

CHAPTER 1

The TIFIC

The TIFIC—take it and forget it contraceptive—is a long-lived contraceptive system for men and women consisting of a pill or capsule that causes infertility until another pill or capsule reinstates it. Any contraceptive concept that does not meet this definition in its entirety fails to earn the label of TIFIC.

Researchers have been working on anti-fertility vaccines for about three decades now. In 1995, a petition signed by over 430 groups and organizations from 39 countries called for an end to research on contraceptive vaccines—the TIFIC, by the way, does not have to be in the form of a vaccine.¹ The petition had its roots in the international feminist health movement. In response, the World Health Organization (WHO) publicly stated that they would halt research if the potential users said they did not want this kind of contraception. The petition was prompted by fears of government control over the reproductive rights of women.

I can empathize with anyone concerned over a stumbling government bureaucracy with a long-lived contraceptive vaccine at its disposal. That is precisely why the TIFIC must be at least

¹ Judith Richter: Vaccination against Pregnancy: Miracle or Menace? (Zed Books, London, 1996)

temporarily reversible. However, I do not agree with any group that tries to protect itself from a potential harm in the future by stifling research. A TIFIC can never become a reality without further extensive laboratory effort. All research has the potential to uncover technology that can be abused by power brokers, but that is no excuse to crush the pursuit of knowledge. The longevity of a contraceptive is only a matter of degree; some contraceptives last longer than others and some are more effective than others. The TIFIC is not a euphemism for chemical sterilization.

Unintended pregnancies cause untold hardship. This is especially so in third world countries where the depth of poverty can be almost unimaginable. Even here in the U.S. the effects of a "take it and forget it contraceptive" (TIFIC) would be unprecedented. The number of single mothers on welfare would plummet. The abortion debate would evaporate. Teen pregnancies would be reduced to rare anachronisms.

Ironically, the TIFIC may become a reality because of infertility research. Free market forces are driven by the quest for profit. Infertile couples routinely pay tens of thousands of dollars for work-ups. When was the last time anyone spent that kind of money on a contraceptive? One team of researchers stumbled upon an idea for a contraceptive while investigating infertility in women who are allergic to sperm. They discovered how to duplicate this immunity to sperm, and the idea of using it as a contraceptive was born along with a patent. In fact, I first uncovered this information while doing a patent search for contraceptive vaccines.

Vaccination research is thriving.² There are several contraceptive schemes afoot.³ One candidate to become the TIFIC involves a newly discovered ion channel protein.⁴ This protein is located in the sperm flagellum and is found nowhere else in the human body. Its job is to control the flow of calcium into the tails of sperm. Calcium is the trigger that causes the tail to beat. If a vaccine antibody is developed to block this ion channel, it could be taken by both sexes.

² <http://www.niaid.nih.gov/vrc/>

³ <http://www.aafp.org/afp/20040215/853.html>

⁴ <http://www.hhmi.org/news/clapham2.html>

One vaccine contraceptive has been used on 95 species of animals to date. The vaccine contains a protein called procine zona pellucida (pZP) that is obtained from pig eggs.⁵ When injected, it stimulates an immune response creating antibodies that attach to the ovulated egg and prevent sperm from attaching to the egg.

In some instances, the animals are vaccinated using bait that is laced with the vaccine. In other instances, the animals are injected. This technique is only about 90 percent effective and therefore not acceptable as a human contraceptive. It also works only on females.

In one project a population of foxes was brought under control only to have several of their prey species overpopulate. Ironically, a vaccine program was then considered to control those out of balance populations. People never cease to amaze me.

Controlling wild animal populations in this manner has its drawbacks. One is that some animals will exhibit immunity to the vaccine. Natural selection will rapidly cause the entire population to become immune. This problem wouldn't apply to people. Finding immune foxes would be difficult. Tests will be available to identify immune people. For immune foxes, the elimination of their competition would help to fuel their population increase. That would not be the case with people. In theory, people who are immune to the TIFIC would continue to have unplanned pregnancies and, *given enough time*, would populate the world with their offspring. This would take a very long time and the rapid growth of technology should be able to outrun that bullet quite easily. In addition, by having a male and female version, the odds that both members of a pair bond would be immune would be very low.

A TIFIC raises many concerns. For example, attempts to control the populations of rival ethnic, religious, or political groups will be made. You can't change human nature. I do not see that as a serious threat or, at least, it is not a new one. An effective antidote would circumvent that possibility. No government would be able to crush a black market trading in antidote

⁵ <http://www.ovpr.uga.edu/researchnews/spring98/elephant.html>

fertility pills. Witness how ineffective our own government's war on drugs has proven to be.

The TIFIC could be used to take reproductive rights away from women. Again, the antidote would negate that concern. A version for men would also help to defuse that possibility.

