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## **Nanopublic Newsmail N° 3**

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**The Nanopublic Newsmail deals with issues related to the development of nanotechnology. It provides useful links, resources, and announcements of important events in Switzerland. This Newsmail belongs to the Nanopublic platform, a joint project of the University of Lausanne and the EPFL.**

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## **NEWS OF NANOTECHNOLOGY IN SWITZERLAND**

### **Coop issues a "list of nanoproducts" sold in its stores**

The big retailer Coop published in April a list of the « nanoproducts » sold in its stores. The list contains a few dozens of products, mainly waterproofs, varnishes and polishes, car maintenance products, household devices (curling iron), and two cosmetics. However, the most important thing is maybe not in the list itself, it is rather the fact the big retailer decided to communicate on this matter. Actually, it is the Interest community of the retailing business (CICDS) that took this initiative. The CICDS, also composed of the large groups Migros and Manor, has sent a questionnaire to manufacturers, asking them to specify if their products contain, or have been processed with, nanotechnology. On the basis of the answers, Coop classified its products in three categories, free nanoparticles, incorporated nanoparticles, and nanostructures. Most of all, a code of conduct has been adopted by Swiss large retailers about nanotechnology where they commit to request information from manufacturers and providers with regards to the specific or supposed action of their products, their composition, and of course the possible risks, and to inform consumers on a transparent basis. The list and the mentioned documents are available on this page.

<http://www.coop.ch/pb/site/nachhaltigkeit/node/64238724/Lfr/index.html>

### **Three people arrested while targeting the future IBM-ETHZ Center in Zürich – Rüschlikon**

Three young people have been arrested in April while they were driving to the place of the future IBM – ETHZ nanotechnology center in Rüschlikon. The police found them with explosives and a letter of claims, and called them « eco-terrorists ». What to think about these facts? Without more precise information, the media questioned these people's motives for preparing such an action. Physical risks of nanoparticles have been evoked, although the attempt was planned in order to warn against the « total social control » we are supposed to be driven in by the ongoing miniaturisation process. Taking what happened as a news item, and silencing it, would have been uncorrect. These people, now still in jail, and the desperate act they were preparing, must steer a reflection. First and foremost, the invasion of information technology in everyday life, for example the power Google and Facebook acquired so quickly, which are potentially threatening individual freedom, deserves much more public debate and attention than it is today. Like in other cases, the authorities are left behind. However, from another point of view, it is not technology or miniaturisation as such which are threatening individual freedom; it is rather the fact that States or harmful organisations are willing to use these technologies for their own ends. They would do it independantly from the availability of a technology or an other. In the end, it is the bombings and attacks, especially those of the 9/11, which have been the main force against civil liberties. Our point of view is that the total control society will not occur because of a Moore law or any technological trajectory, but more likely because democracy would weaken to the point of "laissez faire". Therefore, a watchful debate must be held and maintained about new technology and freedom.

### **Adolphe Merkle Institute : Yearly report published**

The Adolf Merkle Institute (AMI) has been created in 2008 from a Foundation bearing the name of the businessman from Fribourg and a 100 million francs.

Reading the AMI 2009 annual report published end of March allows understanding that the laboratory has been put on tracks very quickly, on the scientific level. But on the institutional level, one learns that the relation between the AMI, the university of Fribourg, and the Foundation, have been difficult to settle. Two main research routes have been developed at the AMI, « soft nanosciences » and « functional polymers ». In soft nanosciences, one finds researches exploring new materials and self-assembling (bottom up approach), work on colloids, polymers, and surfactants, which could be of interest for medicine or the food industry. The research route of functional polymers and nanocomposites opens way to innovations for the communication and the optics domains, thanks to materials converting light wavelengths, or to develop fibers with electromechanical properties for protecting clothes for example, or maybe one day for artificial muscles. The 2009 report may found on this page of the AMI <http://www.am-institute.ch/en/about-us/>

## **PUBLIC DEBATE, ETHICAL, LEGAL, AND SOCIAL ISSUES**

### **Synthetic biology: a European report warns**

The European Group on Ethics in Science and New Technologies to the European Commission (EGE) issued an « opinion » on synthetic biology accompanied with 25 recommendations. Transmitted last year to the European Commission, *Ethics of synthetic biology* has been made public in May 2010.

