Editor's Note: Graber xxx'd out one paragraph in this document as it included details on future angles that she's currently pursuing.

FIRST EMAIL

TO A GENERAL MATTER EMAIL

I'm not sure who'll be reading this, but I have a question for you. I have a story - long-form, narrative science journalism - and it has the potential for video, and all my interviews have been taped NPR-quality and so could be included as audio bites for a tablet version. It's a story that so fascinated me that I decided to take a break from regular freelancing to report it, even without a definite buyer. Are you accepting pitches?

A bit about me: I've been a science reporter for more than 12 years, both for radio and for magazines. I spent five years at NPR's Living on Earth and for the past few years I've been podcasting for Scientific American's 60-Second Science. I've had stories on The World, Studio 360, Latino USA, and others. I've written for many regional and national magazines, including the Boston Globe Sunday Magazine, Smithsonian, Scientific American, and Muse. And I won the AAAS science journalism award for radio in 2004.

I look forward to hearing about your pitch process.

Best,
Cynthia

RESPONSE

Hi Cynthia,

Thanks for getting in touch. Yes, we're accepting pitches. Send us a brief outline of your idea -- we're definitely interested in hearing more!

Best,

Jim

MY FORMAL PITCH

Dear Jim:

As I wrote in my previous email, I did something that I've never done before: I reported and wrote an entire story without having a home for it. I did so because I was fascinated by the topic, and I felt like I couldn't even adequately pitch it without at least beginning to report it. So I decided to jump in.

You asked for a brief outline – I hope you don't mind that this is a rather long pitch email! I think that Matter could be the perfect home for this story, and I look forward to hearing your thoughts.

As with many narrative science stories, this covers many angles, though it can be summarized in one sentence: Tufts researcher Michael Levin has demonstrated that electrical signals among our cells are key in creating form and shape, and may even play a crucial role in regeneration.

But that's a rather dry description of a compelling character, and a fascinating story that begins hundreds of years ago. Electricity in animal limbs was first noticed and made famous by Luigi Galvani in the late 1700s in Italy. His nephew took to shocking newly executed prisoners from Newgate and watching their lifeless eyes open; one even raised an arm in an undead salute. Galvani's research, and that of others at the time, inspired Mary Shelley to employ a "spark of being" to animate Dr. Frankenstein's creation. The fame of *Frankenstein*, along with spurious uses of electricity in people throughout the 1800s (one researcher described it to me as Victorians "zapping" each other), gave electricity a bad name in biology. Still, throughout the early 1900s, researchers studied the role of electricity in our cells, and began rather crude experiments by today's standards that hinted at electricity's role in regeneration.

Today, we take for granted that electrical signals play a role in nerve impulses, commanding our limbs to move and our hearts to beat. But research into the more subtle electrical communication among cells was largely tossed aside once Francis Crick declared, on February 28, 1953, "We have discovered the secret of life!"

Only in the past few years have we begun to recognize that genes aren't omnipotent, and electricity has been taking its place along other physical and mechanical forces, such as shape and pressure, that can determine a cell's development. And due to the work of Michael Levin's lab, it's become clear that electrical signals might be the necessary force we need to harness to induce regeneration – even in humans.

Levin, head of Tufts' Department of Regenerative Medicine, has, according to many I've spoken with in bioelectricity, practically regenerated the field. He's an outsider, entering biology by way of computer science. I have great stories from his childhood (such as when his dad wouldn't buy him Pac-man, so, at 11-years-old, he coded the game in 6 months).

He's since applied that creativity and tenacity to his scientific research. In the lab, Levin has photographs of his creations: six-legged frogs; inch-long flatworms with two heads; headless flatworms with tails at either end. And a tadpole regrowing a tail, though the animal is past the age when it should be able to regenerate the limb at all.

In a tadpole, he discovered that the wound created by a lost tail creates an electrical flow pointing to the damage. If that electrical charge is blocked, the tail can't grow back. But tadpoles only have regenerative capacity to a certain age. So Levin took a tadpole past the regrowing age and removed its tail. Then he manipulated the charge of cells at the wound to turn on the appropriate switch.

The tadpole grew its entire tail back.

Since then, he's published many papers using these tools. Last December, he published a paper in which he and his colleagues grew a complete eye on a tadpole abdomen. (I saw these tadpoles in the lab and describe them in the lead.) They did so by changing the electrical signals among the cells. He's also working with mouse researchers to investigate limb regeneration in mammals.

I became interested in this story when I reported on regenerative medicine in Boston for the *Boston Globe Magazine* in 2009. Many researchers told me to include Levin, and after speaking with him, I realized that his story is worth more than the few paragraphs that I included. I've followed his research as he's built an increasingly strong foundation of papers that lead towards regeneration. The one in December, the first in which his lab generated an entire misplaced organ on a tadpole, signaled to me that this was the right time to tell his story.

I knew that I couldn't get it right unless I reported it. And so, despite having no definite buyer, I contacted Levin. Based on my experience and previous articles, he decided to cooperate. I spent many hours in repeated sit-down interviews with him and his co-researcher, Dany Adams. I hung around the lab and watched research, and chatted both formally and informally with post-docs. I interviewed most of the prominent scientists in bioelectricity. I interviewed scientists out of the field who haven't collaborated with Levin but are familiar with his work. And I dove into historical research to try to recreate some of the early scenes. (One interview I haven't conducted is that with Levin's parents. If the story is accepted, I'd like to do so to get their take and to corroborate some of his stories.)

I weave Levin's story together with that of the history of bioelectricity, back to Luigi Galvani and *Frankenstein*, and incude stories about current research in the field.

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I'm mentioning these because, while I wrote a story about Levin and included some other major scientists in the field, I can also expand it past him and go into greater depth about other lines of research.

Levin's lab's work has been covered in a piecemeal fashion as each new study appears: a story in *Science News* last December; one in *USA Today* in the summer of 2011; short pieces in venues including *New Scientist*, *The Scientist*, and the *Boston Globe* after the tadpole study in 2007. But nobody has told Levin's personal story, nor have reporters placed his research so firmly within its historical context.

I think the weave of profile, history, and science make this a great story for Matter, which, as I understand, intends to publish in-depth, narrative articles about science. I've already written a 9000-word article, which I'm happy to send you – and I must emphasize that I'm completely open to rewriting it. I wrote it because I wanted to see if I could make sense of all the information and tell a compelling story, but I'm happy to rework it to cut out sections, include other angles, etc.

I don't know if you're planning on including video and audio as well, but Levin has great videos from the lab, and I taped all my interviews with an NPR-quality recorder. Segments of the interview could be used on the web or for a tablet version. I can also record myself reading the story for your website, if you plan on offering such options.

In terms of my experience, I've been a science reporter since 1999. I finished my masters in science journalism from Boston University that year, then spent five years reporting for the public radio show Living on Earth, and seven more part-time for the now-defunct World Vision Report. In radio, I also podcast regularly for *Scientific American*, and I've reported for The World, Studio 360, and others. In print, I've written for a variety of national and regional magazines including Smithsonian.com, the *Boston Globe Sunday Magazine*, and *Scientific American*. I also won the Kavli AAAS award for science journalism in 2004 for a radio documentary.

Please let me know if you'd like to read the story; I'm happy to send it to you. I appreciate your consideration, and I look forward to hearing from you.

Best,
Cynthia