International Journal of Vaccine Theory, Practice, and Research
IJVTPR

Response to Critics of Lee & Broudy (2024) on the Toxicity and Self-Assembling Technology in Incubated Samples of Injectable mRNA Materials

YoungMi Lee, MD [1] Daniel Broudy, PhD [2]

[1] Practicing physician with a specialty in Obstetrics and Gynaecology, Hanna Women's Clinic, Doryeong-ro 7, KumSung Building, 2ndFloor, Jeju, Jejudo, 63098, Republic of Korea, Tel: +82-64-711-7717, email: youngmil95@gmail.com (ORCID: 0000-0002-1210-4726)

[2] Professor of Applied Linguistics, Okinawa Christian University, Nishihara-cho, Okinawa 903-0207, Japan, Email: dbroudy@ocjc.ac.jp (ORCID: 0000-0003-2725-6914)

Abstract

Our article "Real-Time Self-Assembly . . . " (Lee & Broudy, 2024) published in this journal has attracted attention from scholars, commentators, and professional fact-checkers from around the world, most of it featuring generous praise and some of it impassioned pleas for its authors to stick to their own areas of expertise. Our reply to the critics of this study is an attempt to address and accommodate scholarly critique and answer other concerns about our perceived lack of know-how to engage in such research. In this response, we suggest that a reflexive and singular focus on the declared components of the COVID injectables represents a bias of its own, and a lack of due diligence on our critics' part. The "Nano–Bio–Info–Cogno (NBIC)" era of the 21st century (see Jamali et al., 2018) is an already very well-documented development (Cevallos et al., 2022; The White House, 2022), and our aim is to urge scholars to enlarge the critical lens they use to assess these phenomena. This broadening of perspective has direct bearing on science and scholarship, direct implications for the status of legacy biosciences, and requires inclusion in any explanatory framework, which we discuss briefly in this reply.

Keywords: *COVID-19 injectables, incubation studies, lipids, nanotechnology, self-assembly*

Introduction

Professor Ian Akyildiz, pioneer of the Internet of Bio-Nano Things (IoBNT), pointed out in an advanced technology symposium in 2023:

> … the Bio-nanoscale machines [behind the IoBNT] are for injecting into the body … and that is going really well with these Covid vaccines. It's going that direction. These mRNAs are nothing [other] than small scale, nano-scale machines. They are programmed, and they are injected [Akyildiz, 2023; also see Akyildiz et al., 2015].

In the article, "Real-Time Self-Assembly of Stereomicroscopically Visible Artificial Constructions in Incubated Specimens of mRNA Products Mainly from Pfizer and Moderna: A Comprehensive Longitudinal Study", Lee and Broudy (2024) described the results of an observational and exploratory study of 54 samples of COVID injectable products, viewed under a stereomicroscope. The samples were incubated for up to 630 days and observed for both morphology and behavior. Various self-assembling structures were found to form over time, some of which showed responsiveness to conditions of incubation, including a marked acceleration in development upon exposure to wireless radiation. In the context of relevant scholarly discussions in the diverse fields of interest, we noted that, "our observations suggest the presence of some kind of nanotechnology in the COVID-19 injectables" (in our abstract on p. 1180). We added that, "both the morphology and behavioral characteristics of these observed phenomena suggest that far from being pure (Finn, 2011 p. 138), these injectables are composed of, hitherto, undisclosed additional engineered components responsive to a range of internal and ambient forms of energy, all of which are traceable to and described throughout the scholarly literature" (p. 1229).

Reactions to the incubation study after publication have been offered by scholars and interested observers — some productive, others not. We are sincerely grateful to Professor Anne Ulrich (2024) for offering her thoughtful and detailed perspective on our efforts and, thus, confine our response to her analysis. As a professional of 35 years in the pharmaceutical industry and professor of organic chemistry, Ulrich has taken time to offer an alternate interpretation of our findings. We are heartened to see she takes no issue with the methods, noting that, "the experiments were carried out diligently and the resulting images are well documented" (p. 1244.7). Ulrich also agrees that the structures we observed to develop over time were formed from self-assembling nanoparticles.

