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GREEN AMERICAN

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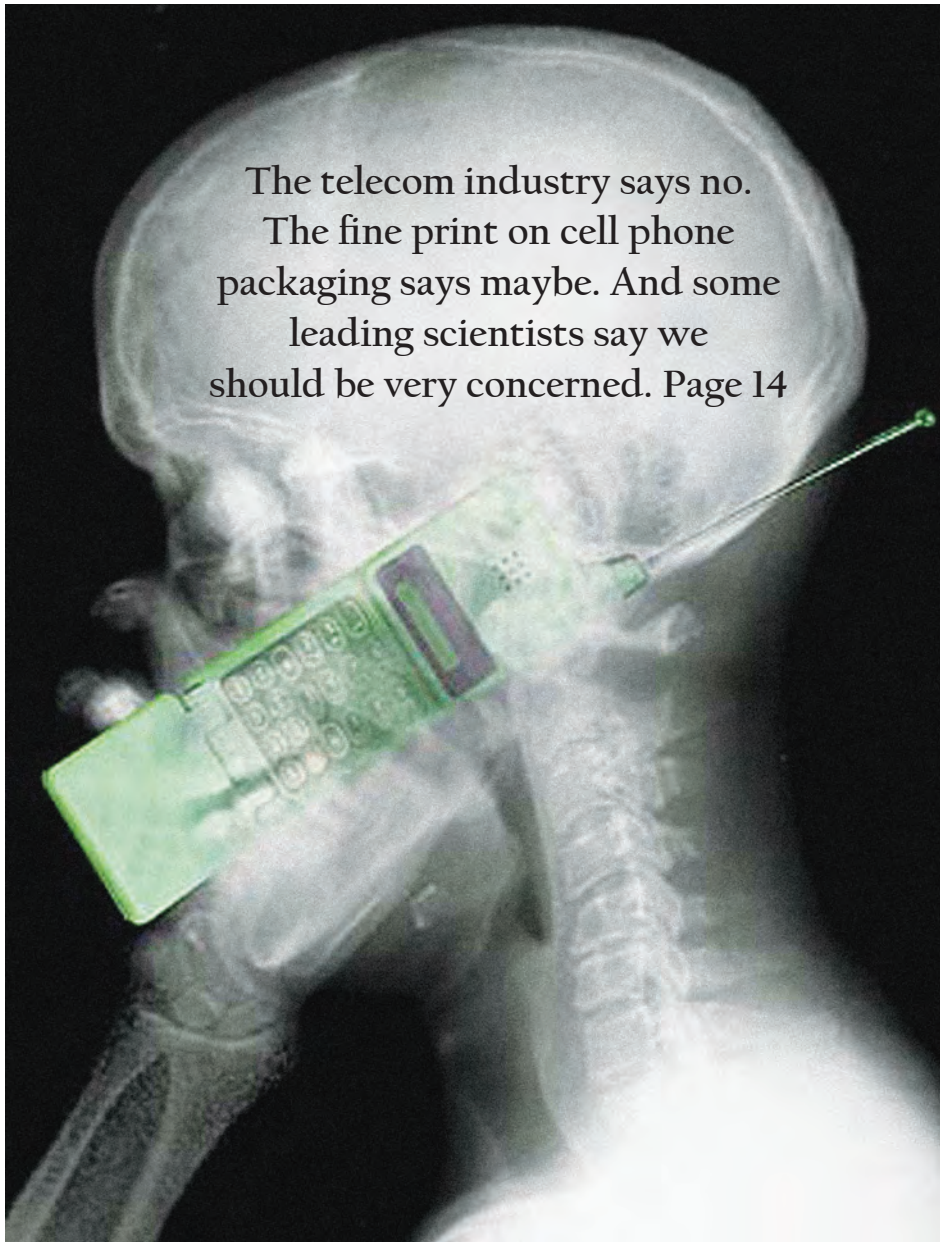
INSIDE

Do Cell Phones Cause Cancer?



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Danger Calling?

Read on before you dismiss the warnings about cell phones. There's real cause for concern behind the industry smokescreen.

This is the first time I've written an introduction to one of our Green American features addressed directly to you, our members. I've always been content to let the subjects of our articles do most of the talking. But when it comes to cell phones, I don't want to just dole out research. If I could, I'd knock on each of your doors and ask you to take care with how you're using these devices.

