

My Journey as a Science Communicator: Viruses, an Egyptian Military Hoax, and the Birth of Virolvlog

by: Islam Hussein

Unexpected events and how we react to them can change our lives forever. I woke up on the morning of Saturday, February 22, 2014 thinking that it was going to be just another weekend. While browsing my Facebook newsfeed, I came across a post by the official spokesman for the Egyptian Armed Forces claiming a “world-class discovery” of a new therapy for hepatitis C and HIV/AIDS.

★ TEXT HAS BEEN REDACTED TO
HIDE SENSATIONALIZED CLAIM.

Before I could even digest this post, I watched a YouTube video detailing this claimed discovery. There were apparently two devices: an antenna-based device (coined C-FAST) providing noninvasive diagnoses of several viral infections, and another (coined Complete Cure Device or CCD) that looked like a dialysis machine for therapy! The next day, at a press conference attended by the interim president and his defense minister, Major General Ibrahim Abdelaty, dressed in his military uniform, proudly shouted: "I have conquered HIV; I can turn this virus into a kofta skewer!" My head was spinning because I knew that announcing these kinds of discoveries should come through peer-reviewed scientific articles, not press conferences.

Having spent three years at NIH studying HIV, I have a deep understanding of how the virus operates. HIV infects the cells of our immune system and integrates copies of its genetic material into the nuclei of infected cells in the form of a "provirus," becoming an integral part of the patient's cells. HIV replication in infected patients can be suppressed using chemotherapeutic agents, but, to my knowledge, science has yet to figure out a way to rid CD4+ T cells of the integrated proviruses.

If General Abdelaty and his team had done their research, then we would have expected a plethora of scientific papers, mostly in high-impact journals, providing several pieces of credible scientific evidence supporting this big claim. Unfortunately, such evidence was not provided, and I found myself in front of a questionable paper published in a predatory journal, and a declined patent application claiming that the C-FAST device was capable of diagnosing a hepatitis C-infected patient from a distance of 500 meters!

The more I learned about these devices, the more it was obvious to me that this was a classic case of pseudoscience. I wanted to know on what scientific basis those claimed diagnostics and treatment devices were based. From reading the pseudopaper and declined patent application, I gathered that the C-FAST antenna was supposed to detect a sequence-specific electromagnetic signal emitted by the viral genetic material

in question. I had never heard of anything like this in my entire journey studying viruses. After some Googling, I realized the C-FAST device was nothing more than a fake bomb detector marketed by a conman, who is currently serving a jail sentence in Britain for the crime. It was very hard to collect reliable information about the CCD because its inventor, General Abdelaty, kept repeating that it was classified proprietary technology.

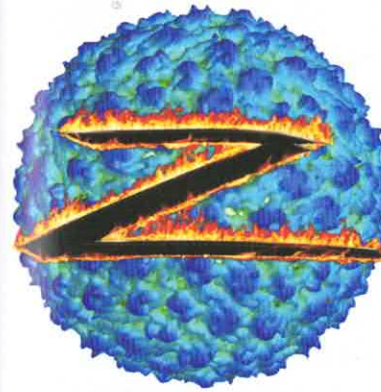
The mainstream Egyptian media played a major role in amplifying this scandalous pseudoscience claim. Since the announcement of these fake devices came shortly after a widely cheered military takeover of the government, there were strong emotional reactions to anything affiliated with the military, and, as such, the media touted these fake devices as great victories for the Egyptian military. In Egypt, where prevalence of hepatitis C is one of the highest worldwide, it was very easy for poorly educated patients to believe these claims. During a TV interview with a member of General Abdelaty's team, it was stated that the CCD relies on withdrawing the patient's blood and exposing it to ultraviolet light, then returning the "cleansed" blood back into the body. No explanation was provided for how the UV light would selectively target viruses without causing toxic effects to other blood components. Furthermore, how would these UV rays penetrate to the proviruses integrated in immune cell genomes? Even if these UV rays could selectively kill hepatitis C viruses in the blood, how would this cure a patient carrying a viral factory in his/her liver?