The point of departure between our two interpretations concerns the nature of the nanoparticles from which the incubated structures formed. We proposed that the self-assembling components may be consistent with nanotechnologies relevant to the Internet of Bodies. Ulrich, in contrast argues that they arise from lipid nanoparticles and cholesterol ingredients in the modRNA injectable platforms. ***Absent compositional analysis, which is forthcoming, neither interpretation can be decisively ruled in or out based solely upon the observational data obtained to date. We remain open to disconfirmation should compositional analysis support Ulrich's interpretation over ours.*** However, we maintain that our interpretation fits the extant observational data and appears consistent with the much wider range of relevant scholarly literature and research.

Our postulation of what may actually be in the injectable products is, as we have pointed out, consistent with what is known of the "material evidence of harm" (Lee & Broudy, 2024, p. 1181) reasonably related to the roll-out of the products in question. Also of greater importance in our view is that our theoretical orientation takes account of the larger domain of nanotechnology as it bears particular

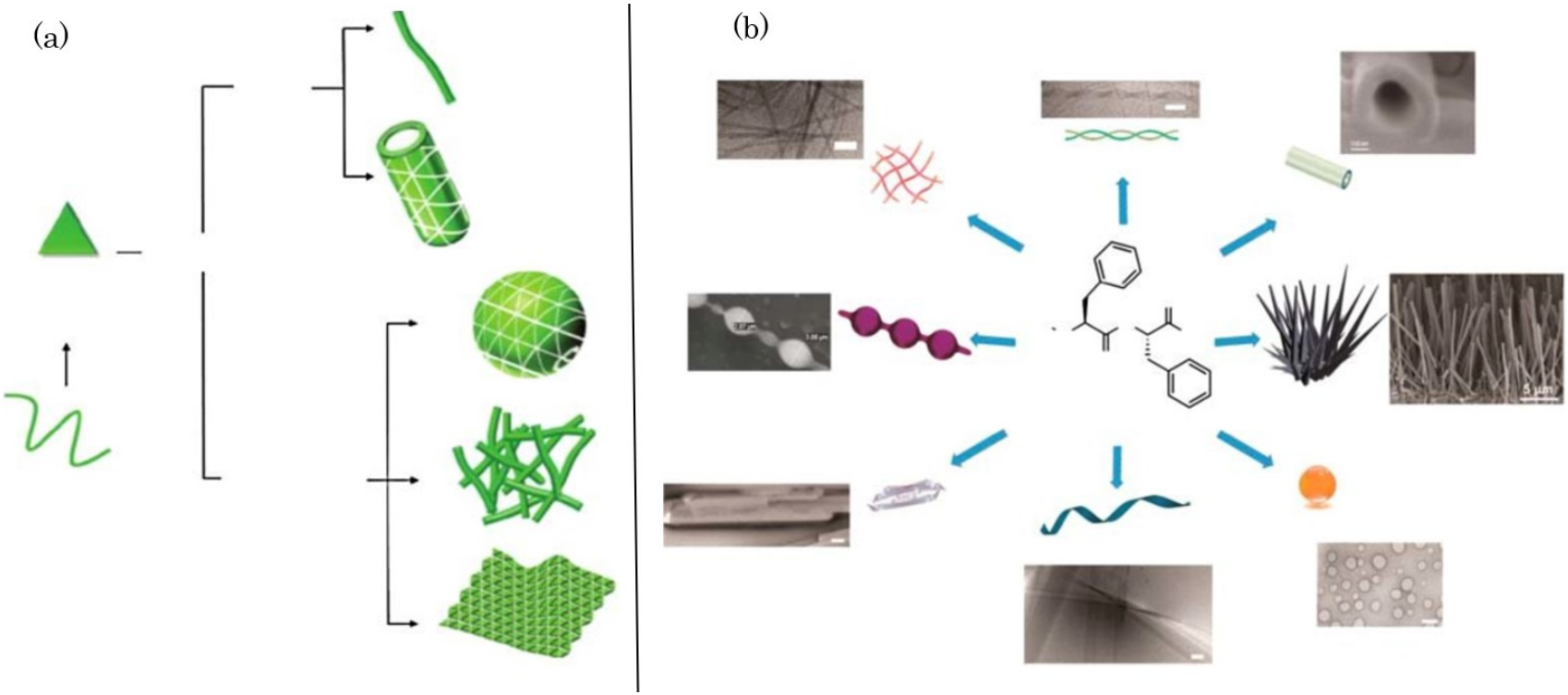

Figure 1. (a) The diagram at the left shows self-assemblies from peptides, similar to those attributed to lipids by Ulrich (2024; see her Figure 2 on page 1244.3). The original source was Santis and Ryadnov (2015), copyright by the Royal Society of Chemistry, which was the same journal and publisher used by Ulrich for her diagram showing self-assembly from lipids. The version shown here is from Figure 3, page 2, of the PDF which is free to download and is posted at this link by Santis and Ryadnov . While acknowledging that the ultimate copyright is held by the Royal Society of Chemistry, we reproduce the image here under Fair Use Law from the freely available prepublication version posted by Santis and Ryadnov. (b) The diagram and images at the right hand side are described in the source article as "Phe Phe [two phenylalanines linked together in a peptide/protein] self-assembled into various kinds of nanostructures" (Marchesan et al., 2015) licensed under CC 3.0 hyperlinked here.

relevance to medicine, pharmaceuticals, and the policies outlining the proposed shape of a future world in which such technologies and injectables overlap (Guntas et al., 2005; Jiang et al., 2018). Our scope of research and theory simply adopts the already larger relevant and widely known contexts, perhaps which are outside the notice, experience or knowledge of most biochemists today. We base our reasoning upon three principal points.

1. Selective Focus on Lipids

