

**Wireless Communications
Electromagnetic Fields (EMFs):
How They Produce Non-Thermal
Biological Effects, Why the Safety
Guidelines Do Not Predict Biological
Effects and Do Not Predict Safety and
Why 5G Is Especially Dangerous**

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Electronically-generated EMFs are generated in a coherent state at a specific frequency, in a specific vector direction, with a specific phase and specific polarity.

Each of these properties is important such that these coherent EMFs produce much higher electrical forces on electrically charged groups and also produces very high magnetic forces in our bodies, as compared with most natural EMFs.

Much of the documentation for my discussion can be found in citations on from my safety guideline fraud document:

<https://ehtrust.org/wp-content/uploads/SafetyGuidelineFraud2.pdf>

Dr. Olsen has stated that some people have argued that the VGCC mechanism that I have shown to be the main mechanism of action producing non-thermal health effects, cannot be true. That is an accurate statement for three people that I know of. Why have they come to that conclusion?

The reason is that they are assuming that the only way that we can get VGCC activation is by depolarization of the plasma membrane. I have argued in four different publications, and many of my talks including the talk in Moscow Idaho 3 weeks ago which Dr. Olson attended, that the mechanism is a direct impact of these highly coherent electronically generated EMFs on the voltage sensor which controls the opening of these channels.

If you make a false assumption (which these people are doing) then you come to a false conclusion.

Dr. Olsen has suggested that there is a consensus that there are no non-thermal effects of EMFs but the consensus among independent scientist is just the opposite!

There are 42 different statement written by independent scientists and/or physicians, each expressing high level concern (in different contexts) that the “safety guidelines” do not protect us from non-thermal effects.

41 of these are described in:

<https://stopsmartmetersau.files.wordpress.com/2019/03/41-expressions-of-high-level-concern.pdf>

Current US/international safety guidelines only based on thermal (heating) effects, even though many non-thermal effects occur at levels many orders of magnitude lower.

Examples of non-thermal biological effects:

1. Lowered fertility (25 different reviews).

Changes in structure of testis, ovaries; lowered sperm count, motility, quality; lowered number of follicles (eggs), increased spontaneous abortion, lowered levels of 3 sex hormones, lowered libido

2. Neurological/Neuropsychiatric effects (29 reviews)

Insomnia, fatigue, depression, headache, lack of concentration/cognitive dysfunction, anxiety/stress agitation, memory dysfunction, tinnitus, etc. Major brain structure changes seen in animals.

3. Cellular DNA damage, 3 types (24 reviews)

Single & double DNA breaks, oxidized bases (8-HOdG); cause both cancer and germ-line mutations

4. Apoptosis, programmed cell death (15 reviews)

Lead to both reproductive and neurodegenerative effects

5. Oxidative stress, free radical damage (25 reviews)

6. Endocrine (hormonal effects) (15 different reviews).

Both non-steroid and steroid hormones systems affected; in some cases EMFs can produce both increased and decreased hormone activity under different conditions.

7. Excessive intracellular calcium $[Ca^{2+}]_i$ (16 reviews)

Underlying cause of almost everything else.

8. Cancer (38 reviews)

Increases initiation of carcinogenesis, tumor promotion and progression, including increased tissue invasion and metastasis

9. Cardiac effects via electrical control of heart (9 reviews).

Tachycardia; chronic exposures can lead to bradycardia; both cause arrhythmia; also get heart palpitations.

TOTAL of 197 bodies of evidence, each demonstrating a specific type of non-thermal effect.

We have 197 bodies of evidence each showing that EMF exposures produce a particular non-thermal effect which is an important threat for human health.

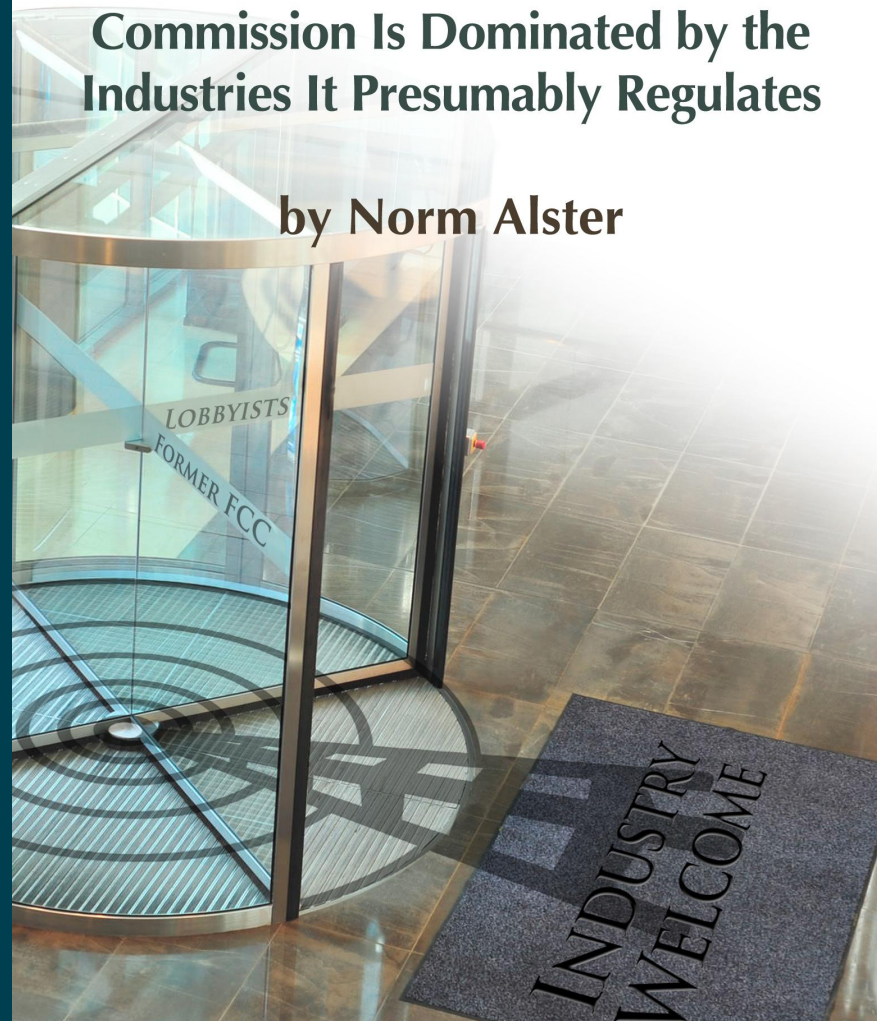
Universally ignored by the industry, by the regulatory agencies, and as you have seen by Dr. Olsen – who was shown these three weeks ago in the Moscow, Idaho talk. One can of course, argue against these, but only if there is clear evidence that all 197 of these are deeply flawed. But of course no one has done that, not even with a tiny fraction of these 197.

A document, published by the Harvard Safra Institute for Ethics, shows that the FCC is a “captured agency” captured by the telecom industry it is supposed to be regulating. Title: “Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates,” by Norman Alster.
http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf

Captured Agency:

How the Federal Communications
Commission Is Dominated by the
Industries It Presumably Regulates

by Norm Alster



Liability insurance coverage regarding EMF effects: Swiss Re, the second largest re-insurer in the world, wrote a document in 1997 putting the risks of EMF effects in the largest risk category. They wrote another such document, again with the highest risk category in 2003. Then again, in 2016, they made a similar assessment of risk for EMFs.

