Discurso en la sesión de apertura de la Directora General de Cooperación Internacional y Relaciones Institucionales, Montserrat Torné

Estimada Vicerrectora,
Estimado Cónsul General de los EEUU en Barcelona
Estimado Director General Adjunto

Dear speakers, EC-US Task Force members and experts, ladies and gentlemen,

The beginning of the preceding decade was marked by the completion of the Human Genome in June 2000. This land-marking event signals also the beginning of a radical new scenario for Life Science in general and for Biotechnology in particular.

On Sept 11 2001, the EC-US Task Force started its meeting at 8:30 am at the NSF premises in Ballston. At the very same time, the New York and Washington attacks, of infamous memory, were taking place, marking the turning point in the recent history of the World and, certainly, of this last decade.

At that meeting on September 11 2001, the result of two important anticipative workshops held in 2001 were to be presented: "Forecasting the future of Biotechnology: the Blue Sky workshop" and the "New research tools for a Life Science Decade". Since the terrible events of that day prevented the EC-US TF from examining them in detail, let me propose you to have a look to the predictions made in those workshops nine years ago, and to examine them today, on the occasion of the 20th anniversary of the EC-US Task Force.

Browsing through the results of these interesting reports, one can find the expectations on how the Biotechnology world would be today from the perspective of almost one decade ago:

- DNA and other molecular computing: In 2001, it was not reasonably expected that the DNA computing would replace *in silico* systems in ten years, but it was expected important qualitative and quantitative progress in this direction. It was recognized that the progress would much depend on the level of interdisciplinary and critical mass that research could reach during the next years.

    - Very recently, biocomputing systems were coupled with standard silicon based chips for the first time. This advancement could yield great potential in the fields of Synthetic Biology, and Biomedical Engineering, as it marks the integration of biological and electro-mechanical systems on a sub-cellular level
- Nanobiotechnology: In 2001, high expectations were put on nanobiotechnology as a source for novel applications for medicine and computing, among other fields.
    - In 2010, the lab-on-a-chip concept has made its way through and new devices with high-throughput capabilities for analysis and diagnosis are being developed. For nanorobots, there is still a long way to go before we have practical and reliable applications for medicine, but the progress is steady geared by sparkling and daring ideas of nanobilologists.
- Plant genomics: In 2001 the highest expectations were put in engineering plant crops to introduce genetic modifications in agriculturally important species to bring them resistance to pathogens. Among the wild –yet seducing, ideas put forward 9 years ago, there was the possibility of developing finely tuned sensing capabilities in plants, which would then be linked to the wireless planetary grid to warn us of impending changes in the biotic environment.
    - In 2010, genetically modified plants with pathogenic and/or herbicide resistance occupy 130 million of hectares (5 times the size of Spain), growing steadily at 10% rate per year and being cultivated by 13 million farmers in 25 countries from all continents. It is also to be recognized that EU has a higher resistance to the deployment of these plants than any other area of the world nowadays.
    - The research frontier is moving from “producing more” to “producing better and healthier”, being the so called “functional food” the explosive and most promising playground for this technology.
    - As for the “grid of GM plants”, we have yet no news, possibly we’ll hear about them during the today’s session
- Bioinformatics: In 2001 there was a clear vision for ten years later: an invisible knowledge network will surround us. The net will be accessible by long-lived, learning agents that specialize in particular domains. The learners themselves will likely be distributed and replicated, providing a computational interface to the web. The result will be a symbiosis: they will constantly be learning from us, just as we learn from them.
- Also, the project to have an “*in silico*” model of a cell was a major driver

- Finally, contribution to the personalized care based on our deep knowledge of the human physiology and its interaction with the genome and environmental factors was a powerful ideal to pursue.
    - In 2010, the world's network infrastructure has much developed, and grid and the more recent cloud computing concept, have developed.
    - The dream of a semantic Web, where concepts and meanings emerge from the interrelations among its nodes, is painfully taking off, but with promising progress.
    - The modeling "*in silico*" of cells, and even tissues, organs and the whole body, is a very active research field, and the focus of much attention from the EU, with a view to provide not only generic models of its functioning, but as clinically validated tools to predict personalized evolution of diseases and their behavior according to personal and environmental parameters.

As we see, the EC-US Task Force has been very active in these 20 years of fruitful history. Indeed, predicting the future is a hard task and looking backwards to what it was predicted 10 or 20 years ago tends always to bring some frustration, as the promises use not to always be kept.

Maybe we should admit that we have not witnessed a major change of paradigm in this last ten years, but we have progressed very much in our capacity to collect and integrate information and knowledge.

Our present is the shady future of our yesterday's dreams, and although it possibly betrays some of our wilder expectations, at least this present we commemorate today brings many good news:

- We are on the track: nothing has yet contradicted our past vision that these are the leads to follow.
- Active research programmes and significant effort, both public and private, are being deployed to sustain progress in these areas

Most –if not all- of the expected breakthroughs require --and are totally dependent on--integration: massive and intelligent data integration; knowledge integration; Interdisciplinarity and integration of research teams; integration across scales of complexity; focused efforts and "complicity" between funding agencies, across the Atlantic and the globe… All this integrative approach is absolutely essential in a complex and fertile field like Biotechnology.

Integration, interaction and interdisciplinarity are all concepts that the European Commission and the US Agencies involved in this veteran trans-

Atlantic initiative have been following during these 20 years, and that have pervaded the attitude of the researchers involved in the activities launched and inspired by the EC-US TF.

Indeed, today's meeting, apart from a joyful celebration of a longstanding accomplishment, gives us the opportunity to reflect on the past achievements and on the future prospects.

In order not to let you alone with the burden of guessing future challenges that, perhaps, will not be fully achieved as we imagine them today, let me give you a privileged input to this hazardous task:

The Spanish Presidency of the EU has promoted as a one of its more visible initiatives, the participation of the citizens from Europe and abroad in identifying those challenges they would like to see solved in 20 years from now - 2030.

A panel of prominent personalities who, in a way or another, have changed our lives as a result of their professional activity, have proposed 14 challenges for the people to choose from. For more than one month, people from all around the globe have been making their choice on the Web site of the initiative. At least 5 out of these 14 challenges rely in a way or another on the progress in Biotechnology to achieve them.

The final rank shows that citizens are now as concerned by energy issues, also linked to the emerging climate change awareness, as by health aspects, as shown by the fact that 5 out of the 8 top challenges are related to fields where biotechnology is playing a major role. *(Slide projection)*

Forecasting is everything but an exact science: unfortunately, not even the best brains meeting in Washington on the eve of the September 11 attacks could have imagined it. Yet, in what was their area of expertise, they proved to be right in identifying those avenues in Biotechnology research which we still follow and, most likely, we will continue to explore.

If the last decade ended with the completion of the Human Genome, the present one will possibly be marked by the first “synthetic cell” that Craig Venter has just announced. Which wonders will human-kind witness in the next decade?

I hope that we will be able to revisit in 10 years from now what we are now forecasting for that future, and I praise we can say that part of our wildest dreams, and those of our fellow global citizens, have become true.

May I wish you all a long life to the EC-US Task Force o Biotechnology Research.