The central basis for Ulrich's conclusion that the structures we document arise from lipid nanoparticles and cholesterol hinges upon faith in the assertions of the pharmaceutical companies regarding the contents of their Covid injectables. Ulrich says, "Each particle is enveloped by a monolayer of helper lipids […] and some cholesterol. […] some PEGylated lipids […]. The task of the special lipid mixtures […] is to stabilize the […] RNA strands and to enable their delivery in the form of nanoparticles" (p. 1244.4). In support of the position that the structures we documented are composed of lipids, she provided Figure 2 on page 1244.3 illustrating a variety of nanostructures that can be formed from lipid nanoparticles. However, her proposed explanation represents a selective focus on lipids — distinct from proteinaceous peptides in that lipids consisting of "long hydrocarbon chains, most frequently containing 16 or 18 carbon atoms" (Cooper, 2000) but no common subunit such as the amino acid sequences found in peptides — at the expense of other equally compelling candidate materials. Similar figures, illustrating a comparable variety of self-assembling structures, forming from different nanomaterials, could just as easily have been provided. For instance, the diagrams and micrographic images just above in Figure 1(a) and Figure 1(b) are from the same publication as Ulrich's Figure 2 on page 1244.3 supposedly showing that all the self-assembling structures we found in our research were formed from the lipids in the Pfizer and Moderna injectables. The diagram of our Figure 1(a), and the diagrams and micrographic images in Figure 1(b) show a comparable array of structures formed from peptides (relatively short proteinaceous structures), as opposed to lipids. Similarly, another diagram, Figure 2 below, is from a paper in the *Journal of Biosensors and Bioelectronics* on nanostructures for potential integration with the internet of medical things (IoMT). It could also have been included by Ulrich (2024) as yet another class of candidate nanomaterials from which the structures we observed may have formed.

Given the array of different components that could potentially self-assemble into the structures we ultimately observed, unlike Ulrich we offered no interpretation as to the specific composition of those structures. Rather, we merely proposed some possibilities regarding their apparent properties, based upon particular aspects of our findings (see below). Ulrich's commitment to the hypothesis that lipids and cholesterol are entirely responsible for the self-assembling structures we documented is not anchored in anything peculiar to our images, or in the manner in which they were obtained — both of which she said were "reliable" and "consistent" with the particular domain of biochemistry research which she obviously knows very well. Her hypothesis, presented as a general truth, depends on the declarations of Pfizer and Moderna about the contents of their products. We do not share her apparent faith in those declarations.