Lloyds of London and then most other insurance companies have put EMF exclusion statements in their standard liability policies.

The insurance company positions have been discussed in:
Roseanne White Geisel June 03, 2007, Insurers exclude risks
associated with electromagnetic radiation. [https://
www.businessinsurance.com/article/20070603/ISSUE03/100022051/insurers-
exclude-risks-associated-with-electromagnetic-radiation](https://www.businessinsurance.com/article/20070603/ISSUE03/100022051/insurers-exclude-risks-associated-with-electromagnetic-radiation)

The Environmental Health Trust has a long, useful discussion
on this:

[https://ehtrust.org/key-issues/reports-white-papers-insurance-
industry/](https://ehtrust.org/key-issues/reports-white-papers-insurance-industry/)

So here we have the insurance industry **whose business model is focused on accurate assessment of risk, coming to the conclusion that there are very high potential risks caused by EMF exposure** when the telecom industry propaganda argues that there are no risks. Given that we know that the telecom industry has a gigantic conflict of interest, we should be very careful before rejecting the insurance industry's assessment.

How are non-thermal effects produced?

30 studies have shown that non-thermal effects of microwave/other frequency EMFs can be blocked or greatly lowered by calcium channel blockers. (5 different types of calcium channel blockers were used in these studies, each having distinct chemical structures and binding to different sites to block channels.)

This shows that EMFs act by activating the voltage-gated calcium channels (VGCCs), allowing calcium ions (Ca^{2+}) to flow through the plasma membrane into the cell.

This effect occurs with millimeter waves, microwave/RF frequency waves, intermediate frequencies and extremely low frequency EMFs (such as 50 or 60 Hz from our power wiring) and also static electrical and magnetic fields.

I will argue that activation of these VGCCs act via direct impacts of the EMFs on the voltage sensor or the VGCCs. Among the type of evidence further documenting this are the following:

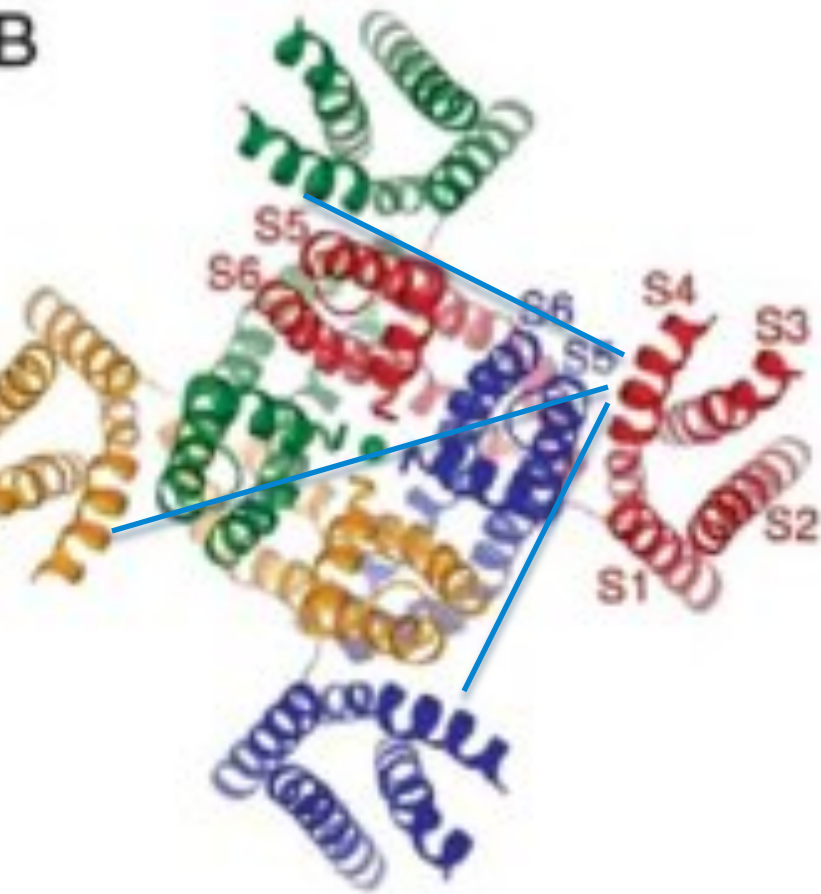
- Other channels containing a similar voltage sensor, the voltage-gated sodium, potassium and chloride channels and the plant so-called TPC channels are also activated by diverse low intensity EMFs.
- VGCC activation has also been confirmed via patch-clamp studies where there is no depolarization of .
- Effects can be blocked via extracellular calcium chelators or using calcium-free extracellular medium.
- Following EMF exposures, cells have large, rapid and in some cases almost instantaneous increases in calcium signaling.

I have a detailed biophysical model of how these EMFs can activate the voltage sensor of these ion channels. It was presented to the World Congress on Physics (October 2019) in 25 minutes.

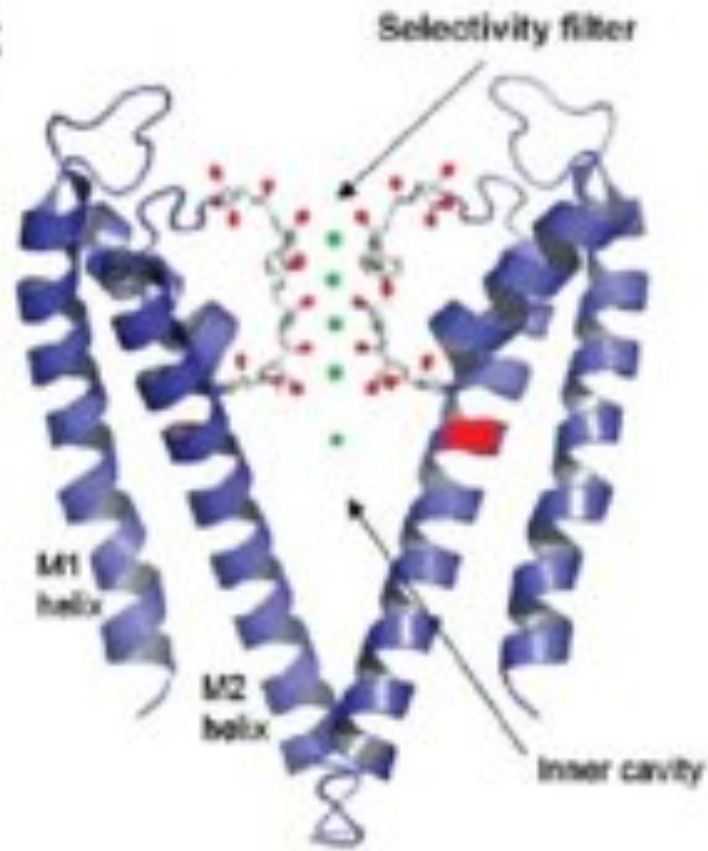
We have no time to present it here.

