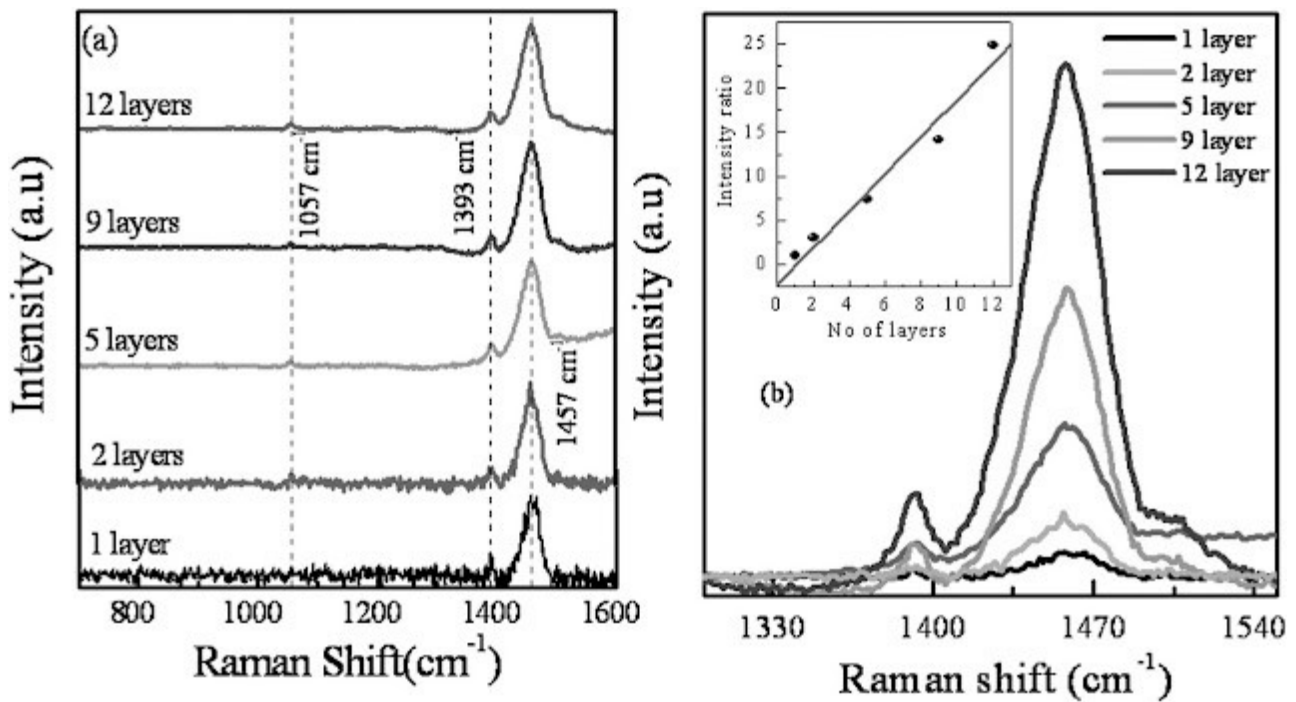


Fig. 6. Raman spectra of PQT-12 films in various layers. (Pandey, RK; Singh, AK; Upadhyay, C.; Prakash, R. 2014)

On the other hand, the PQT-12 polymer is combined with graphene and halide perovskites (crystalline structure of various materials, characterized by its magnetoresistance, superconductivity and lower production cost than silicon), to form synaptic devices (memristors , resistive memories, photoconductors, transistors and photonic flash memories) for interaction with the neuronal complex, so that " synaptic plasticity and the learning process can be emulated ", as explained (Chen, S.; Huang, J. 2020) in their investigation. In fact they argue in their conclusions that " Compared to other materials, Halide (HP) perovskites have unique electrical and optical properties including ion migration, charge capture effects caused by intrinsic defects, excellent light absorption efficiency, high charge mobility, and long useful life of the load, which provides a guarantee for the multilevel modulation of the synaptic weight, of the artificial synapses based on HP and shows great potential in the further development of neuromorphic computing. With the rapid development of HP-based electrical devices, such as memristors, in recent decades, HP-based electrical stimulation synaptic devices have been successfully implemented, promoting the development of HP-based artificial synapses towards a more complex hybrid optical-electrical modulation". In other words, the PQT-12 polymer, together with graphene and halide perovskites at the nano-scale, allow the configuration of the electronics necessary to create artificial synapses with which to emulate the processes of biological thought and reasoning, typical of the human brain, which is also corroborated in the work of (Dai, S.; Zhao, Y.; Wang, Y.; Zhang, J.; Fang, L.; Jin, S.; Huang, J. 2019). However, it is fair to point out that these studies do not provide an in-vivo application, focusing on the electronic emulation aspect of the neuronal synapse. However, PQT-12 is also combined with graphene, forming hydrogels in which it is sought to improve its biocompatibility, reduce its degradation and conductive capacity. In the article by (Chakraborty, P.; Das, S.; Nandi, AK 2019) this is referred to, as is the citation of PVA and graphene hydrogels, among others.