Don't get me wrong. I like cell phones. I appreciate being able to catch my constantly on-the-go family members anytime I need them. I was grateful to have one with which to call for help after a distracted driver plowed into the side of my small car last year. And don't get me started on the upside of being able to play Tetris while waiting for the dentist.

But all of us at Green America, and several members, have been wondering for a while whether there was something to the reports that were trying to connect these nifty little gadgets with brain cancer. We did some preliminary research, which indicated there just might be.

So in the last issue of the Green American, I wrote a brief about how the city of San Francisco is taking precautions when it comes to cell phone radiation and is requiring its retailers to prominently display the specific absorption rate (SAR) of the cell phones they sell on store shelves. SAR is the amount of radiation a cell phone causes a user's body to absorb.

The response from some of you wasn't pretty, though the letters were polite and written by thoughtful, smart people.

Member Julie Ebersole wrote, "As a Green American who also treasures the application of rational thought and scientific evidence to all areas of life, I am dismayed to see Green America giving credence to the fear of cell phone radiation."

"Come now—give us a break," added Jack Ryan, a longtime member. "I guess it would be harder to sell magazines or raise money telling everyone that there is no conclusive evidence linking [cell phones] to higher tumor rates."

Was there something to all this concern that Green America's editorial staff had put on our tinfoil hats and gone off the deep end? Should I have decided against running the San Francisco piece, with its implication that people may have something to fear from cell phone radiation? Were we just dead wrong?

So we decided to tackle the subject in depth. I expected us to turn up some inconclusive evidence that excessive cell phone use may be linked to some ill health effects, and people should be a bit careful about talking on a cell for hours a day—but really, there's not a lot to worry about.

Then we dug into the research. And what we found was truly frightening.

A New Silent Spring?

Our initial research uncovered enough information to make me rethink my cell phone habit.

- A 2009 meta-analysis of 11 studies, published in *Surgical Neurology*, found that using a cell phone for ten years or more "approximately doubles the risk of being diagnosed with a brain tumor on the same (ipsilateral) side of the head as that preferred for cell phone use."
- A 2009 analysis of 23 studies, published in the *Journal of Clinical Oncology*, found that people who used cell phones for ten years or more had a 10-30 percent higher chance of developing cancer than those who rarely or never used cell phones.
- When the Dutch city of Alphen aan den Rijn witnessed an epidemic of sick deciduous trees five years ago, local officials asked researchers at Wageningen University to study the phenomenon.

In late 2010, the scientists released the results, which found that exposing various types of local deciduous trees to radio-frequency radiation emitted by wireless Internet networks (the same type of radiation as that from cell phones) resulted in bark fissures, leaf discoloration, and "various forms of tissue death" in all of them.

Thanks to studies like these, the French government has made it illegal to market cell phones to children, and it has banned cell phones in public schools. The reason for the latter is not to prevent students from talking or texting during class, but to "apply the 'principle of precaution' in the absence of guarantees that the electromagnetic radiation emitted by mobile phones is perfectly safe for young children," according to *ComputerWorld UK*.

Israel has legally mandated that cell phone manufacturers display the SAR level on every cell phone for sale in the country. And the governments of Finland, Switzerland, Germany, the UK, Canada, and Russia have also issued warnings advising cell phone users, especially children, to use headsets to minimize exposure to radio-frequency radiation.

The US President's Cancer Panel report, released in 2010, advises taking care with cell phones, stating that their increasing use "is of great concern." While the report is careful to state that no link has been proven between cell phones and cancer, the authors write that more studies are "urgently needed" to assess safety.

All of this was just the tip of one large, alarming iceberg, a fact I discovered when I talked with Dr. Devra Davis.

A lecturer at Harvard and Georgetown, Davis has a rock-solid reputation as one of America's top-tier scientists (see p. 16). She initially dismissed the concerns about cell phones and cancer as overblown—until she looked into the studies behind the warnings and saw that researchers she respected had authored them. So Davis spent years poring over every study she could find on cell phones and cancer. The results "astonished" her.

"Every case-control study that's ever looked at people who've used a cell phone heavily for ten years or more finds a doubled risk of brain tumors," she told me. When I questioned her word choice, she said, "Every study that's large enough to find an effect finds one."

The results of this work culminated in her new book detailing the evidence she found warning of the potential dangers of cell phone radiation. *Disconnect: The Truth About Cell Phone Radiation, What the Industry Has Done to Hide It, and How to Protect Your Family* (Dutton, 2010) is just as courageous and groundbreaking as Rachel Carson's *Silent Spring*. It could save even more lives.