Ravens and Wettver, Cardiovasc Res 2011:89:776-785 (potassium channel)

B

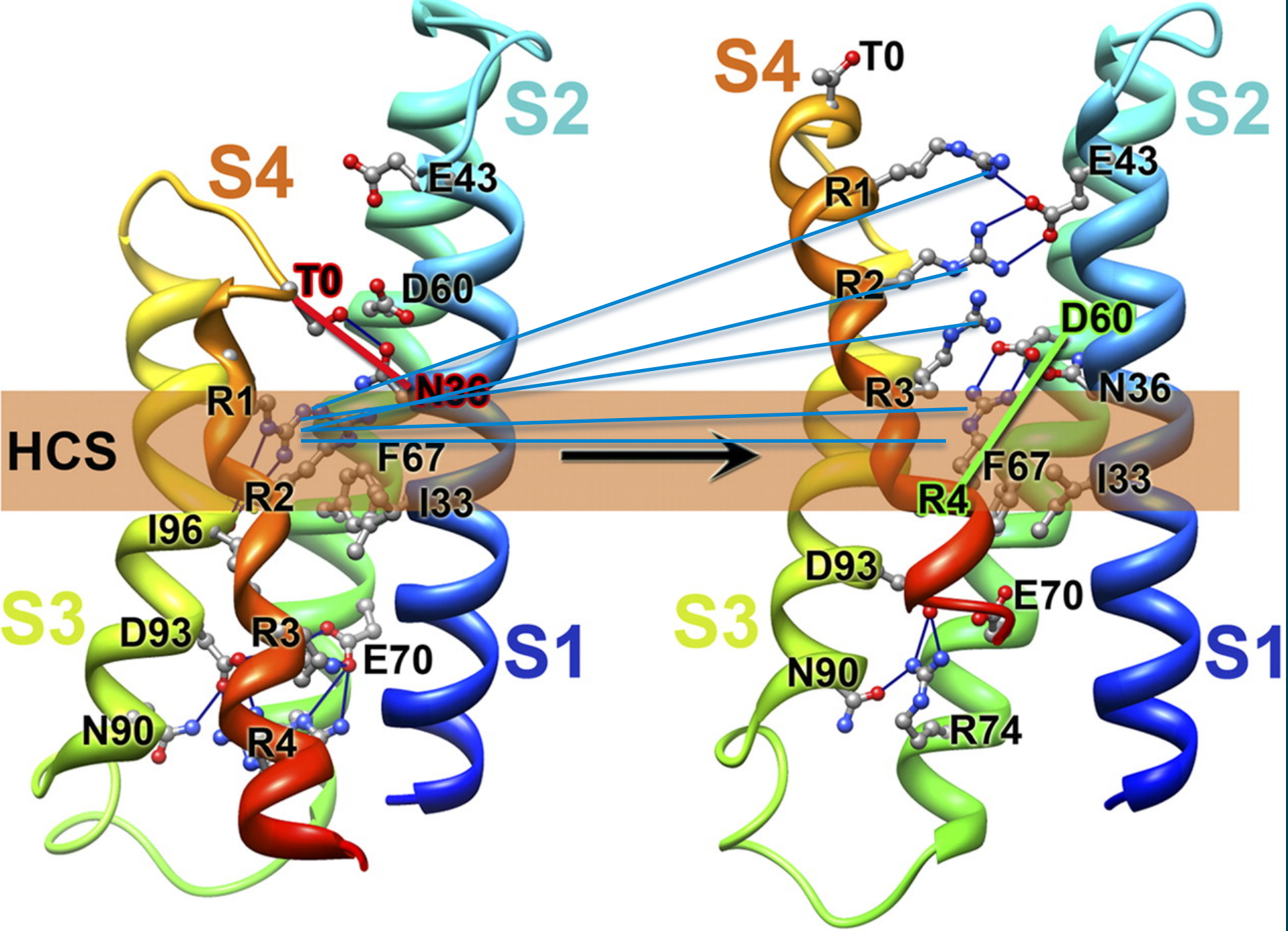


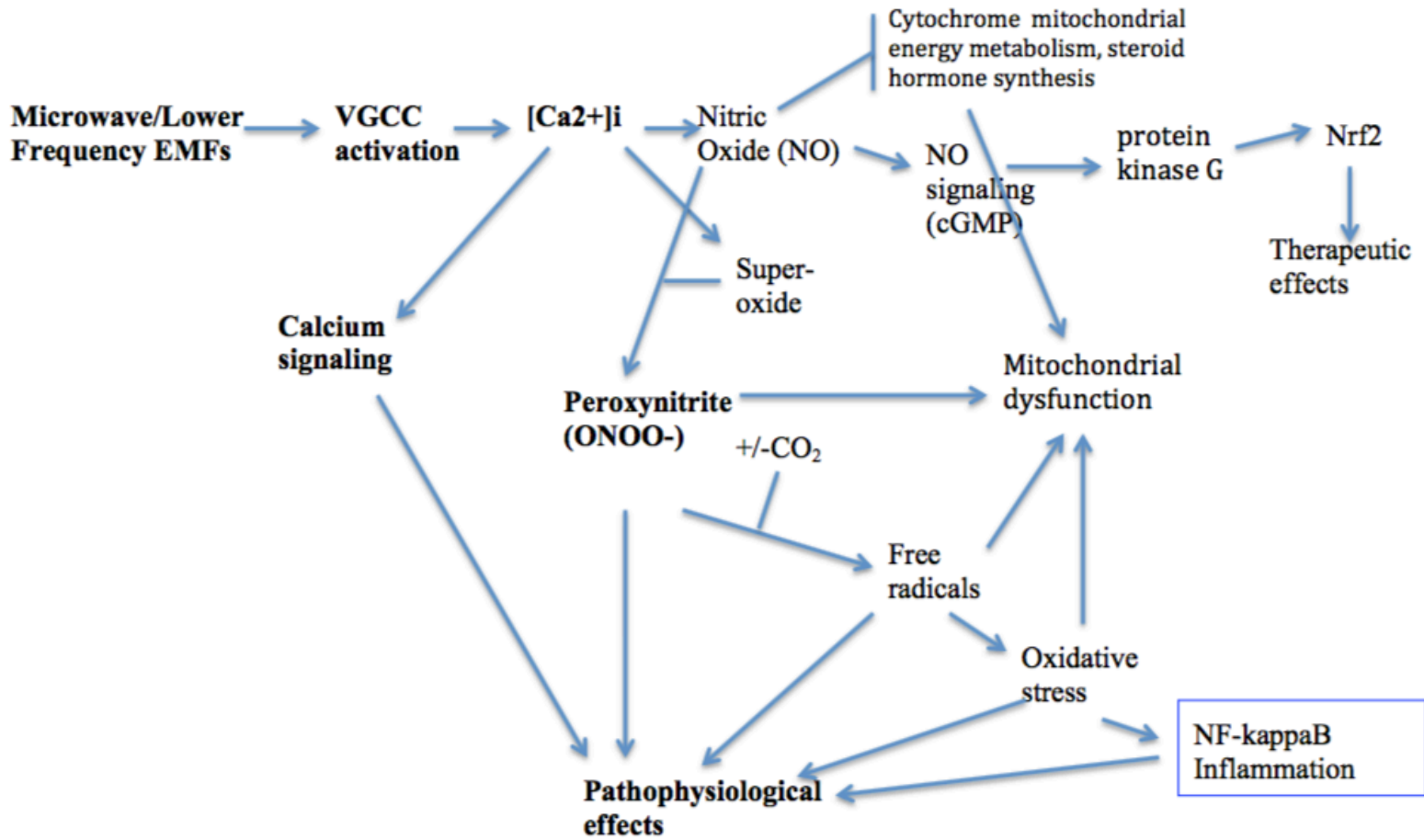
C



The next slide is derived from a very recent paper from Prof. William Catterall's lab (Univ. Washington): Cell. 2019 Aug 8;178(4):993-1003.e12. Resting-State Structure and Gating Mechanism of a Voltage-Gated Sodium Channel. Wisedchaisri G et al.