NN Dimethylacrylamide

NN Dimethylacrylamide has a spectrum of 1453, also very close to the 1450 target, as seen in Figure 7, according to the data recorded in (ChemicalBook. 2017). However, the bibliographic references combined with graphene are reduced, unlike other materials already cited.

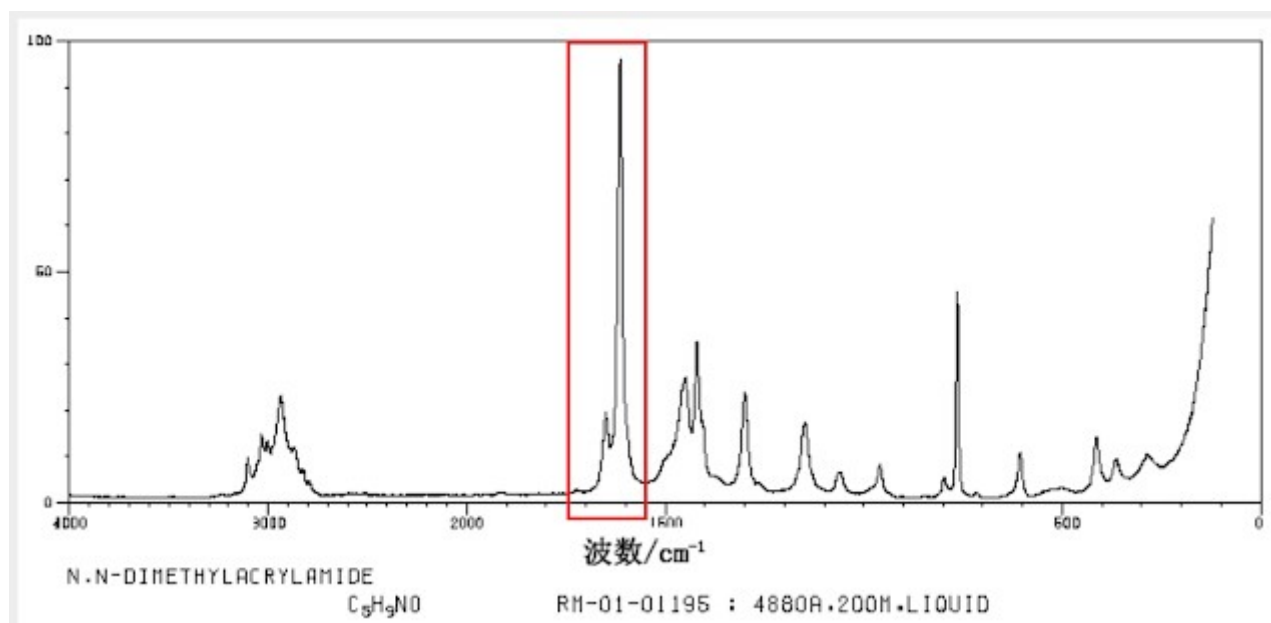


Fig. 7. Raman spectrum of NN Dimethylacrylamide. (ChemicalBook. 2017)

Among the most notable studies of NN Dimethylacrylamide, graphene and biomedical applications, it is worth mentioning that of (Weng, L.; Gouldstone, A.; Wu, Y.; Chen, W. 2008) related to tissue engineering, where it seeks to create a resistant, photoreticulated material, combined with hyaluronans, in order to obtain non-toxic hydrogels that help the production of organ tissues, heart valves, and even bone tissue (Wu, Y.; Zhang, X.; Zhao, Q. ; Tan, B.; Chen, X.; Liao, J. 2020). The acquisition of better mechanical properties in the hydrogel is obtained by adding graphene and chitosan according to what the explanation of (Sun, X.; Shi, J.; Xu, X.; Cao, S. 2013) suggests. NN Dimethylacrylamide was also used as a coating of magnetite particles (Fe₃O₄) to reduce its toxic and mutagenic effects, in human and mouse stromal cell / fibroblast cultures, obtaining negative results.

N-Dimethyl Aminobenzoic Acid

The N-Dimethyl Aminobenzoic Acid appears with a 1450 spectrum in the scientific literature, as observed in figure 8, corresponding to the work of (Choe, JG; Kim, YH; Yun, MJ; Lee, SJ; Kim, G.; Jeong, SC 2001) on intramolecular charge transfer of aqueous cyclodextrin solutions of Dimethyl Aminobenzoic acid. However, there are almost no articles related to graphene or other known materials present in coronavirus vaccines, at least so far. Relationships with perovskites were obtained, as mentioned in the work of (Bonabi-Naghadeh, S.; Luo, B.; Abdelmageed, G.; Pu, YC; Zhang, C.; Zhang, JZ 2018), what that allows inferring the hypothesis that it could be used in the production of electronic devices.