"Invisible radio-frequency radiation can alter living cells and create the same types of damage that we know increase the risk of cancer and neurological disease," she writes in *Disconnect*. "Neither the danger nor the safety of cell phones is yet certain. How we manage that uncertainty could avert a global public health catastrophe."

Plant Doubt, Make More Money

When it comes to cancer and cell phones, one thing is certain, say Davis and others: consumers can't rely on cell phone companies for protection.

"The telecom industry is running a classic tobacco campaign," said one Washington political insider who asked to remain anonymous. "Buy more time; make more profit off a product that could be causing major health problems for millions of people. The model is well, well worn: Deny, deflect, distract. First, create a false impression of total safety and when the scientific evidence builds up, challenge the science and plant doubt."

It took decades of anecdotal evidence, scientific studies, and consumer and investor pressure to get the tobacco industry to come clean about the links between smoking and cancer. And we're seeing the story repeat itself with hormone-disrupting chemicals in consumer products.

In 1998, I read Dr. Theo Colborn's acclaimed book, *Our Stolen Future*, detailing what endocrine disrupting chemicals were and what kind of harm they could cause. Back then, the idea of an endocrine disruptor was foreign to most people. Companies using suspected endocrine disruptors in their products continued to do so, armed with the fact that no one had "proven" that these chemicals were dangerous.

And still, somehow, Colborn's message got out to the world.

Twelve years later, has science proven without a doubt that Colborn was right about endocrine disruptors? No. Have we learned enough about these chemicals to know that we probably shouldn't be exposed to them? Hundreds of scientific studies say so, though the government and industry have taken only very limited protective action.

So it's everyday citizens who have used their economic power to pressure corporations like ConAgra to phase the endocrine disruptor bisphenol-A (BPA) out of food packaging (see p. 9), SIGG and EvenFlo to stop using BPA in beverage and baby bottles, and Appleton Papers to phase BPA out of its thermal paper products (see p. 22). Canada banned its use in consumer products outright, and some US states have banned its use in children's products. Precaution, or taking protective action even in the absence of proof that something causes harm, is becoming the rule when it comes to hormone disruptors, not the exception.

We can do the same with cell phones. We can demand responsibility from the telecom industry and pressure it to produce safer phones and take other steps to protect the public.

Read our interview with Dr. Davis. Take it to your families, your schools, your book clubs, and your communities, and tell people there's good cause to be worried about cell phone safety. Taking just a few simple steps now (see p. 17) can go a long way toward protecting ourselves and our vulnerable children—but we have to stop doubting Cassandra first. Because unlike the soothsayer who predicted the fall of Troy but couldn't get anyone to believe her, this Cassandra has a fistful of scientific evidence backing her up. And I for one am not willing to bet my children's lives that she's wrong.

—Tracy Fernandez Rysavy, Editor

Paula Beezhold

Dr. Devra Davis takes a comprehensive look at the cell phone industry and its potential links to cancer.

A Leading Scientist Answers Your Questions (and Doubts) About Cell Phone Hazards

Over her distinguished career as a scientist, professor, and author, Dr. Devra Davis has racked up her share of laurels. With a Ph.D. in science studies and a post-doctoral Master's of Public Health in epidemiology, Dr. Davis has worked for the National Academy of Sciences, and as a senior advisor in the US Department of Health and Human Services. She was appointed by former President Bill Clinton to his Chemical Safety and Hazard Mitigation Board. And she served as a lead author of the Intergovernmental Panel on Climate Change, which was awarded the Nobel Prize in 2007 along with former Vice-President Al Gore. She was the founding director of what is reputed to be the world's first Center for Environmental Oncology at the University of Pittsburgh, and she currently lectures at Harvard University and Georgetown University.

Her book, When Smoke Ran Like Water *(Basic Books, 2002), was a finalist for the National Book Award, and her book* The Secret History of the War on Cancer *(Basic Books, 2009) is being used at major public health universities, including Harvard, Emory, and Tulane.*

But it's her 2010 release, Disconnect: The Truth About Cell Phone Radiation, What the Industry Has Done to Hide It, and How to Protect Your Family *(Dutton, 2010), that may put her in the history books as the 21st century's Rachel Carson. In it, Davis examines the controversy surrounding cell phone use and its possible link to brain cancer and other human health impacts.*

Like many of us, Davis was initially skeptical about the ties between cell phone use and cancer. But after spending the past seven years poring over the research, she's become one of the most vocal and credible voices warning about the dangers of cell phone radiation.