There is the concern that descendants of those who choose not to take a TIFIC will overrun the world. That would take a very long time. In addition, there would be nothing keeping their descendants from taking a TIFIC just because their parents chose not to. This is not a realistic concern.

For various physiological reasons, not everyone will be able to take a TIFIC. That's OK, this idea doesn't require universal compliance. Taking a TIFIC is voluntary. The motive for taking it is to dodge unplanned pregnancies. The fact that it will help save the planet's biodiversity is actually a side effect.

There is a concern that sexually transmitted diseases will increase with the introduction of a TIFIC. This would require an increase in sex. The TIFIC will not have that effect. Sex is a very complex social act. Young men who set out to end their virginity soon find out just how difficult that can be.

When you think about it, the idea for a vaccine to protect people from sperm isn't far-fetched at all. Look at the vaccines that already exist—smallpox, rabies, polio, tetanus, and anthrax to name just a few. There are vaccines against poisons from scorpions, spiders, and snakes. There are hundreds upon hundreds of vaccines with hundreds more on the way.

Now that the human genome has been unraveled, we are poised for another exponential technology explosion in the direction of genetic engineering. This may be how we finally get the TIFIC.

One of the many interesting details exposed by the genome project is that retrovirus infections have had an impact on our genetic code.⁶ This has been suspected since the discovery of retroviruses. Retroviruses attack certain cells in the body and integrate part of their own genetic code into that of the infected cell. This is how HIV works. It becomes a part of the target cell, turning that cell into a virus-making machine. Unfortunately the target cells are critical to our immune system and once their

⁶ Nature Via Nurture by Matt Ridley, page 114.

genetic code is modified they no longer act as originally designed; that is why HIV causes disease. If a retrovirus were to infect sperm cells or egg cells, the inserted piece of genetic code would pass from generation to generation as with other genetic diseases such as cystic fibrosis. The genome record shows that this has happened many times in the past. Part of our genetic code has come from retrovirus infections that spliced their DNA in with ours.

The implications of this are fascinating. For example, will we find that retrovirus infections of sperm and egg cells have been a driving force in evolution? Could they account for episodes of extremely rapid evolutionary change within a species? Did retrovirus infections create the social structure seen today in termites, ants, bees, and wasps? What if HIV had a propensity to infect human egg cells instead of cells that are critical to our immune system? Instead of HIV being a deadly disease resulting in a destroyed immune system, it would cause infertility. Envision such a disease, but make it as easy to catch as the common cold. It wouldn't take long for most people on the planet to be exposed. Women who were immune to the virus because of genetic variability would be the only ones able to procreate.

This would create the human equivalent of queen bees. Would human culture suddenly lurch in the direction of the social insects? A better analogy would be the reproductive strategy of naked mole rats. As with the social insects, only the queen mole rat reproduces. The fact that they are highly social, hairless, mammals, makes the analogy that much more unsettling. I am digressing again but this idea would make a nice backdrop for a science fiction novel.

Using genetic engineering to modify viruses—particularly retroviruses—is a potentially dangerous exercise. It has to be done with safeguards in place, using biohazard protocols and equipment. One such experiment for a mouse contraceptive in Australia accidentally turned a relatively benign mouse-specific virus into a deadly one.⁷

What I would like to see is something akin to a Nobel Prize awarded for the development of a TIFIC—something that would bestow great status, prestige, and wealth on the inventors. If the

⁷ <http://news.bbc.co.uk/1/hi/health/1110144.stm>

prize were large enough, unprecedented—fifty million dollars or so—we would have the TIFIC within a decade.

The key to the profitability of this contraceptive and its antidote is not so much in its selling price, but in the fact that so many people would use it—6.35 billion customers and more on the way everyday.

Picture walking into a pharmacy. Sitting on a shelf are boxes labeled TIFIC. Each box comes with a single capsule and a simple urine test kit. The instruction sheet inside the box warns you not to engage in unprotected sex for five days after taking the medication. At that time you must also dip a test strip into a urine sample to make sure the TIFIC is active in your blood. The instructions might say that your partner should also use protection to decrease the chances of a contraceptive failure. The instructions could also suggest—for marketing purposes—that the best choice for your partner's contraception is the TIFIC.

If I had millions of dollars to invest, and if I were looking to go down in history as the person who saved the biodiversity of the planet, I would pour it into the development of the TIFIC. The sooner it happens the better. If the U.S. has an unintended pregnancy rate that exceeds 50 percent, imagine what it must be in other parts of the world. The first company to market this product will blow all other manufacturers of contraceptives out of the water. My message to the researchers, entrepreneurs, and industrialists of the world—build the TIFIC, there is money to be made.