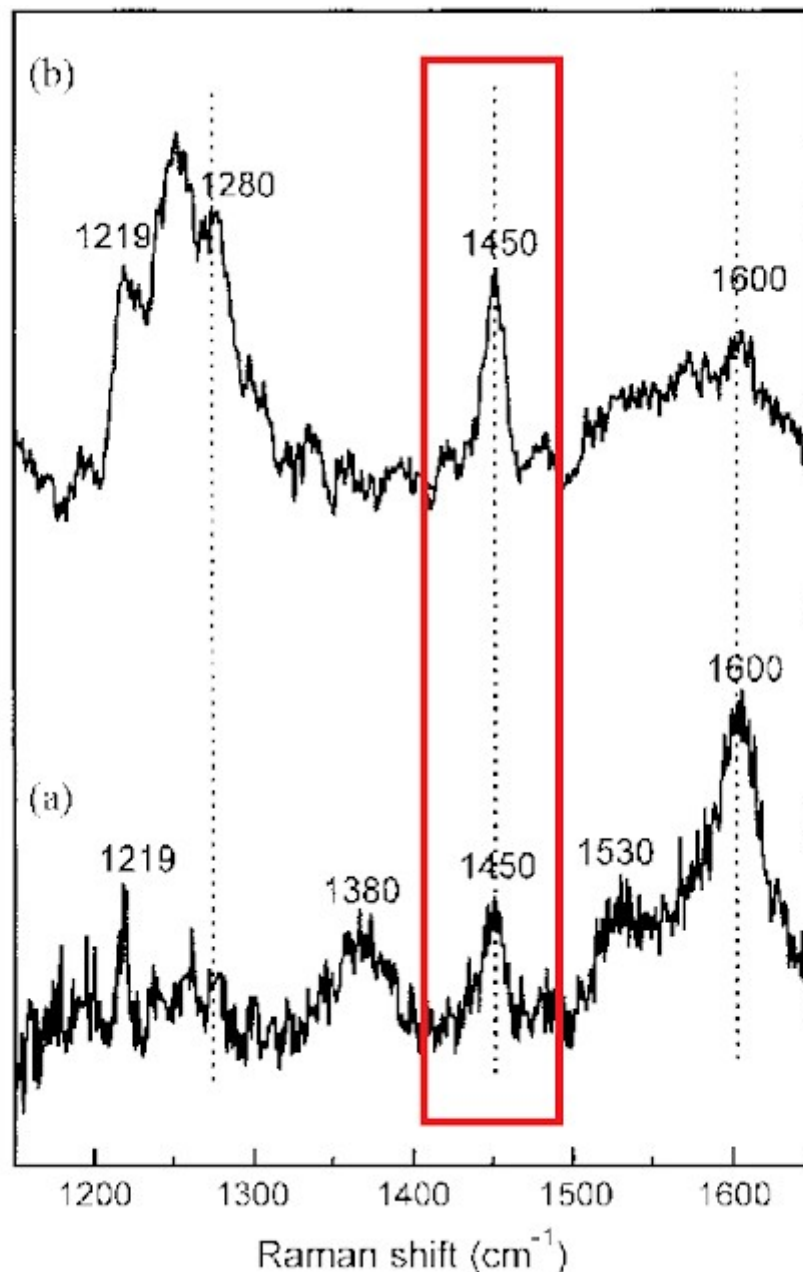


Fig. 8. Raman spectrum of *N*-Dimethyl Aminobenzoic Acid. (Choe, JG; Kim, YH; Yun, MJ; Lee, SJ; Kim, G.; Jeong, SC 2001)

CH₂-CH₃

The ethylene-methylene CH₂-CH₃ groups also present Raman spectra of 1450 cm^{-1} according to the following references (Lykina, AA; Artemyev, DN; Bratchenko, IA; Khristoforova, YA; Myakinin, O.; Kuzmina, T.; Zakharov, V. 2017 | Khalid, M.; Bora, T.; Al-Ghaithi, A.; Thukral, S.; Dutta, J. 2018 | Darwin, ME; Choe, CS; Schleusener, J.; Lademann, J. 2019) and its spectrograms, see figure 9. These coincidences occur in the context of human bone tissue, blood proteins and musculoskeletal tissues, which makes it unlikely that CH₂-CH₃ is the material found in the observed 1450 spectrum in vaccines.