Also, for her view to hold true, all possible forms of nanorobotics must be ruled out. To do that requires proof of the null hypothesis that no "bio-nano-machines", to use a term offered by Akyildiz, whatsoever have been introduced, accidentally or otherwise, to the Covid-19 injectable products. We find this level of faith misguided, particularly as a foundational assumption for research seeking to independently examine the contents. Put simply, the reasoning used in the

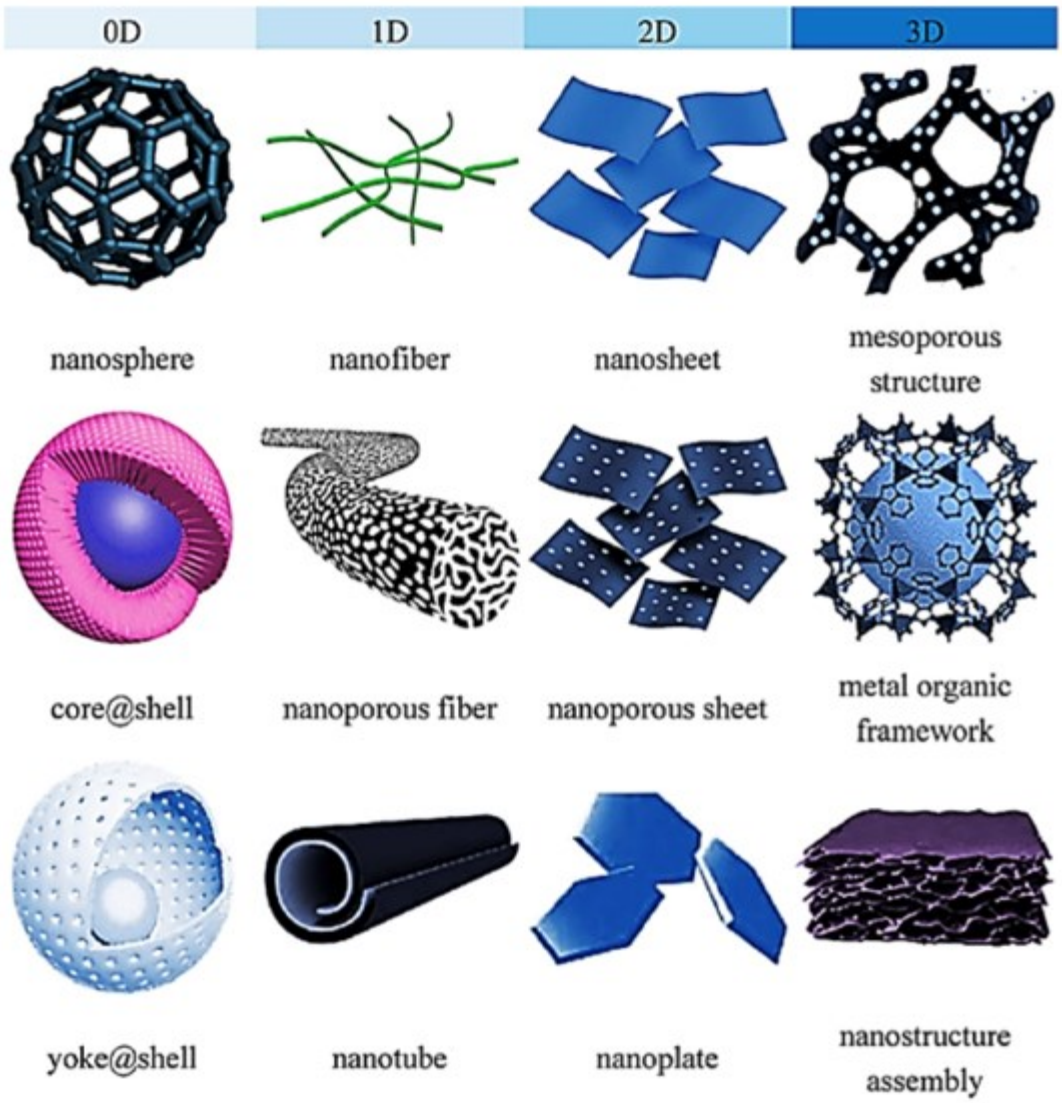

Figure 2. These diagrams are from Byakodi et al. (2022), reproduced here under the Creative Commons CC-BY-NC-ND. The authors in the publication *Biosensors and Bioelectronics: X* attribute the original to (Goh et al., 2020). All these structures are, allegedly, formed at the nanostructure level.

critique is circular. She presupposes that what Pfizer and Moderna say about their products — what they contain and how they are claimed to work — is necessarily true. Thus, she concludes her counter-analysis is true. The problem with such a sweeping assessment is that a single replicable experiment showing conclusive evidence of even one nanorobot disproves her alternate explanation. We, therefore, enthusiastically urge others to replicate our methods and our results.