The EGE report contains four parts, each one interesting and of good quality. The first one gives the state of the art in synthetic biology, and discusses definitions, knowledge, instruments, funding, and promises of innovations and developments in a pragmatic way. The second part makes an inventory of international and European legislations which could apply to synthetic biology, or which could be involved soon according to type of uses. The third part tackles a series of ethical issues: what are the conceptions of life at stake when it comes to “manufacturing” living systems. The issue of biosafety is of course held. Then, the issue of biosecurity comes up, understand issues and stakes linked to « bio-hacking », to « garage biology » which possibilities increased tenfold, and to biological weaponry. The report particularly addresses the issue of intellectual property rights and patenting (see below). The last part makes room for the recommendations: «The Group urges the Commission to propose a robust governance framework for synthetic biology». The authorities at the highest level must prepare a framework able to monitor the research and the developments in synthetic biology, to establish a code of conduct, and to adapt any legislation that could rapidly be involved.

The EGE discusses different definitions used for synthetic biology. The question raised is «what is the difference with genetic engineering?» It appears that if synthetic biology is in line with genetic engineering, it is nevertheless leapfrogging when compared to usual techniques of DNA recombination. On the one hand, synthetic biology rests on the increasing capability to synthesize genetic information (DNA), and on the other hand, it seeks to create biological systems and entire organisms from functional elements. Perhaps it is good to mention that this domain has two different sources of interest: one is to better understand living matter, so to offer a new research tool, and the other is the willingness to develop artificial biological systems for various possible utilizations.

In the latter, the intention is explicitly to create new organisms which would otherwise not come into being.

The report is especially sharp on the issue of intellectual property. The EGE is supported in this domain by the Patent Directive (98/44/EC) which grants the Group on Ethics with the ability to deliver its opinion about ethical issues of patenting. The width of patenting is put into question, and a discussion unfolds with a comparison with the *open source* and the *open access* in informatics. The report warns against the source of controversies and conflicts of the nowadays tendency to illimited patentability. Now, among the scientists involved in synthetic biology, some are precisely looking to warn the authorities and the society against overflows and dysfunction of the intellectual property system. At the opposite side from that of J. Craig Venter, who is an icon in the media, the team of Drew Endy at MIT in particular, whose works are not less spectacular though, is developing an «Open source biology platform» to counter the tendency of appropriation of genetic sequences, human for instance, by transnational corporations.

[http://ec.europa.eu/european\\_group\\_ethics/publications/index\\_fr.htm](http://ec.europa.eu/european_group_ethics/publications/index_fr.htm)

### **Why talking about synthetic biology in a Newsletter about nanotechnology?**

Synthetic biology and nanotechnology have a lot in common. At the level of research, there is first a direct convergence with tools and objects that interfere at the cell and molecular scales. Indirect relations are as much relevant though: synthetic biology raises a series of issues similar to those of nanotechnology, starting with definition problems. Then, there are the discrepancies between fundamental research, scientific promises, and innovations. Like nanotechnology, synthetic biology is also characterised by many unknowns, in terms of innovation, biosecurity, military developments, intellectual property, and issues of adaptation of legislation.



A DNA synthesizer of Applied Biosystems

## **Report of the Swiss ethical commission on synthetic biology**

The Ethical commission for genetic engineering in the non-human domain (CENH) published its «Reflections» on synthetic biology and held a press conference the 10<sup>th</sup> of May. The message of the CENH is that it cannot, for the moment, say anything about the adequacy of the regulatory framework. The relevant legislation is that on genetic engineering, and it is deemed sufficient for the moment. Besides philosophical and moral differences among the twelve Commission's members, neither the majority nor the declared minority see a problem such as to justify a warning or a moratorium type of measure. The CENH chose to focus on a preliminary reflection, consisting of exploring the moral status of microorganisms «artificially manufactured». The Commission looked first to establish a definition of synthetic biology. Then, the issue of the moral status has been discussed after the article 120 of the federal Constitution about the dignity of living beings. In the end, the way living beings are designed, naturally or artificially, does not change their moral status. Reading the booklet, one may ask if other issues raised by synthetic biology, the recent progress in synthesizing DNA for instance, would not have deserved as much reflection and anticipation of the ethical, legal and social issues. The CENH booklet is available on the «Publications» page of the Commission at this address

<http://www.ekah.admin.ch/fr/documentation/publications/index.html>

## **REGULATION, ENVIRONMENT, HEALTH AND SAFETY**

### **Nanomedicine at the European level**

June the 2<sup>nd</sup>, the European Parliament hold a seminar on nanomedicine organised by the Science and Technology Options Assessment (STOA). For this event, the European project Nanomed, which aims at an integrated approach of research in nanomedicine, consulted various experts on regulatory issues, economic impact, needs and expectations from patients, public communication, and the social and ethical stakes. The report is pointing series of issues by formulating recommendations to the European authorities, especially in terms of engagement with the public. The latter answers a strong demand existing in the public to be informed, by reliable experts, about advance in nanomedicine. A short version of this useful report is available at this address.