Without a single scientific publication or proper clinical trial results, the media reported numerous accounts of patients testifying that they were cured after going through CCD-based therapy. The Egyptian Armed Forces announced that therapy for hepatitis C patients would begin in military hospitals on June 30, 2014. Numerous patients were

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being deceived by this state-sponsored fraud, and I felt helpless in front of powerful media justifying pseudoscience for political gains. Once the international media picked up the news, I felt that science in my home country would be greatly tarnished. This deeply troubled me, and I was not quite sure how to act on my strong urge to address this issue. Eventually, I produced a video debunking the claims and uploaded it to YouTube. The video ran for about 80 minutes and was released on February 28, 2014. To my surprise, it went viral and I was immediately under the spotlight. Despite the fact that the video projected nothing more than a scientific critique, akin to what we scientists do in our regular journal clubs, speaking against a military-backed fraud was bound to come with a price. I was showered with a mix of thank you notes, angry messages picturing me as an enemy of the state, and threats telling me to "shut up or else." We scientists might be good at dealing with comments from journal reviewers, but do not get trained in graduate school on communication with the general public. I abstained from responding to personal insults and the politicized media. Instead, I responded to any objective scientific question and funneled all my communication through my social media accounts and scientific portals, all the way up to *Science* magazine. I wrote several articles and blog posts in Arabic and English, and recorded a second video to debunk the false information disseminated by the CCD team. I was not willing to stop until they backed down – they eventually did, in a press conference on June 28, 2014. The promised therapy was deferred for another six months for further testing, and we have not heard about it from the Armed Forces since!

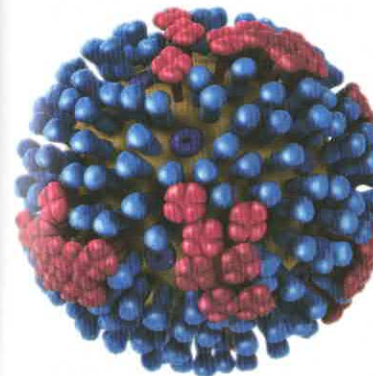
This heated public encounter left me with many powerful lessons that changed the way I think about science forever. It also led to the birth of *Virolvlog*, my video blog dedicated to public education of virology. Scientists spend most of their time behind the closed doors of their laboratories running experiments for papers, to advance the field, and at their desks writing grant proposals to fund their research. In the midst of this intense academic roller coaster, they tend to forget the importance of making their science accessible to a wider audience. Communicating science to



<https://youtu.be/IXm1pEbRmSw>



<https://youtu.be/EajmSImS3eU>



<https://youtu.be/XCrO6gS7RMk>



the general public requires time, skills, and dedication. Scientists are busy people and should not take all the blame for the lack of public engagement. A major contributing factor to their lack of public engagement is the fact that scientists are never rewarded by their academic institutions for

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communicating their work to the general public. Opinion articles, blogs, and vlogs never count toward tenure evaluations; peer-reviewed articles do. It was sobering to learn that a peer-reviewed article is read in full by an average of only 10 people. A short educational YouTube video on CRISPR technology reaching millions of viewers within a few months is no less impactful than the flurry of research papers reporting on experimental data on the same technology. This highlights the importance of educating the public, so they become capable of balancing the benefits and risks of the science that they have funded through tax dollars.

An important by-product of this engagement is training the general public to distinguish between real and pseudoscience. In this Internet age we live in, if scientists do not step up and use this powerful tool to spread the culture of critical fact-based thinking,

the public will be easy prey to the rising wave of “alternative facts.” Advocating for science is in the best interest of scientists.

Virolvlog was officially born on October 11, 2014, out of a burning passion to educate the Arabic-speaking public about viruses and as an attempt to correct any misinformation disseminated by mainstream media. I thought, “Why should I keep complaining about exaggerations or false information published by unprofessional media if I am capable of conveying an accurate picture, and on my own terms, not theirs?”