The slide is of structure of one of the four domains of a channel, in this case a voltage-gated sodium channel and shows how one of the four S4 helixes can ratchet from EMF exposure.





The VGCC mechanism has been amazingly well accepted in the scientific literature.

My first (2013) paper on it was placed on the Global Medical Discovery web site as one of the top medical papers of 2013. That paper has been **cited 252 times** according to the Google Scholar database. Most new scientific paradigms are only slowly accepted and this is much, much faster than usual.

I will have given 59 invited professional talks on this topic in 15 countries, including 4 prestigious keynote addresses. I am currently scheduled to give 1 more prestigious keynote addresses in April.

Two of my papers, my neuropsychiatric paper and my Wi-Fi paper, are each described by the publishing journal as being ***the most often downloaded paper*** in the history of each journal – stunning scientific interest in both papers.

My recent talks, one sponsored by the Dept. of Engineering and Applied Science at Queens University and the other at the World Congress on Physics in Berlin (where I was given a certificate of recognition) show together that both engineers and physicists are starting to realize the importance of this mechanism.

There have been at least 14 scientists who have been victims of personality assassination by the telecom industry, where an incredibly wealthy and powerful industry attacks individual scientists through their surrogates. This started in Nov. 1994 before Dr. Henry Lai had even published his first paper on EMF DNA effects and was immediately followed by the infamous “War Gaming Memo.”

Since, then the following US scientists have been the victims of personality assassination attacks: Allan Frey, William Rea, David Carpenter, Om Gandhi, Cindy Sage; in Europe similar attacks have been done on Lennart Hardell, Franz Adlkofer, Hugo Rüdinger, Dominique Belpomme, Olle Johansson and Dimitris Panagopoulos. I suspect that others should be included here, in addition. Each of these people has had a distinguished scientific career and the only reason each has been attacked is because each has had important scientific findings that the telecom industry did not like.

It is not pleasant to be the target of such attacks but I take it as a badge of honor that I have been added to this list. The telecom industry obviously thinks it is to their advantage to perform personality assassinations, but anyone should see that **this history confirms that they have no science.** If they had science, they would be debating the science, not attacking individuals.

Table 1: 1998 ICNIRP “Safety Guidelines”

	Frequency Range	Whole-body SAR (averaged over 6 minutes)	Localized SAR (head & trunk, averaged over 6 minutes)	Localized SAR (limbs, averaged over 6 minutes)
Occupational exposure	100 KHz-10 GHz	0.4 (W/kg)	10 (W/kg)	20 (W/kg)
General Public Exposure	100 KHz-10 GHz	0.08 (W/kg)	2 (W/kg)	4 (W/kg)

EU & 2013 UK and Australian safety guidelines are identical.
 US FCC and Health Canada’s Safety Code 6 are almost identical.

We have already discussed two distinct types of evidence for non-thermal effects:

1. 197 bodies of evidence each showing that EMF exposures produce a particular non-thermal effect – total of 9 different effects.

2. The voltage sensor of the VGCCs and other voltage-regulated ion channels is stunningly sensitive to activation by non-thermal EMFs of various frequencies.

We now consider six other types of evidence.

Pulsed EMFs are, in most cases much more biologically active than are non-pulsed, continuous wave EMFs of the same average intensity (13 reviews).

Because all wireless communication devices communicate via pulsations, they are potentially and I believe actually much more dangerous. The smarter the device, the more it pulses and therefore, the more dangerous it will be.

Average intensities, the basis of the safety guidelines, cannot be used to predict biological effects!!

5G is designed to be extraordinarily highly pulsed and will therefore be vastly more dangerous as a consequence

Example:

Nanosecond pulses are between 1 nanosecond and 1 microsecond.

But here is the problem: Our existing “safety guidelines” measure *average* the intensities over 6 minutes. In other words, a typical 40 nanosecond pulse, is averaged over 10^{10} - 10 billion times longer. In other words, this decreases the average intensity by a factor of 10 billion!

Current safety guidelines try to sell us on the idea that nothing can happen in 40 nanoseconds, when in fact we know there are effects.

One such effect is the over-activation of voltage-gated calcium channels.

The false logic used by EMF regulators:

A high-powered rifle bullet travels over 700 meters per second, but it only needs 50 microseconds to injure my body. So you go to the regulatory agency with your fears and they respond: Don't worry – if you just average the bullet's force over of a 10 billion times longer period (about 75 days), the force is so low it won't do anything.

There is another fatal flaw in “safety guidelines” coming from pairs of nanosecond pulses.

Pairs of nanosecond pulses when they occur within a few microseconds of each other have special properties: if the 2 pulses have identical polarity, they produce supra-additive effects. If the 2 pulses have opposite polarity, the second pulse cancels most of the first pulse. Both of these findings contradict “safety guidelines” where only additive effects can occur because only additive effects can be averaged.

The flaw here in the safety guidelines is that they average exposures as if EMFs were scalars but we know that they are not scalars, they are vectors with polarity. **ANOTHER FATAL FLAW IN THE PHYSICS OF SAFETY GUIDELINES!!**

These are pure pulses not modulating pulses as occur in 5G, but both types of pulses work via VGCC activation, so these findings are likely to be relevant to 5G.

Any full fledged 5G system, communicating with the “internet of things” will inevitably have trillions of nanosecond pulses and hundreds of billions of paired nanosecond pulses of identical polarity, producing vast effects, none of which are predicted by “safety guidelines.”

Three more fatal flaws:

9 reviews each show that there are exposure windows, ranges of intensity which produce maximum effects but when you go to lower or higher intensity, effects drop way down! Dose-response curve are neither linear nor monotone, they do not always increase with increasing exposure. Using average exposures only makes sense if you have linear dose-response curves. So here we have still another fatal flaw in the “safety guidelines.” Some of these exposure windows produce high level effects at levels approximately 100,000 times below the safety guideline allowable levels.

When individual research groups study EMF effects in different cell types, using identical methodology, they find that cell types differ widely in responses to EMF exposure. This shows clearly that you cannot ignore the biology, but that is exactly what the “safety guidelines” do.

There are also specific frequency windows where specific frequencies produce effects at levels orders of magnitude below those required by nearby frequencies. These have been ascribed to resonance interactions with specific targets.

I have shown you 8 different types of evidence which test predictions of the safety guidelines.

In each case the safety guidelines fail and fail massively to predict biological effects and therefore fail to predict safety.

We have, therefore, a multitrillion dollar set of companies, the telecommunications industry, all of whose claims of safety are based on failed safety guidelines and are, therefore, fraudulent.

At the core of the scientific method, as discussed by Karl Popper and others: When you have a theory and you test predictions of that theory & those predictions fail, you throw the theory out. Consequently, the failure of the industry and the regulatory agencies to throw out the “safety guidelines” is both unscientific and anti-scientific.

Four reasons why EMFs are more active in children than adults:

1. Children have higher surface to volume ratios, such that their tissues are much more exposed to EMFs.

This may be particularly important in the head where thinner skulls mean brain exposures are much higher.

2. Children have very high densities of stem cells which are particularly sensitive to EMFs. (discussed previously by Dr. Igor Belyaev)

3. The developing brain appears to be especially sensitive to EMFs.

4. Young tissues have much greater extracellular water content than do older tissues. This leads to much deeper penetration of effects. (discussed previously by Dr. Devra Davis)

For these reasons, Wi-Fi and cell phone tower radiation in schools are both of special concern.