Green America editor Tracy Fernandez Rysavy talked to Dr. Davis about why she's concerned about widespread cell phone use, and why it's so vital to protect our children from cell phone radiation, even in the face of some uncertainty of harm.

GREEN AMERICA/TRACY FERNANDEZ RYSAVY: What made you start to worry about the connection between cell phones and brain cancer?

DR. DEVRA DAVIS: I initially figured this was just one of those issues that attracts people who aren't very credible. There's a kind of arrogance that those of us who've been at the center of American science tend to have: I frankly assumed if there was anything important to know about cell phones and cancer, I would of course know it!

Then I came across a report by Sir William Stewart of the Stewart Commission of Great Britain. Sir William has been the president of the British Association for Science, the president of the Scottish National Academy of Science, and he's one of Britain's most distinguished scientists. He was an advisor to Margaret Thatcher. He's very highly regarded among both conservatives and liberals in England—a scientist's scientist. And he issued a warning in 2000 that said children should not be using cell phones.

I thought, "Well, the British, they're eccentric, you know."

Then I got a hold of the report, and I was flabbergasted.

Sir William and his colleagues were concerned about the biological properties of cell phone radiation, which I knew nothing about at the time. The report cited studies showing that pulse signals from cell phones could damage DNA and could weaken the blood-brain barrier.

TRACY: So then you looked through seven years' worth of research on this topic. What have the studies that have found possible links between cell phones and cancer had in common?

DR. DAVIS: Every study that's ever looked at people who've used a cell phone heavily for ten years or more finds a doubled risk of brain tumors.

TRACY: Every study?

DR. DAVIS: Yes. Every single study that is large enough to find an effect finds one.

The majority of studies on cell phones and brain cancer have been negative—

they've not found anything. Those studies have defined a user as a person who averaged one call a week for six months. And the average person in the study used a phone for less than six years.

Brain cancer takes a minimum of ten years to develop. So if you're studying a bunch of people who've made very few phone calls and have used a phone for a very short period of time, of course you're not going to find anything. It would be shocking if you did.

Today, three out of every four children under 12 uses a cell phone, and many households have eliminated their landlines and use cell phones exclusively. There are now nearly five billion cell phones in use worldwide.

Another thing those studies have had in common is that they've almost all been independently funded. In other words, when funding comes from industry, it really tends to discourage results from being positive in terms of a link between cell phones and brain cancer. Now that's not to say that everybody who works for industry is on the take. But there are these subtle ways in which it affects conclusions.

There's a general reluctance on the part of scientists to agree that something is a problem, because then their research might be over. So the more uncertainty we can find, the more we need to continue doing the research. Uncertainty becomes a very convenient thing to perpetuate.

I say this as someone who's worked in science for more than 30 years. In the cases of asbestos and passive smoking, which I was involved in leading studies of at the National Academy of Sciences, it was a tremendous struggle before we could get results released suggesting there was a problem. The struggle arose not because of debates about the science of these hazards, but because of the political and economic influence of these highly profitable industries.

TRACY: You're not the first person I've heard compare the studies on cell phones and brain cancer to the struggle to prove that tobacco and asbestos caused harm.

11 Ways to Protect Yourself

Ninety-one percent of Americans and nearly 5 billion people worldwide use a cell phone. Increasingly, cell phones are becoming a vital part of our lives, functioning as our primary mode of personal and business communication as well as our calendars, cameras, MP3 players, and address books. It is hard to imagine a world where we didn't have all these functionalities at our fingertips. But at what cost to our health?

Here's what can you do to protect yourself from potential harm from radio-frequency radiation emitted by these devices:

1 **ALWAYS USE A HANDS-FREE HEADSET OR THE SPEAKERPHONE SETTING WHEN TALKING ON YOUR CELL PHONE.** Some researchers say a wired headset, especially a "hollow tube" headset you can special-order—which will be labeled as such and uses hollow tubes rather than wires to conduct sound—is the best. But even a Bluetooth wireless headset will reduce your radio-frequency radiation exposure by several thousandfold.

2 **KEEP THE PHONE OFF YOUR BODY.** Carry your phone in a purse or bag with the antenna (back of the phone) pointed away from you, not in your pocket or bra. When you're talking on it (with a headset or on speakerphone) put it on a table in front of you. Just a few inches can substantially reduce your radiation exposure.

3 **TEXT INSTEAD OF TALKING.** Holding your cell phone away from your head to send text messages exposes you to less radiation than talking on it without a headset.