2. Unexplained Proliferation in Response to EMF

One of our key findings was a marked and rapid proliferation of rectangular structures in a Moderna sample upon exposure to a wireless recharger as shown here in the images of Figure 3. It is identical to Figure 23, p. 1216 of our original paper, Lee and Broudy (2024), where we referred to EMF exposure. The response to one hour of exposure to a wireless recharger,contrast Figure 3a with 3b just below here, took place within an hour. Figure 3a shows the Moderna sample incubated for 36 days of incubation. There are hardly any self-assembled structures in Figure 3a, and yet, after one hour of EMF exposure, the rapid proliferation shown as Figure 3b took place.

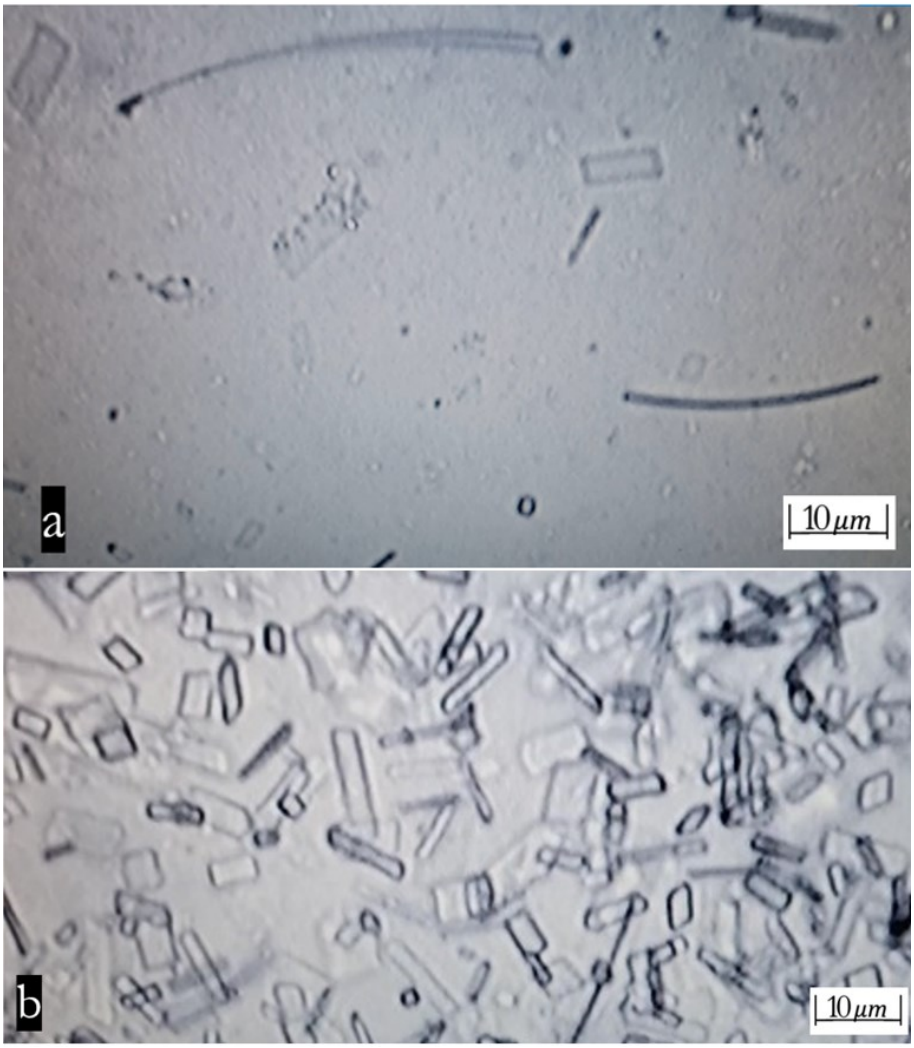

Figure 3. The contrast shown here, not commented on by Ulrich, appeared in our original paper as Figure 23, p. 1216. It shows the results of incubation of a Moderna sample for 36 days in (a) the top image, and in (b) the same sample after just one hour of exposure (being placed on top of) a wireless recharger.