Four other probable biological effects from RF over-exposures:

- Very early onset Alzheimer's and other dementias.

People in their 30s developing Alzheimer's and "digital dementias" in some younger.

- Both ADHD and Autism may be caused by late pre-natal and early post-natal EMF exposures.

Five mechanisms control synapse formation in the developing brain, each controlled by intracellular calcium $[Ca^{2+}]_i$. Excessive $[Ca^{2+}]_i$ following EMF exposure can disrupt synapse formation, causing ADHD and autism via that mechanism.

- Electromagnetic Hypersensitivity (EHS)

There are a number of the EMF-caused effects that appear to be cumulative, and as they become more severe, they become apparently irreversible!! Irreversible is defined here in two ways: 1. When the person or animal is removed from the EMFs, effects don't go back to normal. 2. Conventional medicine does not know how to reverse the changes.

We see this pattern with the much of the reproductive effects. Possible mechanism has been studied in animals where you see cumulative impacts on the structure of the testis and on the structure of the ovaries.

Much of the neurological/neuropsychiatric effects, as shown in occupational exposure studies in humans, are cumulative and as they become more severe, become apparently irreversible. Similarly, in animals, the changes in the structure of the brains are cumulative and irreversible.

There are a number of the other cumulative EMF-caused effects:

3. Cardiac effects due to the impact of the EMFs on the pacemaker cells in the sino-atrial node of the heart (high densities of VGCCs!).

4. Some but not other endocrine (hormonal) effects.

5. Neurodegenerative effects including very early onset Alzheimer's dementias.

6. Cataracts.

I believe that each of these are caused by impacts on the specific tissues involved, leading to what is called tissue remodeling. The tissues impacted in this way include the testes, ovaries, much of the brain, the sino-atrial node of the heart, several endocrine tissues and the lens of the eye. I have published on probable mechanisms in my heart failure paper: Pall, 2015. Int J Mol Sci. 2013 Nov 13;14(11): 22274-330.

5G is designed to be extraordinarily highly pulsed in order to carry extraordinarily high amounts of information!

The extraordinary numbers of 5G antennae in close proximity to homes, schools, hospitals and businesses.

Implications?

- 1. Impossible to avoid extraordinarily high level of pulsed exposures.***
- 2. 5G millimeter wave effects penetrate at least 20 times more deeply than the industry claims possible.***
- 3. Each of the previously discussed findings strongly suggest 5G wireless radiation will produce vastly greater health impacts than existing devices which already produce very large effects.***
- 4. 5G radiation will produce severe effects on the outer parts of the body but will also produce much deeper effects in the body.***

Problems with that need to be considered re 5G:

1. The extraordinarily high level of pulsation. 5G is designed to carry from 20 to 100 times more information than 4G which is already very highly pulsed.
2. The extraordinary numbers of 5G antennae in close proximity to homes, schools, hospitals and businesses – making it almost impossible to avoid.
3. Estimated human exposure circa 30 times higher than produced by our current antennae (Nasim & Kim, Human Exposure to RF Fields in 5G Downlink, arXiv:1711.03683, 2017 – arxiv.org)
4. Phased arrays to be used to increase penetration into buildings – this produces still more pulsations and higher maximum intensities.
5. 2, 3 and 4 are all designed to produce increased penetration into buildings. These all are each predicted to increase biological effects. Absorption of these frequencies is likely to involve interaction with electrically charged groups, such that we predict that high level absorption will produce high level VGCC activation through increased forces on the voltage sensor charges.

These all are each predicted to increase biological effects. High absorption of MM-wave frequencies is likely to involve high level interaction with electrically charged groups, such that we predict that high level absorption will produce high level VGCC activation through increased forces on the voltage sensor charges. The industry has predicted from this high absorption, that MM-wave including 5G will only produce effects on the outer 1 mm of the body. But this has been shown not to be true. Both human and animal non-pulsed MM-wave studies have shown vastly deeper penetration of effects:

Zalyobokskaya NP, 1977. Biological effect of millimeter radiowaves. Vrachebnoye Delo 3: 116-119. Declassified and Approved for release 2012/05/10: CIA-RDP88B01125R000300120005-6

Levedeva NN, Reactions of the central nervous system to peripheral effects of low-intensity EHF emissions. Approved for release 2000/08/10: CIA-RDP96-00792R000100070001-9

Potekhina IL, Akoyev GN, Yenin LD, Oleyner 1992 Effects of low-intensity electromagnetic radiation in the millimeter range on the cardiovascular system of the white rat. Fiziol Zh 78:35-41

Numerous other citations listed in: Betskii OY & Lebedeva NN. 2004 Low-intensity millimeter waves in biology and medicine. In: Clinical Application of Bioelectromagnetic Medicine, Marcel Decker, New York, pp. 30-61.

Kostoff et al (Toxicol Lett 2020:323;35-40) came to same conclusion.

How, then can these MM-waves produce penetrating effects? It has been known for decades that the electrical parts of the EMFs can be relatively easily absorbed but that the magnetic parts are deeply penetrating. The magnetic parts can put forces on dissolved ions, moving them and regenerating the electrical parts, same frequency and pulsation patterns, but with much lower intensity. However, with the stunning forces placed on the voltage sensor, such very low intensities can produce effects. This mechanism suggests that effects may be particularly intense adjacent to large volumes of extracellular water, such as blood, cerebrospinal fluid, amniotic fluid, fluid in the kidney, in the gut, in the eye, etc.

As you have heard Dr. Olsen, claims that Maxwell's equations argue against the occurrence of these penetrating millimeter wave effects. However, that is not true either. Maxwell's third equation is:

$$\nabla \times \mathbf{E} = -\partial \mathbf{B} / \partial t$$

Dr. Olsen has a legitimate claim to having high-level expertise in this area! When he is wrong in this area, what does that say about all the other areas where he is making judgments where he has no such claim of high level expertise?

Let's consider what 5G is apparently doing. Again, I want to emphasize that effects of any full-fledged 5G system communicating with "the internet of things" will be vastly greater than 5G effects on testing or initial rollout!

Human 5G effects have been reported in Switzerland and in Stuttgart Germany. In Switzerland there have been widespread neurological/neuropsychiatric effects and also cardiac effects.

https://www.illustre.ch/magazine/5g-sentons-cobayes?utm_source=facebook&fbclid=IwAR1kXKK1yWBDKoaZRVOQB7gRvC8o-1a3GyVbQHJPYpkAzzpl73iKYtaiA6Q

<https://mdsafetech.org/2019/07/20/the-first-report-of-5g-injury-from-switzerland/>

In Stuttgart, 5G also apparently produces neurological/neuropsychiatric effects and cardiac effects and, in addition large increases in electromagnetic hypersensitivity (EHS).

<https://www.stuttgarter-nachrichten.de/inhalt.demo-am-staatsministerium-in-stuttgart-protest-gegen-5-g-in-weissen-artzkitteln.f964401b-85f9-4915-a236-4f3177597300.html>

The neurological/neuropsychiatric effects, cardiac effects and EHS effects reported to be apparently produced by 5G radiation as very similar to but much more severe than the effects produced by diverse EMFs (Belaev et al review) smart meter radiation (Lamech & also the Conrad study) and are also the occupational EMF exposures as shown in the Karl Hecht review:

Belyaev I, Dean A, Eger H, Hubmann G, Jandrisovits R, Kern M, Kundi M, Moshhammer H, Lercher P, Müller K, Oberfeld G, Ohnsorge P, Pelzmann P, Scheingraber C, Thill R. 2016 EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses. Rev Environ Health DOI 10.1515/reveh-2016-0011. Lamech, F., 2014. Self-reporting of symptom development from exposure to radiofrequency fields of wireless smart meters in Victoria, Australia: a case series. Altern. Ther. Health Med. 20, 28–39.