4 **TURN IT OFF.** Phones only emit radio-frequency radiation when they're searching for or receiving a signal, so a phone that's off or in "airplane mode" is safe.

5 **REPLACE CORDLESS PHONES WITH CORDED MODELS.** Cordless phones can emit as much radiation as cell phones, and the charging station constantly emits radiation.

6 **USE A LOW-RADIATION CELL PHONE.** Unless you live in San Francisco, cell phone retailers aren't required to display the specific absorbency rate (SAR), or the amount of radiation a phone causes your body to absorb. Search FCC.gov/cgb/sar to find out the SAR level of your model, or consult the Environmental Working Group's online database: EWG.org/cellphones. But no matter how low the SAR of your phone is, it's still important the phone away from your head and body whenever possible.

7 **KEEP YOUR CELL PHONE, CORDLESS PHONE, AND WIRELESS MODEM AWAY FROM YOUR HEAD.** All three will expose you to radio-frequency radiation, so banish all three from the bedroom or, at least, keep them away from your head and body. If you must have wireless Internet, turn off your router when you're not using it, especially at night—a power strip with a timer can help.

8 **KEEP YOUR PHONE FULLY CHARGED.** When a cell phone's signal strength is weak or blocked, it has to work harder—and consequently emits more radiation.

9 **BE WARY OF DEVICES THAT CLAIM TO BLOCK EMF EXPOSURE.** A Google search yielded 236,000 results for "EMF protection," most of which were sites selling "protective" devices ranging from pendants and crystals to microchips and herbal remedies. Most experts agree that many are based on quasi-science and there's no evidence that they work. Some "EMF shields" for your phone can actually increase the amount of radiation that it emits, since they block the signal and the phone has to work harder.

10 **DON'T GIVE CELL PHONES TO YOUNG CHILDREN AS TOYS OR PACIFIERS.** If you occasionally let your small tot play Pac-Man on your cell phone, put it into "airplane mode" so it won't search for a signal—which means it won't emit radiation.

11 **TAKE CARE WITH OLDER CHILDREN.** Children are more susceptible to potential harm from radio-frequency radiation than adults. If you give your children a cell phone for safety reasons, also give them a headset and encourage them to text or use the speakerphone instead of putting the phone close to their heads.

—Victoria Kreha

Kucinich to Introduce Cell Phone Bill

This past summer, Rep. Dennis Kucinich (D-OH), a frequent Green Festival™ speaker, announced his plan to introduce a bill aimed at making cell phones safer. The bill would create a new national research program to study cell phones and health, require an update to antiquated cell phone safety standards, and mandate warning labels on cell phones.

Kucinich has been working on this issue for the past few years, since he first became aware of the potential link between cell phones and cancer. In 2008, he called a Congressional hearing on the state of current research on cell phone safety—and telecom industry representatives refused to appear.

With the recent *Citizens United* Supreme Court ruling, which lifted restrictions on corporate political donations, Capitol Hill watchers who support the bill fear that cell phone companies could dump millions of dollars into the political coffers of candidates running against those who embrace a precautionary stance on cell phone radiation. But that threat isn't stopping Kucinich, who is working on draft legislation that will likely be available for comment in 2011.

Kucinich says that Americans have the right to know just how much radiation our phones are emitting, he says, noting that requiring warning labels on cell phones could push the telecom industry in the right direction.

"Most people want to use their hard-earned money on things that are good for the environment and for our health. But we can't do that if we don't have the information to make the decision," says Kucinich. "If we knew which phones were more likely to make someone ill, we would buy a different phone, sending a clear signal to cell phone companies: 'We want you to develop technologies that are safer for us.'"

—Tracy Fernandez Rysavy

DR. DAVIS: In both of those situations, I noticed a pattern: First you'd have reports of harm of people. And then industry steps in to raise doubt of that harm.

Now with the publication of the tobacco papers, we have evidence of what went on, which is a campaign where the tobacco companies exaggerated doubt so they could keep selling their products.

A book by Dr. David Michaels called *Doubt Is Their Product* (Oxford University Press, 2008) talks about a phrase that appeared in a memo from the tobacco industry referring to the idea that smoking caused lung cancer: "As long as we can raise questions in people's minds, then we've succeeded."

That's the modus operandi here: raise doubt, confuse people.

TRACY: Let's get more specific about how cell phone radiation can damage DNA. There's a belief out there—which was published last fall in *Scientific American*—that cell phone radiation can't cause cancer, because it's non-ionizing radiation.