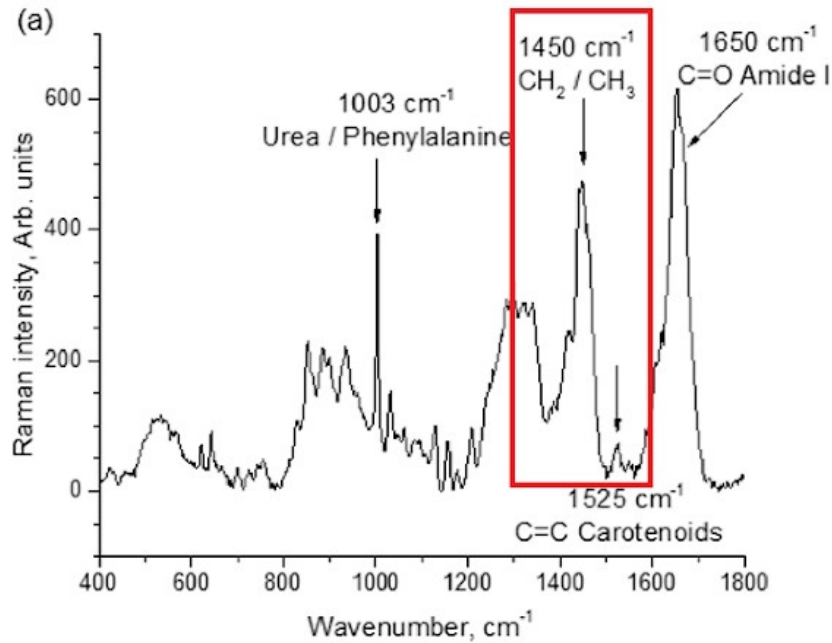


Fig. 9. Raman spectrum of the $\text{CH}_2\text{-CH}_3$ group. (Darvin, ME; Choe, CS; Schleusener, J.; Lademann, J. 2019)

ANNEX 1. Cardiac and vascular diseases caused by vaccines according to the EMA

The number of cardiovascular diseases registered daily increased steadily, rising significantly in recent months, according to the increase in the rate and frequency of vaccination in the population. This can be verified in the official data registered by the European Medicines Agency (EMA), so that a cause and effect correlation can be established between the vaccine and the serious damage it causes. This appendix presents data for the Pfizer, Moderna, AstraZeneca, and Jansen vaccines. Links are also provided to the official source (EMA database) where it is possible to consult the cases, adverse reactions and even deaths, which have (officially) caused the vaccines, in the countries of the European Union.

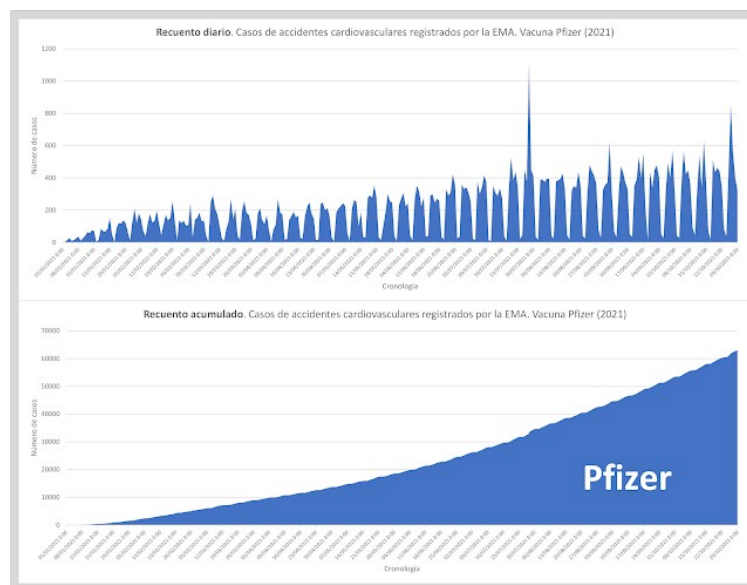


Fig. 10. Count (daily and accumulated) of cases of cardiovascular accidents caused by the Pfizer vaccine, registered by the EMA throughout the year 2021. (Average of 209 daily cases. Total count 63,061 cases). Source: EMA. Graphic: Own elaboration. [Consulted in 2021/11/03].