The response of the Moderna sample to the wireless recharger was a key factor that helped to inform our interpretation of the self-assembling structures. We wrote, "preliminary observations show that the materials in the injectables react positively to wireless cell phone rechargers […]. As electromagnetic frequency-sensitive materials, it is plausible that the injectable contents are designed to act as a kind of semi-conductor" (2024, p. 1225). Supporting references from various domains of research were referenced and are revisited below.

Ulrich, however, does not address this finding, but ignores it, thereby sidestepping a key piece of potential evidence for the very interpretations she rejects. We can locate no literature nor precedent regarding cholesterol and/or lipids capable of explaining the Moderna product's responsiveness to EMF. Accordingly, it is inconsistent with Ulrich's analysis.

Nor does Ulrich engage with our findings regarding the effect of EMF on Pfizer filaments, which showed a delayed and moderate proliferation. Rather, she offers a generalization absent any citation that, "tubes, in turn, have been seen to collapse into smaller partitions upon external perturbation (e.g. mechanical force, electromagnetic waves) and end up looking like beads on a string." It would be helpful to interested readers to review the literature here.

We did not, however, observe Pfizer filaments looking like beads on a string following their exposure to the wireless recharger. Once again, Ulrich seems to ignore our findings. In short, evidence that does not support Ulrich's interpretation has been bypassed.

3. The Crucial Larger Context

As noted in the epigraph above, the work of Akyildiz et al. (2015), we think, provides another useful lens through which to observe how the "Internet of Bio-Nano Things" might help inform deeper analysis of the structures described in our study and other ongoing studies like it. As with all other scientific interpretations, ours too did not emerge in a social and political vacuum.

In our study, we simply presented interpretations of observed microscopic phenomena situated in a larger contemporary world in which legacy biosciences appear to struggle over new terrain in nanotechnology, and particularly bio-nanotechnology. Since the rollout of novel "nano-medicines," we have entered a new era of science with the officially-funded Nano-Bio-Info-Cogno (NBIC) (2018) paradigm. With the "National Nanotechnology Initiative Strategic Plan," this new age of government-funded initiatives should sharpen the focus of researchers working to understand how

> nanotechnology [has] emerged as a key tool in the fight against COVID-19 . . . . [As the plan lays out:] Innovators are leveraging decades of investments in nanotechnology research to develop vaccines and other prophylactics, diagnostics, and surveillance tools, therapeutics, disinfectants and coatings, and protective equipment [White House, 2021, pp. 13-14].

Some of this nanotechnology and its applications approximate that of traditional biosciences and medicine, such as the lipid nanoparticles that Ulrich speculates underpin our findings. These ostensibly act simply as carriers. Other nanotechnology, and bio-nanotechnology, subserves more novel applications such as bio-electronics, electro-microbiology, and bio-cyber interfaces and designs of "molecular communication systems" in blood vessels (C. Lee et al., 2023).

Because we work in diverging disciplines and admit that the story of injectable nanotechnology in service to a new paradigm of human-based nano-networking and computation (Seo et al., 2019) human-based networking appears to be the stuff of fantasy fiction, we still think it is unwise to ignore this voluminous scholarly literature. Nearly five years after the Corona story emerged, microscopy studies carried out in light of the biotech and electronics engineering litereatures raise many more questions than answers. Perplexed physicians reflexively balk at our reference to possible "nanobot-like structures," but a simple search of the scholarship shows "nanoelectronic machines" (Koman et al., 2018) are now as ordinary as nasal spray and as easily deliverable.

The incubation study has unfolded with our awareness of other findings that have been made contemporaneously and which are forthcoming in this collection of responses. It is the observed and documented behavior of the structures themselves that has been noted in our study which, we feel, lends credibility to suggestions that certain nanotechnologies other than those already declared in the Covid injectables may be somehow at work. We sincerely hope to develop more open dialogues with Professor Ulrich on this front and will address additional questions in due course.