Hecht, Karl. 2016 Health Implications of Long-Term Exposures to Electrosmog. Brochure 6 of A Brochure Series of the Competence Initiative for the Protection of Humanity, the Environment and Democracy. http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/07/KI_Brochure-6_K_Hecht_web.pdf (accessed Feb. 11, 2018)

To remind you the neuropsychiatric effects include: sleep disturbance/insomnia; fatigue/tiredness; headache; depression/depressive symptoms; lack of concentration/attention/cognitive dysfunction; dizziness/vertigo; memory changes; restlessness/tension/anxiety/stress/agitation; irritability; tinnitus

There are also unusual neurological/neuropsychiatric effects in cattle reported, some of which have been linked to 5G radiation exposure. These include multiple mass panic attacks in cattle:

www.melkvee.nl/artikel/191780-koeien-in-paniek-mogelijk-door-testen-5g-netwerk/

<http://stop5g.whynotnews.eu/?p=639>

<https://www.mast-victims.org/forum/index.php?action=vthread&forum=1&topic=6143>

They also include very unusual aggressive behavior in both cattle and sheep:

<https://www.nordbuzz.de/niedersachsen/niedersachsen-ort29155/papenburg-oldenburg-niedersachsen-schock-schafe-brechen-attackieren-menschen-11833036.html>

<https://www.sueddeutsche.de/bayern/bayern-peiting-kuh-bauernhof-dach-1.4626878>

<https://www.bayerische-staatszeitung.de/staatszeitung/leben-in-bayern/detailansicht-leben-in-bayern/artikel/danger-die-kuh-das-wilde-wesen.html>

<https://www.tz.de/bayern/altoetting-bayern-tier-drama-kuh-buext-aus-stall-aus-sie-ueberlebt-ihren-ausflug-nicht-12189661.html>www.tz.de/welt/ice-strecke-kassel-wuerzburg-kuh-laeuft-in-tunnel-und-legt-bahnverkehr-lahm-zr-11832114.html/

www.tz.de/welt/ice-strecke-kassel-wuerzburg-kuh-laeuft-in-tunnel-und-legt-bahnverkehr-lahm-zr-11832114.html

Both of these types of behavior can be produced by two responses to EMFs acting via VGCC activation: Elevated release of norepinephrine (fight or flight hormone) and elevated fear responses.

**Learn. Mem. 2006. 13: 584-589; The L-Type voltage-gated calcium channel Cav1.3 mediates consolidation, but not extinction, of contextually conditioned fear in mice
Multiple calcium channels mediate neurotransmitter release from peripheral neurons**

**T M Perney, L D Hirning, S E Leeman, and R J Miller
PNAS September 1, 1986 83 (17) 6656-6659**

**Magnesium inhibits norepinephrine release by blocking N-type calcium channels at peripheral sympathetic nerve endings T Shimosawa, K Takano, K Ando, T Fujita –
Hypertension 2004;44:897–902**

It was proudly announced in England that an ambulance service will be using 5G communication between the ambulances and the hospitals served by them. The first such ambulance, it was proudly announced, was to be put into operation in Coventry in the West Midlands region of the UK:

<https://www.coventrytelegraph.net/news/coventry-news/what-is-5g-15108544> So what happened when that 5G ambulance was operational? What happened is that three of the medical technicians personnel died within an 11 day period of apparent suicide: Three NHS workers die suddenly while working for same 'toxic' ambulance trust. Could 5G be related? Alan Selby Mirror Sun, 24 Nov 2019 02:23;

<https://www.bbc.com/news/uk-england-suffolk-50522214> ;

<https://www.itv.com/news/anglia/2019-11-22/concern-for-welfare-of-east-of-england-ambulance-staff-after-three-deaths-in-11-days/> Shortly before their deaths a

whistleblower wrote to the East of England Ambulance Service NHS Trust's boss complaining about psychological abuse. There are widespread neuropsychiatric effects produced by low intensity EMF exposures, including depression. Depression can cause suicide and various other neuropsychiatric effects may well lead to abusive behavior.

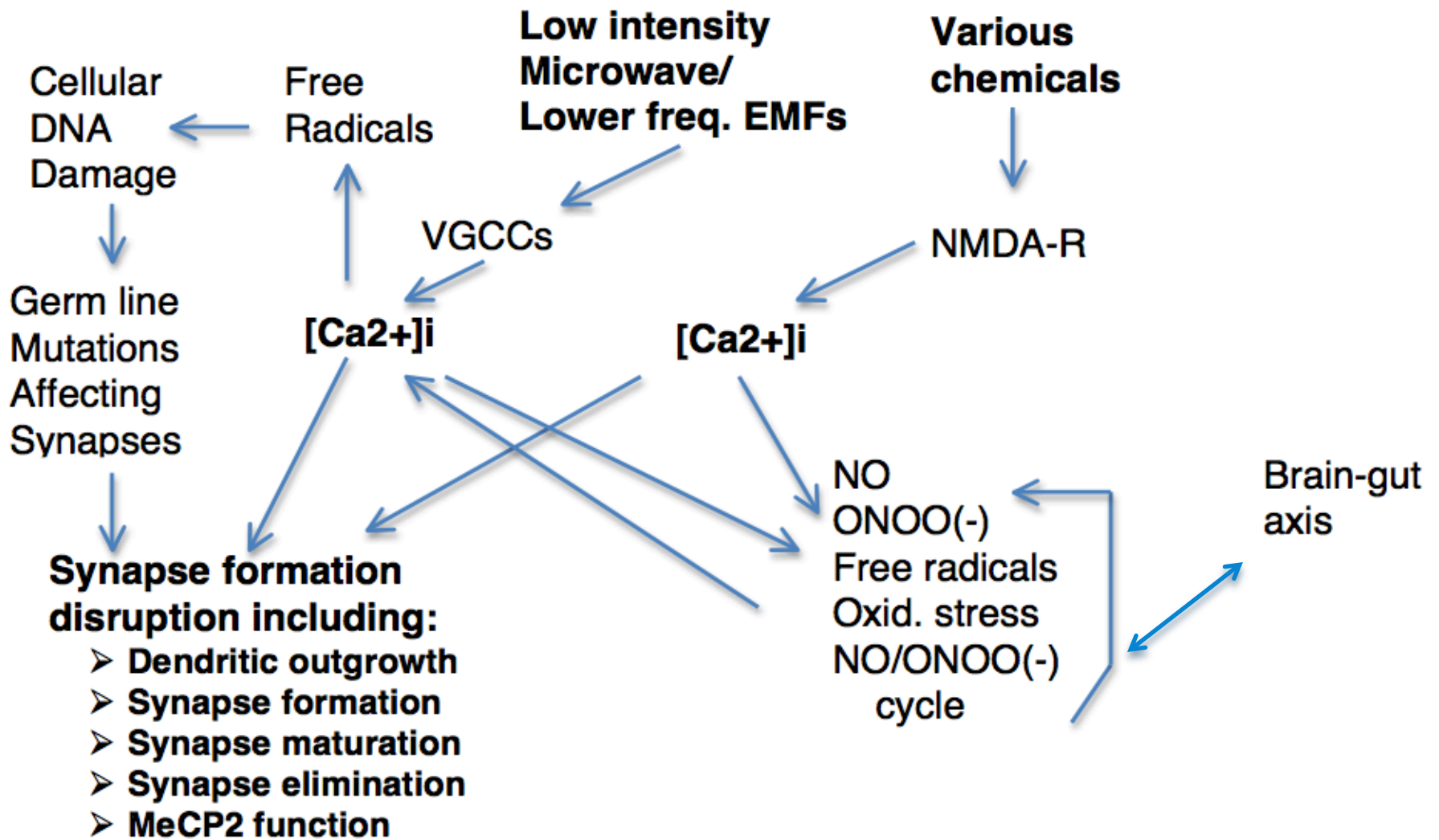
There have been a series of very unusual human birth defects, in both Germany and France, involving aberrant limb development, such as aberrant hand and finger structure and even missing hands or missing arms.