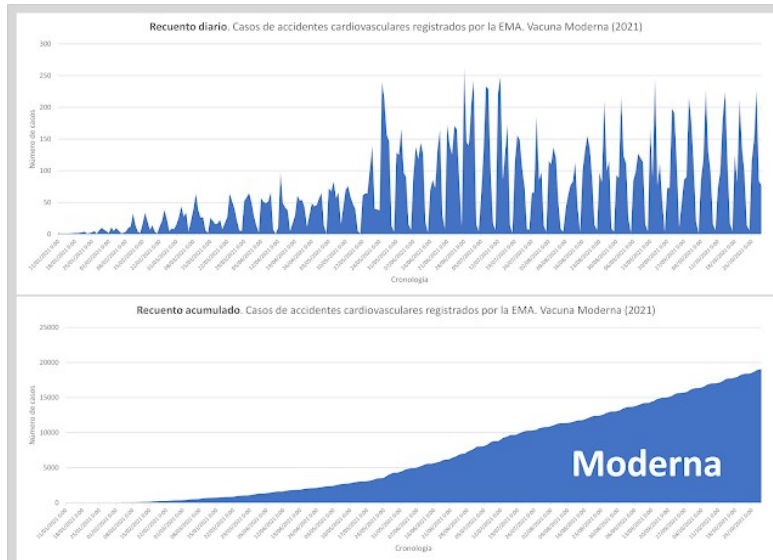


Fig. 11. Count (daily and accumulated) of cases of cardiovascular accidents caused by the Moderna vaccine, registered by the EMA throughout the year 2021. (Average of 68 daily cases. Total count 19,071 cases). Source: EMA. Graphic: Own elaboration. [Consulted in 2021/11/03].

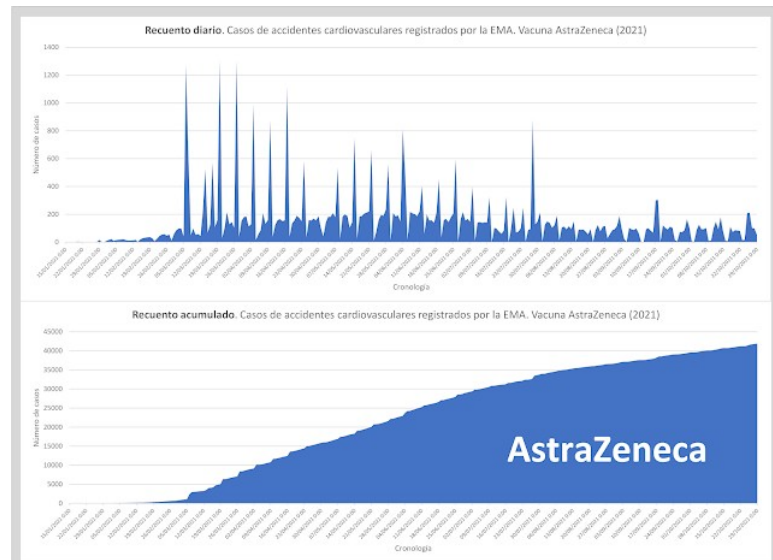


Fig. 12. Count (daily and accumulated) of cases of cardiovascular accidents caused by the AstraZeneca vaccine, registered by the EMA throughout the year 2021. (Average of 149 daily cases. Total count 41,907 cases) Source: EMA. Graphic: Own elaboration. [Consulted in 2021/11/03].

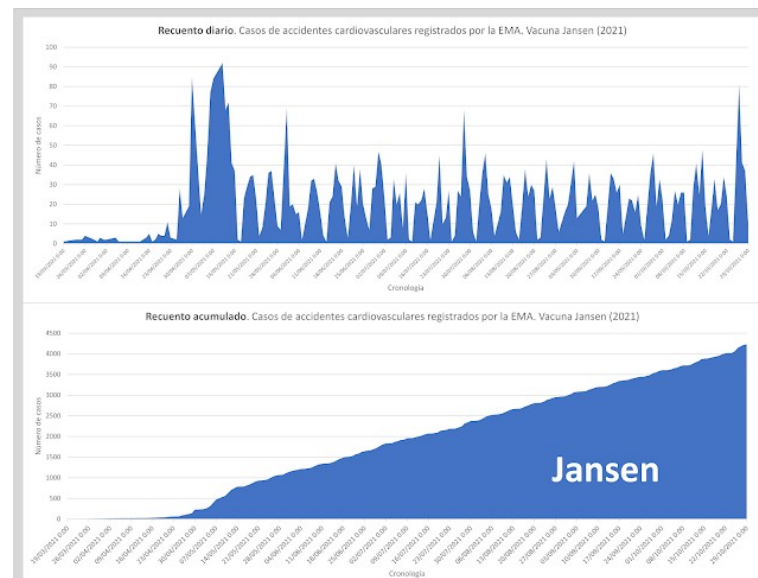


Fig. 13. Count (daily and accumulated) of cases of cardiovascular accidents caused by the Jansen vaccine, registered by the EMA throughout the year 2021. (Average of 21 daily cases. Total count 4,232 cases). Source: EMA. Graphic: Own elaboration. [Consulted in 2021/11/03].

