

Can Nanotechnology Solve the Problems of Poor Women in Developing Countries?

Talk at 1st Annual Workshop on Geoethical Nanotechnology, July 20, 2005 by Dr. Martine Rothblatt, Chairman, Unither Telemedicine Services Corporation

Dr. Max More: Our next speaker, Martine Rothblatt, who's a satellite entrepreneur and wizard, and founder of United Therapeutics, and also a visionary, founder of Terasem Movement, which has resulted in bringing us all here together, and I think all of us are having a fantastic time, very stimulating, and a very happy to be together. I think with those three points alone, that's all I need to know, show how high quality our next speaker is, so Martine.... [applause]

Dr. Martine Rothblatt: Thanks Max. That was really nice to be introduced by you. I appreciate that. I'm going to walk sort of quickly through two presentations. One that we skipped earlier, "What Can Nanotechnology Do for Poor Women in Developing Countries?" and the second one follows is more similar to Mike's presentation in terms of nanotechnology policy, especially with regard to self-replicating nanotechnology.

I've got a couple of different hats; the one that I'm doing this hat under is the Unither Telemedicine Services, which is our company's telemedicine company, as a quick answer in terms of what nanotechnology can do for poor women in developing countries. The bottom line is it can help them and more ably in conjunction with economic growth and with social solidarity policies. So it can do some help by itself, but do a lot more help in conjunction with a couple of other things. If the help is in any way a function of the potential of molecular nanotechnology divided by biotechnology and information technology, in other words if the help is at all related to the potential of this technology compared to all other technologies, it's going to be awesome help and it will basically create a decent and safe and enjoyable lifestyle for everybody on earth.

Why? Well, the reason I think is that molecular nanotechnology (MNT) is a theoretical subset of technology. I say theoretical because really true molecular nanotechnology is not much in operation today, it's still just coming out of the lab. It's most closely related to mechanization and information technology and, in fact, the forms of technology that have helped the world's poorest women the most are quite similar to molecular nanotechnology. Since other forms of technology similar to MNT have helped the world's poor women already, it's reasonable to think that MNT would also help the world's poor women.

This chart, which I'm not going to have time to walk through completely, basically makes the following point. The point of this chart is to say that by itself you can't help the world's poor women with technology. By itself, you can't help the world's poor women with economic development and by itself with social solidarity policies. You get more help if you combine any two of those together. Technology by itself might not do much. North Korea has technology; the people aren't very much helped by it. You get the greatest help if you can combine all three of them together, and that's what the kind of mathematical formula shows at the bottom, that because a combination of technology, social solidarity, and economic development helps best, a combination of MNT and those three areas is going to help best.

My personal goal is to provide global healthcare via telemedicine, telemedical nanotechnology from our American telemedicine seeds that we have today. And this is a map showing the

telemedicine network that we operate in the United States today. It's the largest digital telemedicine network, and what I believe we can do is we grow from this into nanomedical telemedicine and bring that to the entire world.

Our telemedicine technology is already operating in orbit. All of the cosmonauts in the Mir space station, the astronauts on the international space station use our company's telemedicine technology to monitor their heart rhythms. So if we can do it in outer space in orbit, I don't see why we can't do it in Burkina Faso. If we can monitor the world's heart rhythms, why not take the next step and begin using the ability of nanobots and transdermal nanosensors to begin sensing serum levels of different disease indicators and this sort of thing?

Here's an example of the sort of things we can do today wirelessly. We can monitor people's heart rate when they're out on the golf course, or when they're fishing. So, again, if we can do this, why can't we monitor people's heart rhythms in the Congo in Zaire? And we can, it's just a matter of getting focused and doing it.

Telemedical nanotechnology, which is what I call TNT, really completes the picture, because local medics cannot see as much of the picture as an expert system. Eventually, of course, we could download all kinds of intelligence, down to the nanobots for each person, but initially, what we do right now, is we use our telemedical devices to relay information to greater sources of intelligence, artificial intelligence systems. Ray Kurzweil's company, Kurzweil Technologies, has designed for us a super-artificial-intelligent system that detects heart waves that no other kind of technology can do. So we're going to continue our partnership with them to be able to diagnose more and more things remotely.