DR. DAVIS: That was a very unusual piece for *Scientific American* to run on several accounts, one of which was that it used language that science usually doesn't use. It said that it's "physically impossible" for cell phone radiation to have a biological effect that causes cancer, because it doesn't damage DNA by breaking chemical bonds.

Let's break that sentence down. First of all, yes, it's certainly true that cell phone radiation is too weak to break DNA. No one has ever suggested that it does so like X-rays. In fact, X-rays are ionizing radiation. That means they break the chemical bonds that hold things together.

Non-ionizing radiation, by definition, cannot do that. That doesn't mean that it's safe. It may damage DNA in other ways.

The amount of power in a cell phone is several thousand times weaker than that of a microwave oven, but they both use the same frequency. A microwave oven will boil a cup of water in two minutes. And cell phones are being held next to your brain for hours a day.

Studies are showing that cell-phone radiation produces free radicals that we know can cause damage. It is destabilizing DNA, impairing the ability of DNA to repair itself. And we know it's causing weakening of the blood-brain barrier and weakening of cell membranes. All of these are biological impacts that can lead to cancer.

We also know you can get cancer without damaging DNA, as what happens with asbestos and hormone replacement therapy; these two agents cause cancer but do not directly damage DNA. So this idea that you can't have cancer because you don't damage DNA is wrong, on its face.

Finally, we know that cell phone radiation has profound biological effects from studies that have been done in cell cultures in animals and some experimental studies on humans. For all of those reasons, the *Scientific American* article was really mistaken. It's incredible that it took such a strong tone.

TRACY: I want to go back to the blood-brain barrier, because I thought that was so important when I read your book. Can you explain what it is, and how cell phone radiation affects it?

DR. DAVIS: The blood-brain barrier is a natural barrier that protects the brain from undesirable materials that could enter it through the bloodstream.

I talked to Dr. Allan Frey for my book, who performed a study involving the blood-brain barrier with the Office of Naval Research. What he basically did was to take a rat, inject blue dye into its veins, and show that while everything

else inside the rat turned blue, the blue dye didn't get into the brain. That showed we have a blood-brain barrier protecting the brain.

Then what he did was to perform the same experiment exposing the rat to a microwave-sized, pulsed digital radio-frequency signal before injecting the dye—and the brain turned blue. That was pretty powerful.

And then he was told by his superiors to stop working in that area if he expected to continue getting support for his research.

Well, a pseudo-replication of this study was done by a group connected to industry where they injected the dye into the abdomen, not into the bloodstream. The brain, of course, didn't turn blue, so they concluded that Frey was wrong. That's the kind of misleading science that has characterized this field.

The blood-brain barrier work, by the way, is really relevant to Green America's work on toxins. Since radio-frequency radiation weakens the blood-brain barrier, that means you will enhance the uptake of toxicants through the brain by using a cell phone. So all of our policies to protect us from toxins will do nothing if we do not also deal with this exposure.

Who's Most At Risk?

These computer models from the University of Utah show how radio-frequency radiation from cell phones passes further into the brain of a child than that of an adult. Research that Dr. Om P. Gandhi and Dr. Devra Davis are currently working on indicates that children may be exposed to twice as much radio-frequency radiation from a cell phone as an adult.

Source: Brain graphics courtesy of Professor Om P. Gandhi, Univ. of Utah; photos from iStockPhoto.com

TRACY: Why is it that we have to worry most about children and cell phones?

DR. DAVIS: Children are not just little adults. They have thinner brains, they have thinner skulls, and their brains contain more fluid. The more fluid something contains, the more vulnerable it is to microwave radiation. After all, a cell phone is just a small, two-way microwave radio.

Children today are growing up in a sea of radio-frequency radiation that did not exist even five years ago. They need to be protected.

TRACY: I was surprised to learn that men who'd like to become fathers also need to be careful of cell phone use.

DR. DAVIS: Yes. If you take sperm from healthy men and split it into two samples, it will die naturally, because sperm don't live that long. But sperm exposed to cell phone radiation will die four times faster, and they will develop biological signs of damage that we know indicate they've been harmed.

Studies showing sperm damage in human males have been done by leading researchers in Australia, in Greece, in Turkey, and in the US at the Cleveland Clinic. In addition, studies have followed men who have reduced sperm count and found that those who use their phone for four hours a day have half the sperm count of others.

Finally, studies in Greece have shown that exposing fruit flies to cell phone radiation doesn't kill them. But when you expose them and then magnify them under a microscope, you can see that their testes and ovaries are shrunken.