CSV files

<https://t.me/Corona2InspectForum/2338>

Source: EMA database

- European Medicines Agency (EMA). (2021). [Database]. Pfizer-Biontech - Tozinameran Comirnaty™ - Dashboard. https://dap.ema.europa.eu/analytics/saw.dll?PortalPages&PortalPath=%2Fshared%2FPHV%20DAP%2F_portal%2FDAP&Action=Navigate&P0=1&P1=eq&P2=%22Line%20Listing%20Objects%22%2022Substance%20Code%22&P3=1+42325700
- European Medicines Agency (EMA). (2021). [Database]. Moderna - CX-024414 - Dashboard. https://dap.ema.europa.eu/analytics/saw.dll?PortalPages&PortalPath=%2Fshared%2FPHV%20DAP%2F_portal%2FDAP&Action=Navigate&P0=1&P1=eq&P2=%22Line%20Listing%20Objects%22%2022Substance%20Code%22&P3=1+40983312
- European Medicines Agency (EMA). (2021). [Database]. AstraZeneca - CHADOX1 - Dashboard. https://dap.ema.europa.eu/analytics/saw.dll?PortalPages&PortalPath=%2Fshared%2FPHV%20DAP%2F_portal%2FDAP&Action=Navigate&P0=1&P1=eq&P2=%22Line%20Listing%20Objects%22%2022Substance%20Code%22&P3=1+40995439
- European Medicines Agency (EMA). (2021). [Database]. Janssen - AD26.COVID.S - Dashboard. https://dap.ema.europa.eu/analyticsSOAP/saw.dll?PortalPages&PortalPath=%2Fshared%2FPHV%20DAP%2F_portal%2FDAP&Action=Navigate&P0=1&P1=eq&P2=%22Line%20Listing%20Objects%22.%2022Subnce%20Objects%22.%2022Subnce%20Code%22&P3=1+42287887

Bibliography

1. Adorinni, S .; Rozhin, P .; Marchesan, S. (2021). Smart Hydrogels Meet Carbon Nanomaterials for New Frontiers in Medicine. *Biomedicines*, 9 (5), 570. <https://doi.org/10.3390/biomedicines9050570>
2. Alpert, O .; Begun, L .; Garren, P .; Solhkhah, R. (2020). Cytokine storm induced new onset depression in patients with COVID-19. A new look into the association between depression and cytokines-two case reports. *Brain, Behavior, & Immunity-Health*, 9, 100173. <https://doi.org/10.1016/j.bbih.2020.100173>
3. Baldock, C .; Rintoul, L .; Keevil, SF; Pope, JM; George, GA (1998). Fourier transform Raman spectroscopy of polyacrylamide gels (PAGs) for radiation dosimetry. *Physics in Medicine & Biology*, 43 (12), 3617. <https://doi.org/10.1088/0031-9155/43/12/017>
4. Bonabi-Naghadeh, S .; Luo, B .; Abdelmageed, G .; Pu, YC; Zhang, C .; Zhang, JZ (2018). Photophysical properties and improved stability of organic-inorganic perovskite by surface passivation. *The Journal of Physical Chemistry C*, 122 (28), pp. 15799-15818. <https://doi.org/10.1021/acs.jpcc.8b03681>
5. Campra, P. (2021). Detection of graphene in COVID19 vaccines by Micro-RAMAN spectroscopy. https://www.researchgate.net/publication/355979001_DETECTION_OF_GRAPHENE_IN_COVID19_VACCINES