<https://www.faz.net/aktuell/gesellschaft/menschen/gelsenkirchen-drei-saeuglinge-mit-handfehlbildungen-geboren-16382810.html>

None of the many articles on these limb birth defects have suggested a link to 5G EMF exposures but such a link should be considered. The reason for that is that Bates et al, Ion Channels in Development and Cancer, Annu Rev Cell Dev Biol 2015; 31: 231-247 showed that elevation of both VGCC activity and also elevation of voltage-gated sodium channels can produce aberrant limb development. While the excessive activities of single channels do not produce aberrations identical to those in these recent human birth defects, a combination of excessive voltage-gated ion channel activities may well do so.

Very Early Onset Alzheimer's & other dementias:

1. There are some superb animal models of AD. Jiang et al, Arch Med Res 2013;44:178-184 showed that EMF pulses given to 2 month old rats on one day in one, ten or 100 seconds produce 18 months later essentially universal AD. Jiang et al, Brain Res. 2016; 1642:10-19 started those pulses at 2 months of age but subsequently gave pulses every day – this produced 100% Alzheimer's in 4 months (6 month old rats) –so these are very very very early AD. Two additional studies from Dasdag's group support these conclusions.
- 2. 5G EMFs produce very high effects on the human brain.**
3. Excessive intracellular calcium has central essential roles in causing Alzheimer's and other neurodegenerative diseases – calcium hypothesis of Alzheimer's disease (AD).
4. Epidemiological studies report that people exposed to EMFs occupationally have higher AD incidence.
5. Genetic studies show that increased VGCC activity increase AD incidence and conversely lowered VGCC activity lower AD.
6. EMFs produce large increases in the amyloid beta (A β) protein in isolated neurons – probably via oxidative stress - has key role in Alzheimer's and EMFs produce AD-like changes in animal brains.
7. Young people who are on Wi-Fi or other digital devices many hours a day develop what are called “digital dementias” with symptoms very similar to AD. The physiology behind digital dementias has not been determined -- very clear that EMFs can cause dementia in humans.



EMFs and Autism: How 5G may cause near universal autism.

Lowered fertility (25 different reviews).

Changes in structure of testis, ovaries; lowered sperm count, quality; lowered number of follicles (eggs), increased spontaneous abortion, lowered levels of each of the 3 sex hormones, lowered libido.

These effects appear to be increasing in our technologically advanced societies. Sperm counts in all such societies have dropped to below 50% of normal (Levine et al, 2017 Temporal trends in sperm count: a systematic review and meta-regression analysis).

Magras and Xenos showed that EMF levels well below “safety guideline” allowable levels caused reproduction in mice to crash -- apparently irreversibly crash to zero within about 90 days to 150 days.

Late 2018 study in Switzerland showing that 62% of young males are infertile (Rahban et al, Semen Quality of Young Men in Switzerland: a nationwide cross-sectional population-based study. Androl 2019 1-9). Study showed that sperm count, sperm motility and other measures of sperm quality were all low – each of these have been shown to be impacted by EMF exposures.

Two earlier 2018 studies in Finland and in Denmark showing that 78 or 79 % of males are either in the low fertility range or in the infertility range.

Rodprasert et al, An update on semen quality among young Finnish men and comparison with Danish study. Andrology 7; 15-23.

Cellular DNA damage, 3 types (24 reviews)

Single & double DNA breaks, oxidized bases (8-HOdG); cause both cancer and germ-line mutations

- These types of DNA damage all produced by the free radical attack on the DNA.
- Each of the types of mutations commonly involved in *de novo mutations* in autism, chromosomal rearrangements, copy number mutations and point mutations.
- It appears from the autism de novo mutation studies, we already have much higher levels of mutation because of EMF exposures and because 5G radiation will be so much more damaging than our already existing EMFs, a much higher mutation frequency produced by 5G is likely to again be sufficient to cause extinction.

I predicted about a year before the first 5G rollout that 5G radiation would probably cause massive fires because of the impact of EMFs on plants. EMFs impact plants producing large increases in intracellular calcium levels which act in turn to produce large increases in highly volatile and highly flammable terpenes. This, in turn, can make the plants burn as if they were sprayed with a light spray of gasoline. We may have seen the first 5G fires. Five cities along the east coast of South Korea, where some of the earliest 5G rollouts in the world occurred, had their 5G systems turned on – late April 3, 2019. The five unprecedented fires occurred in those same cities 1 ½ days later, April 5, 2019!

<https://www.thehindu.com/sci-tech/technology/s-korea-launches-5g-networks-early-to-secure-world-first/article26730605.ece> ; <https://www.telegraph.co.uk/news/2019/04/05/thousands-flee-homes-wildfires-rip-south-korea/> ; <https://www.thesun.co.uk/news/8799140/south-korea-biggest-wildfire-near-olympic-city/>

Other possible 5G fires may have also occurred in 2019 in areas of Southern California where 5G was rolled out, including along I405 freeway.

We discussed the fact that there were 5G cardiac effects in humans in Switzerland and in Stuttgart. There have also been two 5G cardiac effects in birds of the most severe tynetratings. Those occurred in a park in Rotterdam where 5G radiation was being tested and also in the Coventry hospital where 5G radiation was being used in connection with the 5G ambulance, discussed in the previous slide. In each case many birds died of apparent sudden cardiac death during the 5G exposures.

<https://www.healthnutnews.com/hundreds-of-birds-dead-during-5g-experiment-in-the-hague-the-netherlands/>

<https://www.facebook.com/Francesalexandrina/posts/2704854299560059>

It has been shown in rats that MM-wave exposure (non-pulsed) can cause sudden cardiac death (Potekhina IL, Akoyev GN, Yenin LD, Oleyner 1992 Effects of low-intensity electromagnetic radiation in the millimeter range on the cardiovascular system of the white rat. Fiziol Zh 78:35-41).

Human and animal hearts have pacemaker cells in the sino-atrial node of the heart which regulate the heartbeat and which have very high densities of VGCCs. I believe that these cardiac effects are produced by EMF impact on those pacemaker cells.

Wuhan, the capital of Hubei province in China, was chosen to be China's first 5G "smart city" and the location of China's first smart 5G highway.