<http://www.nanomedroundtable.org/Publications>

### **Nanomedicine in the Netherlands**

May the 31st, the Rathenau Institute published a short study on the promises of nanomedicine and the landscape of research in this domain in the Netherlands. The 25 pages report provides a series of interesting information about recent developments, on research centers in Holland, on the private and public funding, and points to public and political stakes in a conclusion. Get the report here.

<http://www.rathenau.nl/en/publications/nanomedicine-in-the-netherlands-1.html>

## **Germany: warning against the use of nanosilver**

The Federal Institute for Risk Assessment (BfR), which belongs to the Ministry of Food, Agriculture, and Consumer Protection, in charge of advising the authorities and the Länder, recommends manufacturers «to refrain from using nanosilver in consumer products». In a press conference of the 14<sup>th</sup> of June, the BfR's Director explains that the use of silver ions for antimicrobial purposes, for example in refrigerators and sport socks, which increased a lot recently, should be restricted until risk for health can be excluded.

<http://www.safenano.org/SingleNews.aspx?NewsId=1058>

## **Toward labeling "nano"**

Members of the European Parliament's environment, public health and food safety Committee have voted to forbid entry on the European market of food derived from cloned animals (authorized in the US) or produced by nanotechnology processes, unless such food has undergone a specific risk assessment. Following the European Parliament's 2009 decision on principle to label food and cosmetics, which will come into force in 2011, the Parliament's Committee is proposing the labeling, i.e. the indication of the product's composition in the list of ingredients (not to mix with labels as badges added on the product) of food and cosmetics containing manufactured particles of nanometric size. A product containing zinc or titan would have to add the word "nano" in brackets aside of the chemical formula, for example TiO<sub>2</sub>-(nano). For this measure to be adopted indeed, also the Parliament and the European Council have to make a decision.

## **Sunscreens: should one care about nanoparticles?**

The ecologist organisation Friends of the Earth (FoE) in the US recently published on its web site that there are «new evidence of risk» for health from sunscreens containing zinc dioxide or titan dioxide nanoparticles (<http://www.foe.org/healthy-people/nanosunscreens>). FoE declares in particular that nanoparticles could indeed penetrate an adult healthy skin. This news should have steered a little earthquake. However, it is not reliable. An expert whose independence is not into question, Andrew Maynard, explains in an article posted on a blog June the 8<sup>th</sup> how hasty conclusions have been derived by FoE from partial studies (<http://2020science.org/>). By the way, the news is not taken up by other NGOs. As matter of example, the Fédération romande des consommateurs et consommatrices (FRC), in a dossier devoted to sunscreens for children published in the issue of *FRC Magazine* of the 29<sup>th</sup> of June, clearly recommends protection against the main risk: the sun. The expert of the FRC, Madame Huma Khamis, writes: «the scientific studies have shown the efficiency of titan dioxide as sunscreen. Sometimes, concerns remain about its capability to cross the barrier of the skin. For the time being, scientific data show that these nanoparticles do not penetrate a healthy skin. In any case, it should not prevent using a sunscreen.»

## **READINGS, BOOKS, MOVIES, AND OTHER GOODIES**

« **Governing Future Technologies : Nanotechnology and the Rise of an Assessment Regime** ». M. Kaiser, M. Kurath, S. Maasen, and C. Rehmann-Sutter Editors