Our vision over this is to basically grow telemedicine from a small revenue base to a large one, from a small world to a whole world. For example, ten million people at \$10 per month, for telemedical nanotechnology, which is today just telemedical cardiac services, can grow to be a hundred million people at \$5 a month and probably a hundred million people in the world could afford five bucks a month. A billion people could probably afford a dollar a month, and six billion people could probably afford a quarter a month. As we're growing that revenue from ten million to six billion people, our company's revenue would grow from 1.2 billion dollars to six billion to twelve billion to eighteen billion dollars a year. At eighteen billion dollars a year, we'd have substantially, we have probably around a 200 billion dollar market cap on par with a Microsoft sort of company. Providing technology to the entire world is, in fact, a very good business. We would, over time, need to extend what's today reimbursed cardiac telemedicine, eventually to consumers and then to additional non-telecardiology services, such as blood serum sampling and other diagnostic services.

In this chart, I lay out five phases of telemedical nanotechnology. In Phase 1, based on sampling of people's serum, we could simply advise regarding better nutraceuticals, it may even be local herbs, again using artificial intelligence and constant information flowing in. Phase 2 would be empowered to prescribe it, so we would have telemedical machines, so it'd be empowered to prescribe a drug that could be picked up. Phase 3, capable of actually dispensing a drug. Phase 4, synthesizing nanoscale medicines and Phase 5, programming and/or delivering unique biobots

or medibots that can actually address the problem. All the time upgrading, uplinking, upgrading and syncing local intelligence with ever more advanced artificial intelligence.

Biotechnology and information technology do have a track record of helping the world's poorest women. A number of diseases have already been wiped out. Nanotechnology guidelines from the Foresight Institute and others have focused on applications for the developing world from the very beginning. That's been in all of the drafts of the Foresight Institute guidelines.

Why are there still horrible problems among the world's women? Well, again, as mentioned, technology is only part of the story. There's also a need for social solidarity policies and economic development. MNT can provide abundance, and this helps, but women are going to need social solidarity policies and economic development as well as technology to resolve their problems. There have been a number of theories of what are the basic human needs, food, water, housing. You heard already how people like Ray are working on providing safe water for everyone and Doug talked about technologies to provide green food for everyone. Drexler and Mulhall have also shown that MNT can address the needs for basic human needs. Water, we've already talked about that and these are quotes from Doug's book. Some more quotes from Doug's book in terms of what can be done in terms of providing food.

Who will pay for this stuff if we don't pay for it now? Ray has shown that exponentiating information technology will lead to supercomputing products at ever-diminishing prices. Per Mulhall, even the software will be impossible to exhort the monopoly rents over, because exponentiating intelligence will always be able to find ways around existing patents and the entire patent structure will basically break down. And also, James Hughes has given us, I think, a very good conceptualization of a basic income guarantee, which is likely to be an early return on molecular nanotechnology.

MNT is kind of a genie, but the big question is will it move Gini? And Gini is an index that's used by the United Nations and other developing programs to measure the equality of resource allocation across different countries. Just because you have a Gini, it doesn't mean necessarily that everybody will share equally in it. I think the bottom line is that what has been shown is that there's no absolute link between economic growth and human progress.

So in other words, just because there's economic growth, doesn't mean technology comes next, and just because there's technology, economic growth hasn't always come next. Instead, economic growth, technology and social solidarity policies create what are called virtuous circles, that they reinforce each other and move each other up and up to higher levels of satisfaction. A lot of data has shown that there's no simple correlation. It's not like the richest countries have the best technology. Oftentimes countries whose economic development GDP per capita is lower than other countries have better technology, and then catch up.

Similarly, with the Technology Achievement Index, which is another United Nations index, the bottom line here is you don't need to be rich to be MNT, but you do need to focus on it socially and to have conducive economics to it. If you economically de-incentivise people to have it, forcing everybody to have an equal portion will just mean you'll have an equal portion of nothing.