These studies have also led to researchers raising the issue of whether cell phone radiation has anything to do with the hive collapse phenomenon that's endangering honeybees.

TRACY: One thing you point out in your book that I think people don't realize is that industry is issuing warnings about cell phone radiation and human health—though very quietly.

DR. DAVIS: The ultimate indication of this now comes from the insurance industry. You cannot buy secondary insurance for cell phone damages from Lloyds of London, Swiss Re, or many of the companies that provide this insurance.

And the cell phone companies are all issuing fine-print warnings in the paperwork that comes with all the smart phones. What are you supposed to do if you have an iPhone 4 that says you can't put it into your pocket without exceeding the FCC exposure guidelines?

TRACY: And many of the warnings also recommend holding your cell phone about an inch from your head.

DR. DAVIS: Yes, go ahead and try getting everyone to do that.

A Call for Corporate Responsibility

People around the world are exposed to radio-frequency radiation every day from cell phone towers, wireless Internet routers, cordless phones, and even the otherwise beneficial "smart meters." Only time will tell for sure what the health effects will be. It's up to us to demand safer, low-radiation forms of these devices—especially cell phones, which are more dangerous because they are held directly against the body. Green America supports Dr. Devra Davis's Campaign for Safer Cell Phones (EnvironmentalHealthTrust.org), which is calling on government and industry to take the following steps:

1. Require that warning labels about safer cell phone use appear prominently on cell phones.
2. Require that cell phones be sold with speakerphones and earpieces.
3. Increase public awareness about the specific absorption rate (SAR) of all phones and ways to reduce exposures to radiation.
4. Conduct a major review and revision of safety standards, incorporating state-of-the-art science that takes into account the fact that billions of cell phone users are people who are much smaller and younger than the heavy-set tall man on which standards are now based. And support a major multidisciplinary independent research program on cell phones.
5. Develop recommendations about lowering direct radiation to the head.
6. Conduct a national survey of radio-frequency radiation exposure (the last one was done in 1980), and develop monitoring of heavy cell phone users by creating access to cell phone billing records to qualified researchers.

Web exclusives: For copies of the health warnings that are now appearing on cell phones, for more about the Campaign for Safer Cell Phones, and to get sticker templates for your cell phone to remind you to keep it away from your head, visit GreenAmerica.org/go/cellphones.

TRACY: I know your campaign (EnvironmentalHealthTrust.org) is asking for more visible warnings directly on the phones themselves. What would this accomplish?

DR. DAVIS: It would accomplish two things: First, people would have to look at this warning every time they picked up their phone and think about how they have to keep it away from their body and their brain.

Second, it would also help the phone companies reduce their liability, so it's not a losing proposition for them.

TRACY: Would it also push them to create safer phones, too?

DR. DAVIS: Yes. The newer phones now have the antennas on the back, pointing away from the body when you talk on them. That feature is safer than in the past, when the antennas were on the front.

But the newer phones are also more dangerous, because if you turn that phone and keep it in your pocket with the antennas pointing toward your body, as that phone is searching for a signal—which is what they do when they're on—it's pumping radiation into you.

Plus, studies indicate that the newer 3G and 4G phones may be even more harmful than the 2G phones. *[Editor's note: One 2008 study cited in Davis' book found a ten times higher rate of damaged DNA in human cells exposed to radio-frequency radiation from 3G phones compared to 2G phones.]*

TRACY: Can they make a low-radiation phone that isn't as much of a concern, or is any radiation bad for us?

DR. DAVIS: They can make very low-radiation phones. But there's no guarantee of safety, no matter how low the radiation is, if you're going to use the phone next to your head for hours.

TRACY: How problematic is the fact that when the FCC [Federal Communications Commission] establishes threshold safety levels for radiation exposure from cell phones, it's basing them on the SAM model?

DR. DAVIS: SAM stands for "standard anthropomorphic male," and he was taken from the top ten percent of military recruits in the 1989. He was six-foot-three, weighed 220 pounds, and had an 11-pound head.

Most people in the world do not have SAM's head. Radiation goes more deeply into a smaller head than a larger one. And today, three out of every four 12-year-olds, and half of all ten-year-olds, have a cell phone.

Plus, the safety standards for cell phones also presume calls last only up to six minutes. Our heads—especially children's heads—are getting a lot more exposure than SAM would get. We need a major revision of the safety standards that takes into account that billions of cell phone users are much smaller and younger than SAM.