Virolvlog is a team of two: my 13-year-old son Adham and me. Since November 2014 we have established a home studio, taught ourselves the basics of video editing through free Web tutorials, and have grown the vlog audience greatly. So far, we’ve released 20 videos discussing some of the most complicated topics in virology. Some of our most successful videos, which exceeded 100,000 views, were on the Zika virus and CRISPR. We also conduct interviews with scientists and nonscientists from all walks of life to show our audience how interconnected virology is with other disciplines of science, engineering, history, politics, art, and all the way to outer space! Our viewership data indeed confirm that *Virolvlog* videos are reaching diverse age groups in almost all Arabic-speaking countries. We hope to be a useful resource to students and health professionals, and a deterrent to anyone with intention to deceive the masses. We are also looking to enrich Arabic Web content, which is estimated to make up only 3% of the entire Internet. I sometimes pause and ask myself whether all the time and effort we are putting into *Virolvlog* is actually worth it, but when I receive messages from one of our student viewers saying, “I love microbiology because of you,” that pretty much answers it! ■

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A NOTE

Read more about CRISPR, mentioned by Hussein, on page 60.

CO-WORKERS

Hussein's 13-year-old son, Adham, makes up the other half of Virolvlog. They research, film, and edit each video together.



Islam Hussein

Islam Hussein is a molecular virologist. He graduated from the Faculty of Veterinary Medicine, Zagazig University, Egypt, in 1999. He earned his doctorate degree in virology from the University of Cambridge, UK, in 2007. He did his postdoctoral training at the U.S. National Institutes of Health and the University of Kansas Medical Center. Currently, he is a research scientist at the Massachusetts Institute of Technology.



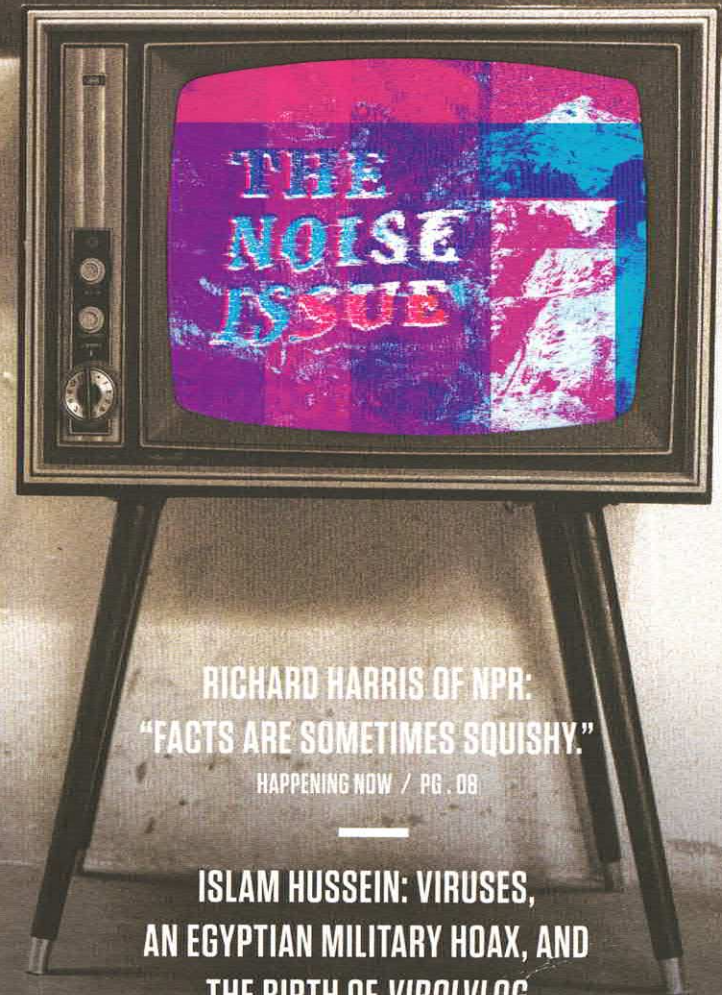
Adham Hussein

Adham Hussein was born in Egypt and raised in the US. He is a 7th grader at the Watertown Middle School, MA. He is interested in all things related to technology, enjoys the whole video production process, and strives to learn more about it.



CULTURES

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