6. Chakraborty, P .; Das, S .; Nandi, AK (2019). Conducting gels: a chronicle of technological advances. *Progress in Polymer Science*, 88, pp. 189-219.
<https://doi.org/10.1016/j.progpolymsci.2018.08.004>
7. ChemicalBook. (2017). N, N-Dimethylacrylamide (2680-03-7) Raman.
https://www.chemicalbook.com/SpectrumEN_2680-03-7_Raman.htm
8. Chen, HT; Wu, HY; Shih, CH; Jan, TR (2015). A Differential Effect of Graphene Oxide on the Production of Proinflammatory Cytokines by Murine Microglia. *Taiwan Veterinary Journal*, 41 (03), pp. 205-211. <https://doi.org/10.1142/S1682648515500110>
9. Chen, S .; Huang, J. (2020). Recent Advances in Synaptic Devices Based on Halide Perovskite. *ACS Applied Electronic Materials*, 2 (7), pp. 1815-1825.
<https://doi.org/10.1021/acsaelm.0c00180>
10. Choe, JG; Kim, YH; Yun, MJ; Lee, SJ; Kim, G .; Jeong, SC (2001). Silver Colloidal Effects on Excited-State Structure and Intramolecular Charge Transfer of pN, N-dimethylaminobenzoic Acid Aqueous Cyclodextrin Solutions. *Bulletin of the Korean Chemical Society*, 22 (2), pp. 219-227.
<https://www.koreascience.or.kr/article/JAKO200113464478260.page>
11. Dai, S .; Zhao, Y .; Wang, Y .; Zhang, J .; Fang, L .; Jin, S .; Huang, J. (2019). Recent advances in transistor-based artificial synapses. *Advanced Functional Materials*, 29 (42), 1903700. <https://doi.org/10.1002/adfm.201903700>
12. Darvin, ME; Choe, CS; Schleusener, J .; Lademann, J. (2019). Non-invasive depth profiling of the stratum corneum in vivo using confocal Raman microscopy considering the non-homogeneous distribution of keratin. *Biomedical optics express*, 10 (6), pp. 3092-3103.
<https://doi.org/10.1364/BOE.10.003092>
13. Dowaidar, M. (2021). Neuroinflammation caused by activated microglia and astrocytes can contribute to the progression of pathogenic damage to substantia nigra neurons, playing a role in Parkinson's disease progression. <https://osf.io/preprints/ac896/>
14. Fabbri, R .; Saracino, E .; Treossi, E .; Zamboni, R .; Palermo, V .; Benfenati, V. (2021). Graphene glial-interfaces: challenges and perspectives. *Nanoscale*, 13 (8), pp. 4390-4407.
<https://doi.org/10.1039/D0NR07824G>
15. Fan, L .; Yang, H .; Yang, J .; Peng, M .; Hu, J. (2016). Preparation and characterization of chitosan / gelatin / PVA hydrogel for wound dressings. *Carbohydrate polymers*, 146, pp. 427-434. <https://doi.org/10.1016/j.carbpol.2016.03.002>
16. He, Y.; Zhu, L .; Zhu, Y .; Chen, C .; Jiang, S .; Liu, R .; Wan, Q. (2021). Recent Progress on Emerging Transistor-Based Neuromorphic Devices. *Advanced Intelligent Systems*, 2000210.
<https://doi.org/10.1002/aisy.202000210>
17. Jia, M .; Rolandi, M. (2020). Soft and Ion-Conducting Materials in Bioelectronics: From Conducting Polymers to Hydrogels. *Advanced healthcare materials*, 9 (5), 1901372.
<https://doi.org/10.1002/adhm.201901372>
18. Jiang, S .; Liu, S .; Feng, W. (2011). PVA hydrogel properties for biomedical application. *Journal of the mechanical behavior of biomedical materials*, 4 (7), pp. 1228-1233.
<https://doi.org/10.1016/j.jmbbm.2011.04.005>
19. Khalid, M .; Bora, T .; Al-Ghaithi, A .; Thukral, S .; Dutta, J. (2018). Raman spectroscopy detects changes in bone mineral quality and collagen cross-linkage in staphylococcus infected human bone. *Scientific reports*, 8 (1), pp. 1-9. <https://doi.org/10.1038/s41598-018-27752-z>
20. KR20210028062A. (2020). [Patent]. Physiological Saline Containing Graphene.
<https://patents.google.com/patent/KR20210028062A/en>

21. Liu, S .; Zhao, Y .; Hao, W .; Zhang, XD; Ming, D. (2020). Micro-and nanotechnology for neural electrode-tissue interfaces. *Biosensors and Bioelectronics*, 112645.
<https://doi.org/10.1016/j.bios.2020.112645>
22. Liu, X .; Miller, AL; Waletzki, BE; Lu, L. (2018). Cross-linkable graphene oxide embedded nanocomposite hydrogel with enhanced mechanics and cytocompatibility for tissue engineering. *Journal of Biomedical Materials Research Part A*, 106 (5), pp. 1247-1257.
<https://doi.org/10.1002/jbm.a.36322>
23. Lykina, AA; Artemyev, DN; Bratchenko, IA; Khristoforova, YA; Myakinin, O .; Kuzmina, T .; Zakharov, V. (2017). Raman spectra analysis of human blood protein fractions using the projection on latent structures method. In: *CEUR Workshop Proceedings* (pp. 64-68).
<http://ceur-ws.org/Vol-1900/paper14.pdf>
24. Martín, C .; Merino, S .; González-Domínguez, JM; Rauti, R .; Ballerini, L .; Prato, M .; Vázquez, E. (2017). Graphene improves the biocompatibility of polyacrylamide hydrogels: 3D polymeric scaffolds for neuronal growth. *Scientific reports*, 7 (1), pp. 1-12.
<https://doi.org/10.1038/s41598-017-11359-x>
25. Oribe, S .; Yoshida, S .; Kusama, S .; Osawa, YES; Nakagawa, A .; Iwasaki, M .; Nishizawa, M. (2019). Hydrogel-based organic subdural electrode with high conformability to brain surface. *Scientific reports*, 9 (1), pp. 1-10. <https://doi.org/10.1038/s41598-019-49772-z>
26. Palmieri, V .; Perini, G .; De-Spirito, M .; Papi, M. (2019). Graphene oxide touches blood: in vivo interactions of bio-coronated 2D materials. *Nanoscale Horizons*, 4 (2), pp. 273-290.
<https://doi.org/10.1039/C8NH00318A>
27. Pandey, RK; Singh, AK; Prakash, R. (2014). Directed self-assembly of poly (3,3^{'''} - dialkylquarterthiophene) polymer thin film: effect of annealing temperature. *The Journal of Physical Chemistry C*, 118 (40), 22943-22951. <https://doi.org/10.1021/jp507321z>
28. Pandey, RK; Singh, AK; Upadhyay, C .; Prakash, R. (2014). Molecular self ordering and charge transport in layer by layer deposited poly (3, 3^{'''} -dialkylquarterthiophene) films formed by Langmuir-Schaefer technique. *Journal of Applied Physics*, 116 (9), 094311.
<https://doi.org/10.1063/1.4894515>
29. Rodriguez-Losada, N .; Wendelbob, R .; Ocaña, MC; Casares, AD; Guzman-de-Villoría, R .; Aguirre Gomez, JA; Narvaez, JA (2020). Graphene oxide and reduced derivatives, such as powder or film scaffolds, differentially promote the differentiation and survival of dopaminergic neurons. *Frontiers in neuroscience*, 14, 1277.
<https://doi.org/10.3389/fnins.2020.570409>
30. Shi, Y .; Xiong, D .; Li, J .; Wang, K .; Wang, N. (2017). In situ repair of graphene defects and enhancement of its reinforcement effect in polyvinyl alcohol hydrogels. *RSC advances*, 7 (2), pp. 1045-1055. <https://doi.org/10.1039/C6RA24949C>
31. Stammen, JA; Williams, S .; Ku, DN; Guldborg, RE (2001). Mechanical properties of a novel PVA hydrogel in shear and unconfined compression. *Biomaterials*, 22 (8), pp. 799-806.
[https://doi.org/10.1016/S0142-9612\(00\)00242-8](https://doi.org/10.1016/S0142-9612(00)00242-8)
32. Sun, X .; Shi, J .; Xu, X .; Cao, S. (2013). Chitosan coated alginate / poly (N-isopropylacrylamide) beads for dual responsive drug delivery. *International journal of biological macromolecules*, 59, pp. 273-281. <https://doi.org/10.1016/j.ijbiomac.2013.04.066>
33. Wan, C .; Cai, P .; Guo, X .; Wang, M .; Matsuhisa, N .; Yang, L .; Chen, X. (2020). An artificial sensory neuron with visual-haptic fusion. *Nature communications*, 11 (1), pp. 1-9.
<https://doi.org/10.1038/s41467-020-18375-y>