A team of Swiss young researchers, among whom a few members of Nanopublic, published a book on the governance of nanotechnology in the *Sociology of Sciences Yearbook*, at Springer, 2010. The subtitle of the book opens a large field of issues: is a new regime of evaluation and governance of technology settling with nano? Let's mention here a few of the contributions of this rich book. A first part is dedicated to shifts and repositioning of some laboratories and specialisms thanks to the attractivity of nano. In particular, there is a study of the Swiss Federal laboratory for testing materials (EMPA), which entered a crisis in the 90s, and was challenged to make more research aside of its traditional service activities. EMPA found the help of material sciences and then nanosciences to start a profound mutation. The author, Martina Merz, well shows how these emerging domains brought to EMPA new funding sources and allow the laboratory to find a new corporate identity. Then, Monika Kurath tackles the case of toxicology, a declining branch, to which nanotechnology is now offering a huge potential work. A second part is devoted to the NBIC convergence discourse and to the production of images and of visions of the future. It contains in particular an analysis of Joachim Schummer of the rhetorics of the highly controversial document of the National Science Foundation of 2002 (M. Roco et W. Bainbridge : *Converging Technologies for Improving Human Performance : Nanotechnology, Biotechnology, Information Technology and Cognitive Science*). The same quality of analysis is met by the contribution of our colleague from Berlin Christopher Coenen about the prospects of human enhancement. A young colleague from California, Colin Milburn, already author of a famous paper on nanotechnology and science fiction, brings in here a contribution about video games as vehicles of subliminal visions of popular nanotechnology. The members of Nanopublic and of the Science – Society Interface of the University of Lausanne have a chapter in the part dedicated to the public sphere and deliberation. It analyses public participation and the studies in ethical, legal, and social issues with the suggestive title « Why enroll citizens in the governance of nanotechnology ? » The book also contains a contribution of Arie Rip, one of the greatest specialist in Europe of the governance of science. Only the future will say if nanotechnologies (or some of them) do bear a different regime of evaluation and social integration than for example biotechnology.

For more information and to order the book at the price of 99€:

<http://www.springer.com/social+sciences/book/978-90-481-2833-4>

« **Developments in the Debate on Nanoethics** », an article from Arianna Ferrari, in *NanoEthics*, April 2010, vol. 4, No 1 : 27-52.

How do ethicists approach nanotechnology? Arianna Ferrari, doctor in philosophy, discusses the traditional approaches of ethics and bioethics, and shows the limits of some of their conceptions. The consequentialist perspective in particular, when it reduces ethics of nano to the only issues of potential physical risks, and bioethics, today too much attached, she explains, to the individual and the informed consent in the clinical context, are insufficient. A. Ferrari proposes to go beyond these approaches and to enlarge the scope of nanoethics to social and economic stakes. For her, the aim of "nanoethics" is not to produce a judgment anticipating possible future consequences. It is rather to analyse values and visions, which accompany the development of nanotechnology, so to lead a reflection on the orientation of present choices.

**You read correctly: « 3 trillions of \$ in 2015 »! You are not obliged to believe it though**

To end this Newsmail, let's have a bit of fun: you've read, or you are soon going to read, that nanotechnology is growing so fast and so promisingly that their market size is going to be about 3 trillions of \$ in 2015. One trillion = 1'000 billions. Unbelievable? Yes. A webpage of Nanowerk, one of the most active site in the world which issues everyday full of scientific, industrial, and other news (nanowerk.org), brings an explanation: « Don't be fooled by crazy figures that tell you nanotech market is already hundreds of billions \$ worth and will be worth trillions in just 5-6 years ». In fact, the way consultants make their estimates is dubious: it is not the share value of nanotechnologies, which is taken in account, but it is that of the products which contain them. Nanowerk gives a few examples: if a drug includes for 10 cents of nano ingredients, and is sold 100 \$, it is the value of the entire product which is taken. If a car uses a nano new technology, it is its total cost of the car which is taken in account (50'000 \$). That's how nanotechnology's market is estimated 1'000 or 10'000 times bigger than it is probably going to be. As matter of comparison, the market share of synthetic dye is not estimated with the products incorporating dyes, but with the effective quantities sold. Doing the same to estimate other markets displays the absurdity of this consultant's method. Nanowerk reminds that the inflation of estimates started with the National Science Foundation 2001 report on the impact of nanotechnology, where one speaks for the first time of one trillion \$ market share in 2015. A web page announcing the ImagineNano event of 2011 in Bilbao speaks of « 3'000 trillions ». Here, they have mistaken, because they wanted to say 3'000 billions without losing the magics of the word, the trillion!

**Nanopublic - Nanotechnology and society interdisciplinary platform. Project of the University of Lausanne and the EPFL which conducts research on ethical, legal and social issues of nanotechnology. Nanopublic also aims at promoting public debate about emerging technologies.**

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