Conclusion

In her book *Living with the Fluid Genome* (2003), geneticist and biophysicist Mae-Wan Ho observed that over the preceding twenty years, huge biotech companies had increasingly come to influence the sort of science and scientific research that gets funded, all of which has helped to ensure

> … their survival and prosperity, so they can better exploit the masses for further gain. Under the banner of the "free market" and "free choice", we are losing our right to self-determination and self-sufficiency in every aspect of our daily lives: our food, health, social mores, the way we choose to live and most seriously of all, our right to think differently from the corporate establishment (2003, p. 24).

Is it any wonder why scientific debate in the NBIC age (Johnson et al., 2024) has been so well guarded and why researchers open to genuine dialogue are so hastily marginalized? If the past five years have taught us anything, it is that science *is* the product, and any pursuit, theory or propagation of research critically examining that knowledge outside the boundaries of official funding or sanction is just too controversial. How can researchers still endowed with the power of observation continue to maintain that legacy biosciences are the only way to conduct and interpret contemporary inquiry?

Ho highlighted a key issue, seemingly unresolvable in the present epoch: the pursuit of knowledge intimately tied to the pursuit of monetary gain. Because such pursuits are often single-mindedly self-interested, their path may, indeed, be one of short-term profits but their end surely of self-destruction. Let us remain hopeful that Mae-Wan Ho's warnings are not a self-fullfilling prophecy.

Acknowledgments

For their timely and incisive suggestions, the authors would like to thank Lissa Johnson, PhD, David Nixon, MB, ChB, Robyn Cosford, MBBS(Hons), FACNEM, FASLM, Matt Shelton, MB, ChB, FRCNZCP, FACNEM, Shimon Yanowitz, MSc, Peter Robinson, PhD, and Daniel Santiago, RPh, PharmD. The Editor-in-Chief has also shared with us some of the comments of members of the Editorial Board for this journal who enthusiastically endorsed our paper: they included but were not limited to James Lyons-Weiler, PhD, David A. Hughes, PhD, Stephanie Seneff, PhD, Mary Holland, MA, JD, Leigh Willoughby, MD, Asgeir Saebo, MS, and Tamara Tuuminen, MD, PhD.

Conflict of Interest Statement

The authors declare that they have no conflicts of interest as regards the content of this rebuttal and that their own personal gain is merely the acquisition of wider understanding.

References

Akyildiz, I. F. (2023, March 21). *ARRC Seminar Series — Prof. Ian F. Akyildiz* [Video recording]. https://www.youtube.com/watch?v=YAtQFkEg5-w

Akyildiz, I. F., Pierobon, M., Balasubramaniam, S., & Koucheryavy, Y. (2015). The internet of Bio-Nano things. *IEEE Communications Magazine*, *53*(3), 32–40. IEEE Communications Magazine. https://doi.org/10.1109/MCOM.2015.7060516

Byakodi, M., Shrikrishna, N. S., Sharma, R., Bhansali, S., Mishra, Y., Kaushik, A., & Gandhi, S. (2022). Emerging 0D, 1D, 2D, and 3D nanostructures for efficient point-of-care biosensing. *Biosensors and Bioelectronics: X*, *12*, 100284. https://doi.org/10.1016/j.biosx.2022.100284

Cevallos, Y., Nakano, T., Tello-Oquendo, L., Rushdi, A., Inca, D., Santillán, I., Shirazi, A. Z., & Samaniego, N. (2022). A brief review on DNA storage, compression, and digitalization. *Nano Communication Networks*, *31*, 100391. https://doi.org/10.1016/j.nancom.2021.100391

Cooper, G. M. (2000). The molecular composition of cells. In *The Cell: A Molecular Approach. 2nd edition*. Sinauer Associates. https://www.ncbi.nlm.nih.gov/books/NBK9879/

Finn, T. M. (2011). U.S. FDA requirements for Human Vaccine Product Safety and Potency Testing. *Procedia in Vaccinology*, *5*, 137–140. https://doi.org/10.1016/j.provac.2011.10.010

Goh, P. S., Wong, K. C., & Ismail, A. F. (2020). Nanocomposite Membranes for Liquid and Gas Separations from the Perspective of Nanostructure Dimensions. *Membranes*, *10*(10), Article 10. https://doi.org/10.3390/membranes10100297