Wuhan is also the center of the horrendous coronavirus epidemic. The possible linkage between these two events was first discussed in an Oct. 31, 2019 article entitled: "Wuhan was the province where 5G was rolled out, now the center of deadly virus"

<https://5g-emf.com/wuhan-was-the-province-where-5g-was-rolled-out-now-the-center-of-deadly-virus/>

The question that is being raised here is not whether 5G is responsible for the virus, but rather whether 5G radiation, acting via VGCC activation may be exacerbating the viral replication or the spread or lethality of the disease. Let's backtrack and look at the recent history of 5G in Wuhan in order to get some perspective on those questions. An Asia Times article, dated Feb. 12, 2019 (

<https://www.asiatimes.com/2019/02/article/china-to-launch-first-5g-smart-highway>) stated that there were 31 different 5G base stations (that is antennae) in Wuhan at the end of 2018. There were plans developed later such that approximately 10,000 5G antennae would be in place at the end of 2019, with most of those being on 5G smart street lamps. The first such smart street lamp was put in place on May 14, 2019. (www.china.org.cn/china/2019-05/14/content_74783676.htm).

Large numbers of these antennae only started being put in place in October, 2019, such that there was a furious pace of such placement in the last 2 ½ months of 2019. These findings show that the rapid pace of the coronavirus epidemic developed at least roughly as the number of 5G antennae became extraordinarily high. So we have this finding that China's 1st 5G smart city and smart highway is the epicenter of this epidemic and this finding that the epidemic only became rapidly more severe as the numbers of 5G antennae skyrocketed.

Are these findings coincidental or does 5G have some causal role in exacerbating the coronavirus epidemic? In order to answer that question, we need to determine whether the downstream effects of VGCC activation exacerbate the viral replication, the effects of viral infection, especially those that have roles in the spread of the virus and also the mechanism by which this coronavirus causes death.

Accordingly, the replication of the viral RNA is stimulated by oxidative stress:

J Mol Biol. 2008 Nov 28;383(5):1081-96. Variable oligomerization modes in coronavirus non-structural protein 9. Ponnusamy R, Moll R, Weimar T, Mesters JR, Hilgenfeld R.

Five different downstream effects of VGCC activation have important roles in coronavirus infections including parts of the infectious process that are essential for the spread of the virus. Those five are increased $[Ca^{2+}]_i$, oxidative stress, NF-kappaB elevation, inflammation and apoptosis. The first citation listed here specifically implicates the VGCCs in controlling the coronavirus infection.

Virology. 2020 Jan 2;539:38-48. Porcine deltacoronavirus (PDCoV) modulates calcium influx to favor viral replication. Bai D, et al.

J Virol. 2011 May;85(9):4234-45. Distinct severe acute respiratory syndrome coronavirus-induced acute lung injury pathways in two different nonhuman primate species. Smits SL, et al.

Cell Calcium. 2018 Nov;75:30-41. NAADP-dependent Ca^{2+} signaling regulates Middle East respiratory syndrome-coronavirus pseudovirus translocation through the endolysosomal system. Gunaratne GS, et al.

Proteome Sci. 2011 Mar 8;9:11. Proteomic analysis of chicken embryonic trachea and kidney tissues after infection in ovo by avian infectious bronchitis coronavirus. Cao Z, et al.

Res Vet Sci. 2015 Jun;100:12-7. Serum biomarkers of oxidative stress in cats with feline infectious peritonitis. Tecles F, et al.

J Infect Dis. 2008 Mar 15;197(6):812-6. Glucose-6-phosphate dehydrogenase deficiency enhances human coronavirus infection. Wu YH et al.

J Virol. 1998 Jun;72(6):4918-24. Transmissible gastroenteritis coronavirus induces programmed cell death in infected cells through a caspase-dependent pathway.

Eleouet JF, et al.

The predominant cause of death in the Wuhan coronavirus epidemic is pneumonia. Pneumonia is greatly stimulated by these same five effects, increased $[Ca^{2+}]_i$, oxidative stress, NF-kappaB elevation, inflammation and apoptosis. The first citation listed implicated calcium signaling and apoptosis in pneumonia in a coronavirus infection.

Mucosal Immunol. 2014 Nov;7(6):1366-74. doi: 10.1038/mi.2014.24. Epub 2014 Apr 16.

Secretion of IL-16 through TNFR1 and calpain-caspase signaling contributes to MRSA pneumonia.

Ahn DS et al.

Microb Drug Resist. 1999 Winter;5(4):247-52. Calcium signaling in Streptococcus pneumoniae: implication of the kinetics of calcium transport. Trombe MC.

Vet Immunol Immunopathol. 2011 Sep 15;143(1-2):1-10. Calcium influx, a new potential therapeutic target in the control of neutrophil-dependent inflammatory diseases in bovines. Burgos RA, et al.

Medicine (Baltimore). 2018 Nov;97(45):e13087. N-acetylcysteine improves oxidative stress and inflammatory response in patients with community acquired pneumonia: A randomized controlled trial. Zhang Q, et al.

Sci Rep. 2018 Oct 18;8(1):15393. Surfactant protein D attenuates acute lung and kidney injuries in pneumonia-induced sepsis through modulating apoptosis, inflammation and NF- κ B signaling. Du J, et al.

Curr Neurovasc Res. 2020 Jan 28. MicroRNA (miR)-429 promotes inflammatory injury by targeting kruppel-like factor 4 (KLF4) in neonatal pneumonia. Zhang L, et al.

J Clin Invest. 2013 Apr;123(4):1630-7. doi: 10.1172/JCI66142. Epub 2013 Mar 8. Activation of inflammasome signaling mediates pathology of acute P. aeruginosa pneumonia. Cohen TS, Prince AS.

Life Sci. 2019 Jul 1;228:189-197. Long noncoding RNA SNHG16 targets miR-146a-5p/CCL5 to regulate LPS-induced WI-38 cell apoptosis and inflammation in acute pneumonia. Zhou Z, et al.



This article is more than **1 month old**

How baseless fears over 5G rollout created a health scare

Misconceptions about the technology and lack of consultation with local communities may have boosted conspiracy theories

Alex Hern

Fri 26 Jul 2019 04.28 EDT

When Tonia Antoniazzi stood up in the House of Commons to talk about the risks of 5G, she admitted that “initiating a conversation ... has had members of my own team and family telling me that it is all made up.” But the Labour MP was undeterred, securing a debate in parliament and the support of a handful of Labour and SNP colleagues to ask about the “unintended consequences” of the latest upgrade to the nation’s mobile phone network.

The government’s response - that there was no evidence of any risk, and that it anticipated “no

Alex Hern is technology editor of Guardian running industry propaganda.

Wired Connections Are Always Better Than Wireless Communication!

Wired connections are faster, more secure, much more energy efficient and most importantly, much safer for human health and the environment. This includes both fiber optics or copper wire connections.

The only thing that cannot be done wired all the time, are cell phones, but even cell phones can be made vastly safer than they are now.

We were already facing two imminent existential threats to our survival from pre-5G exposures:

Crash of our (primarily male) reproductive function, over the technologically advanced world, quite possibly within two years due to the cumulative effects.

Crash in our collective brain function within something like 4 to 5 years.

Either one of these can produce rapid utter chaos in our “technological advanced” societies.

5G not only speeds those two up, but also adds further imminent existential threats:

1. Massive cardiac collapse due to the cumulative effects of 5G radiation on the pacemaker cells in the heart.
2. Universal or near universal very very very early onset Alzheimer's dementias.
3. Universal or near universal autism.
4. Massive contamination of the human gene pool through DNA effects in human sperm.

Then there are all the other big issues, cancer, hormone dysfunction, immune changes etc.

We must stop 5G, take out what 5G has already put in and then start rapidly reversing most of the other exposures. Failure to do so will end humanity as we know it by producing impacts making the worst apocalypse movie look tame.