34. Wang, J .; Gao, C .; Zhang, Y .; Wan, Y. (2010). Preparation and in vitro characterization of BC / PVA hydrogel composite for its potential use as artificial cornea biomaterial. *Materials Science and Engineering: C*, 30 (1), pp. 214-218. <https://doi.org/10.1007/s10856-013-5121-0>
35. Wang, J .; Zhu, M .; Chen, Z .; Chen, Y .; Hayat, T .; Alsaedi, A .; Wang, X. (2019). Polyacrylamide modified molybdenum disulfide composites for efficient removal of graphene oxide from aqueous solutions. *Chemical Engineering Journal*, 361, pp. 651-659. <https://doi.org/10.1016/j.cej.2018.12.123>
36. Weng, L .; Gouldstone, A .; Wu, Y .; Chen, W. (2008). Mechanically strong double network photocrosslinked hydrogels from N, N-dimethylacrylamide and glycidyl methacrylated hyaluronan. *Biomaterials*, 29 (14), pp. 2153-2163. <https://doi.org/10.1016/j.biomaterials.2008.01.012>
37. Wu, Y .; Zhang, X .; Zhao, Q .; Tan, B .; Chen, X .; Liao, J. (2020). Role of Hydrogels in Bone Tissue Engineering: How Properties Shape Regeneration. *Journal of Biomedical Nanotechnology*, 16 (12), pp. 1667-1686. <https://doi.org/10.1166/jbn.2020.2997>
38. Zeinali, K .; Khorasani, MT; Rashidi, A .; Daliri-Joupari, M. (2021). Preparation and characterization of graphene oxide airgel / gelatin as a hybrid scaffold for application in nerve tissue engineering. *International Journal of Polymeric Materials and Polymeric Biomaterials*, 70 (10), pp. 674-683. <https://doi.org/10.1080/00914037.2020.1760269>
39. Zhang, X .; Wei, C .; Li, Y .; Li, Y .; Chen, G .; He, Y .; Yu, D. (2020). Dose-dependent cytotoxicity induced by pristine graphene oxide nanosheets for potential bone tissue regeneration. *Journal of Biomedical Materials Research Part A*, 108 (3), pp. 614-624. <https://doi.org/10.1002/jbm.a.36841>
40. Zhao, Y .; Wang, Y .; Niu, C .; Zhang, L .; Li, G .; Yang, Y. (2018). Construction of polyacrylamide / graphene oxide / gelatin / sodium alginate composite hydrogel with bioactivity for promoting Schwann cells growth. *Journal of Biomedical Materials Research Part A*, 106 (7), pp. 1951-1964. <https://doi.org/10.1002/jbm.a.3639>