Guntas, G., Mansell, T. J., Kim, J. R., & Ostermeier, M. (2005). Directed evolution of protein switches and their application to the creation of ligand-binding proteins. *Proceedings of the National Academy of Sciences*, *102*(32), 11224–11229. https://doi.org/10.1073/pnas.0502673102

Ho, M.-W. (2003). *Living with the Fluid Genome*. Science in Society Archive. https://www.i-sis.org.uk/fluidGenome.php#google_vignette

Jamali, H. R., Azadi-Ahmadabadi, G., & Asadi, S. (2018). Interdisciplinary relations of converging technologies: Nano–Bio–Info–Cogno (NBIC). *Scientometrics*, *116*(2), 1055–1073. https://doi.org/10.1007/s11192-018-2776-9

Jiang, H., Sang, Y., Zhang, L., & Liu, M. (2018). Self-assembly and directed assembly. In K. Ariga & M. Ebara (Eds.), *Materials Nanoarchitectonics* (pp. 165–186). John Wiley & Sons, Ltd. https://doi.org/10.1002/9783527808311.ch9

Johnson, L., Broudy, D., & Hughes, D. A. (2024, May 24). WHO's pulling the strings? COVID injections and the Internet of Bio-Nano Things, part 4: Testing new human nodes of connectivity. *Propaganda In Focus*. https://propagandainfocus.com/whos-pulling-the-strings-covid-injections-and-the-internet-of-bio-nano-things-part-4-testing-new-human-nodes-of-connectivity/

Koman, V. B., Liu, P., Kozawa, D., Liu, A. T., Cottrill, A. L., Son, Y., Lebron, J. A., & Strano, M. S. (2018). Colloidal nanoelectronic state machines based on 2D materials for aerosolizable electronics. *Nature Nanotechnology*, *13*(9), 819–827. https://doi.org/10.1038/s41565-018-0194-z

Lee, C-M., Koo, B-H., Chae, C-B., and Schober, R. (2023). The Internet of bio-nano things in blood vessels: System design and prototypes. *Journal of Communications and Networks*, *25*(2), 222-231, DOI: 10.23919/JCN.2023.000001.

Lee, Y. M., & Broudy, D. (2024). Real-time self-assembly of stereomicroscopically visible artificial constructions in incubated specimens of mRNA products mainly from Pfizer and Moderna: A comprehensive longitudinal study. *International Journal of Vaccine Theory, Practice, and Research*, *3*(2), 1180–1244. https://doi.org/10.56098/586k0043

Marchesan, S., E. Styan, K., D. Easton, C., Waddington, L., & V. Vargiu, A. (2015). Higher and lower supramolecular orders for the design of self-assembled heterochiral tripeptide hydrogel biomaterials. *Journal of Materials Chemistry B*, *3*(41), 8123–8132. https://doi.org/10.1039/C5TB00858A

Santis, E. D., & Ryadnov, M. G. (2015). Peptide self-assembly for nanomaterials: The old new kid on the block. *Chemical Society Reviews*, *44*(22), 8288–8300. https://doi.org/10.1039/C5CS00470E

Seo, J-Y., Kim, S., Park, H-H, Choi, D-Y, and Nam, J-M. (2019). Nano-bio-computing lipid nanotablet. *Applied Sciences and Engineering, 5*(2). DOI: 10.1126/sciadv.aau2124

The White House. (2022, September 12). *Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy*. The White House. https://www.whitehouse.gov/briefing-room/presidential-actions/2022/09/12/executive-order-on-

advancing-biotechnology-and-biomanufacturing-innovation-for-a-sustainable-safe-and-secure-american-bioeconomy/

Ulrich, A. S. (2024). No Nanobots in Vaccines — Just Lipids on the Loose: Commentary on Lee and Broudy (2024), "Real-Time Self-Assembly of Stereomicroscopically Visible Artificial Constructs in Incubated Specimens of mRNA Products Mainly from Pfizer and Moderna: A Comprehensive Longitudinal Study." *International Journal of Vaccine Theory, Practice, and Research*, *3*(2), 1244.1-1244.10. https://doi.org/10.56098/7hsjff81

Legal Disclaimer