TRACY: One thing in your book that really worried me was that cordless home phones are emitting similar radiation to cell phones.

DR. DAVIS: Yes. And the base station is radiating all the time. When you hold the handset next to your head, you're getting a whopping dose. We recommend that people not use cordless phones, and certainly not have the base station close to your bed.

TRACY: Which, of course, is where mine has been.

DR. DAVIS: Which is where most people's is. I've actually replaced my cordless phones with corded landlines. In France, people are starting to buy them more, and the Israelis have recommended that people replace their cordless phones with corded phones.

The good news is that experimental studies show that good nutrition—literally exposing animals or cells to the natural hormone melatonin or vitamins A, E, or C before you expose them to radio-frequency radiation—may help repair

damage. So whatever you have done in the past, go forward with good cell phone practices, and good nutrition can help repair past damage.

TRACY: How worried do we have to be about wireless Internet? Is it as much of a worry as cell phones?

DR. DAVIS: No, it's not as big of a worry because we're not holding the wireless routers against our bodies. But again, distance is your friend. Your routers should not be located in your bedroom or anyplace where your family spends a lot of time. Turning wireless devices off at night makes sense because it protects health, saves energy, and reduces demand for energy grid access.

What I'm very concerned about now are children sleeping with phones under their pillows so they can text at night, and young girls are keeping phones in their bras.

TRACY: I didn't know that was an epidemic!

DR. DAVIS: Well, apparently, it's pretty common among teenagers and athletic women. Several physicians have contacted me about breast tumors in women right at the site where they've kept their phone.

TRACY: Is there anything else you'd like to our readers to know?

DR. DAVIS: Those of us working in this field want to encourage safer design. We want to encourage people to use cell phones in a safer way and to encourage more corporate responsibility. I am pleased that the businesses joining our Business Campaign for Safer Cell Phones are agreeing to provide headsets and simple warnings to all their employees. That's why I wrote my book and why I'm speaking around the world.

And I do think people need to use their phones less. I realize that cell phones are going to be driving economic forces. It's not like I want people to turn off their phones. It's not realistic. But we really do need a national conversation and a cultural change about a lot of aspects of cell phone use.

Bakaleev Aleksey, iStockPhoto.com

Why It's Vital to Recycle That Cell Phone

Tantalum. You've may never have heard of this rare metal, but it's inside your cell phone. Valued for its ability to resist corrosion and extreme heat, it's become a vital material in portable electronics. And it's directly linked to child labor and the civil war in the Democratic Republic of Congo (DRC), where millions of civilians have been killed or raped.

Tantalum is derived from a metallic ore called columbo-tantalite, or coltan for short. The United Nations (UN) states that coltan can be found in "major quantities" in the eastern areas of the DRC. Both the Congolese military and militarized rebel groups control mining operations, and many children toil for long hours in deep mine pits, often staying in these foul-smelling holes for days, says Annie Dunnebacke, who works on the Congo campaign at the human rights nonprofit Global Witness (GlobalWitness.org) and has visited the DRC mines.

"Competition over control of the mineral trade is not necessarily the primary reason the conflict started, but in recent years, it's become a primary reason warring parties are continuing to fight," says Dunnebacke.

DRC coltan mines are also located in eastern gorilla territory, destroying critical habitat and further pushing this already endangered species to the brink of extinction.

A new US law enacted in July may help encourage companies to avoid funding violence in the DRC. The law requires publicly traded US companies to disclose steps they are taking to ensure that any coltan, tin, and tungsten sourced from the DRC and neighboring countries are "conflict-free." The new law also mandates independent chain-of-custody audits for these minerals.

Mvembo Phezo Dizolele

Child laborers mining coltan in the Democratic Republic of Congo.

Conservationists and human rights activists are calling on people to recycle their cell phones to help lessen the need for coltan, tin, and tungten. Many US zoos accept and responsibly recycle cell phones via Eco-Cell (Eco-Cell.com). You can also drop off your old cell phones for recycling at any Green Festival™ (GreenFestivals.org) or at your local Best Buy retailer, which partners with responsible e-waste recyclers such as Electronic Recyclers International[m]. Or, send them to an "E-Stewards" recycler certified by the Basel Action Network (E-Stewards.org).

ProjectKopeg.com[m] and Recycle Place.com[m] also offer fundraising programs where groups earn cash for collecting and sending in 30 or more cell phones for recycling.

—Tracy Fernandez Rysavy

[m] Designates an approved member of Green America's Green Business Network™