The UNDP recommendations for optimizing new technology do now include MNT. I think that's really exciting that their 2002 report specifically endorsed MNT as a way to address the problems of the world's poor.

In summary, what MNT can do for poor women in developing countries based on other technology, can empower durable human progress via a virtuous circle with economic growth, contribute to reducing mortality, and it's basically a tool to life people out of poverty. Unique to MNT, women can probably expect an acceleration of progress compared to other technologies, and also a final equalization of status.

It may all sound too good to be true, but so were the leaps in life expectancy, literacy, and wellbeing. There are now more literate people in the south than in the north; that would have been just an astonishing expectation even a few decades ago when almost all the literate people were in the north. It is important to bring rest-of-the-world women into the MNT R&D process, as Mike indicated earlier, as part of a global development. And a good place to start would be with telemedical nanotechnology for basic healthcare.

We could imagine a kind of women's molecular nanotechnology initiative that focused on food, water, shelter, and health, and again, these will be posted on the website, but here are some sample projects that could be done in each of those areas. It could be paid for, this kind of women's molecular nanotechnology initiative, in a number of creative ways. Prices, better IP protection, government contracts, a world nanotech lotto. You know, there's really no shortage of creative ways to finance it if one really gets together. I'm sure the Delphi process could probably come up with a lot of them.

I'd like to conclude this part of the presentation by saying there are really three reasons, that I feel, that geoethical MNT is the third-world women's best friend. First, it's a fail-safe poverty ender. I frankly believe that poverty is on its way out anyway, and there are easier ways to end it, but if those ways don't end it, molecular nanotechnology is a fail-safe way to end poverty, and that is third-world womens' biggest problem by far.

Secondly, I think it has the greatest potential to end the apartheid of sex; the rigid definition of women from men into separate sex roles is probably the second-worst problem that women face throughout the world. The ones carrying the water three miles from a well and all of these sorts of things. Electronanotechnology, by taking over all of the brute work will contribute hugely to an equalization of status. And, as one of the speakers showed earlier, that's one of the millennium project, the millennium goals of the United Nations: equalization of status.

Finally, and most importantly, I think it's really the only way to realize women's full-life potential because first of all ending poverty, in fact, is really an easy problem, even without MNT. I think we all realize if we had some kind of a rational global government process, we could probably end poverty through better reallocation of resources. I'm not saying that will happen, but there are easier ways to end poverty than molecular nanotechnology. However, as soon as poverty is ended, which people forecast to be anywhere from 20, 30, 40 years, whatever it is, third-world women are immediately going to want life extension, just like us. Who

wouldn't? And if we don't start with aggressive molecular nanotechnology and bio MNT right now, it ain't going to be ready in 20, 30, 40 years when billions of women in the third world want radical life extension.

So sometimes you've got to plan ahead. You've got to plan more than like two or three years ahead and, I think especially because we are the technology that is going to be able to extend the lives of billions of third-world women 20, 30, 40 years hence, we are ultimately their best friend. We're going to give third-world women the most number of years of life, but we've got to start the work now to have it ready then. [Applause]

James Mulhall: A legal question related to telemedicine. How do you get around requiring a local physician to be with the patient? Are you advising the patient directly? Or just the physician?

Dr. Martine Rothblatt: What goes on today is that you're basically providing data to a patient, rather than an actual diagnosis. What that patient does with their data is their own decision. In fact, there is a group working on international telemedicine protocols that would allow doctors to actually remotely diagnose conditions, and then the next step after that is to remotely prescribe drugs and there's work on harmonizing telemedical laws throughout the world. A lot of that work is being done under the International Bar Association. Today, very frequently, your x-rays may be read by an x-ray technician in another state. The radiologists are, in fact, the most advanced among all of the groups in being able to actually diagnose something based on an interstate radiograph. But the short answer to your question is today, what's being provided is data and the next step is diagnosis and then prescription.