

EUROPEAN COUNTRIES BIOLOGISTS ASSOCIATION

# BIO2020 vision

Sustaining our common future



[WWW.ECBA.EU](http://WWW.ECBA.EU)

## ECBA introduction

Biology is a rapidly developing science which offers considerable contributions to a sustainable society in major areas like health, environment, food and energy for future generations.

ECBA recognises that biology is a living science, a continuum from classic academic science to being a cornerstone for a prosperous future.

In 1975, the biologists associations of the different countries of the EEC have been federated in the European Communities Biologists Association (ECBA).

This formation of an association was timely, since the progressive development in the multilateral relationship between the different states of the EEC, established in the Agreement of Rome in 1957, which resulted in common monetary, economic and social policies and which aimed a free movement of professionals in Europe, had led some other bodies of free professionals to come to an understanding of joint activities and cooperation.

Furthermore, the practice of the political and administrative bodies of the European Commission to negotiate with European, and not with national bodies, strengthened the basic move to build an association.

Today ECBA represents biology at an international level and is the European organisation concerned with current and future biology. It does so from a strategic viewpoint, in close association with its members. Additionally it cooperates in matters at a national level although national issues remain the responsibility of national bodies.

ECBA will inform, safeguard, stimulate and communicate with modern biology.

ECBA supports the development of a sustainable society by progressing all aspects of biology, old and newly discovered, including established and newly establishing biological disciplines, in a balanced fashion, and presents them in a clear and comprehensible manner to end users in industry, politics and academia as well as to the general public.

ECBA operates in primary and secondary education, academia and professional fields of biological sciences, for example at the level of biotechnology, molecular biology, synthetic biology, botany, entomology and medical biology.

ECBA provides the Professional Biologist's European qualification, the EurProBiol title, an EU standard

ECBA is administered by a Council of delegates from member associations; the Council is held annually to discuss policies and develop strategic plans.

ECBA has Commissioners who engage in activities in professional fields designated by the Council. These Commissions act upon relevant issues in Europe on behalf of ECBA

ECBA is composed of national Biology associations representing over 800.000 biologists in EU countries

Where no relevant National Biology Association exists ECBA supports the founding of an association or can act in its place, temporarily.

# BIO2020

## Sustaining our common future

Draft version 2.0; written by the ECBA steering committee

There is a science which is changing so fast that having a flu for a few days can be a major setback for a scientist. This science has disciplines like proteomics and metabolomics and it is considered the major economic driver for this century. Many have heard about this fast transforming and expanding science but do not know what it really is? It is biology, but not biology as society thinks it is, it is today's modern biology. In this short paper we present a vision on modern biology for Europe.

### What is this modern biology?

Biology has changed in a few decades from a basic science into a science which functions by the integration and/or reintegration of the many disciplines of biology and its surrounding fields. In recent years biology surpassed the status of a basic scientific discipline and is gradually becoming a subject of application in areas as diverse as environment, food and human health in a competitive or complementary manner with other disciplines.

As the publication "A New Biology for the 21st Century" makes clear, not only is it a combination of the classic biological disciplines, it also integrates chemistry, physics, mathematics and computational sciences into biology. This integration of disciplines enables us to bring biology to an unforeseen level of understanding how living systems work.

This integrated "new" biology is certainly not new, many scientists and presumably most the biologists are already practising this integrated and interdisciplinary approach to biology. All biologists use computational tools to analyse data, and cannot work without a profound understanding of chemistry, physics and mathematics. However interesting, it should be well understood that one of the building blocks of modern biology is classic biology, so it is not a totally new form. However it is quite clear that there is now a point of inflection where the pace and scope of the developments will increase dramatically. This speed shift in biology research is caused by the increased critical mass of biology itself and the actions of policymakers who consider this century to be the century of biology. This has resulted in a severe global competition.

### Why is it important

There are major issues like ensuring sustainable food production, how to feed the world, protecting the environment and biodiversity, finding renewable energy sources and improving health for today's and future generations. Failing to solve these issues will pose a threat to our common future.

In the Europe we do recognize the importance of these issues, in his 2020 Strategy President Barroso set out a vision which rests on three interlocking and mutually reinforcing priority areas: Smart growth, developing an economy based on knowledge and innovation; sustainable growth, promoting a low-carbon, resource-efficient and competitive economy, and inclusive growth, fostering a high-employment economy delivering social and territorial cohesion."

Modern biology is positioned perfectly to help in solving these and other issues. Biologists have a responsibility and an ability to develop a sustainable, profitable and healthy society. Even today they already have a strong role in solving issues related to health, environment, energy and food.

### Why now?

Apart from the speed shift in development of biology and the need to solve our planet's problems there is also a strong economic component. Policy makers are calling this the "century of biology" because of its economic implications. There is a global race going to reap the economic benefits of modern biology. Biology is considered to be the major driver for the global economy for the near future. Whoever comes first gets a bigger piece of the pie.

This notion has led to major initiatives; the USA is presenting plans like: "Ensuring the United States Leads the Coming Biology Revolution". China is rolling out a \$US124 billion additional annual budget for "deepening the health care reform", it is reversing the brain drain by massive investments in bioscience research and appointed a large piece of land in a densely populated area to build a biosciences park with the dimensions of a small EU country. These massive investments are an indicator for the expected economic and social benefits from the investment. Most scientists, let alone policy and/or decision makers are aware of the rapid changes in science. Unlike their counterparts in other parts of the world, most are not aware biology is the actual driver of this change.

These large initiatives to compete in biology have several things in common, most importantly they recognize the point of inflection in modern biology and the economic implications thereof. They are also recent, centrally planned and executed at a blistering speed. The initiatives are large in all imaginary ways, invest heavily in infrastructure needed for modern biology (cooperation, people and IT) and the sums involved are larger than any single EU nation can carry. Initiatives like Agenda 2020 and comments from national and EU policy makers like "the Vision for UK research" make clear Europe wants to be a key player in this global competition. To compete successfully the EU has to adopt a clear long term vision, strategy and budget to support modern biology and how to derive economic and social benefits from it.

What about society ?

Long term global competition in the biosciences or any science requires making choices. These possibly far reaching decisions can only be taken if the general public supports them. Here is a potential threat: there is a gap between science and society causing scientific illiteracy. This gap is increasing; more and more Europeans are not interested in science and/or do not trust the outcomes of science. Scientific illiteracy leads to people lacking basic (mathematic and logical) skills to analyse issues and are likely to switch from rational to emotional decision making. This will hinder good and sustainable decision making in Europe because the general public is not likely to support rational decisions on issues they do not understand. If modern biology is the promise for the future, the worst imaginable scenario for our common future would therefore be to reduce the amount of biology taught to the 4-18 years old in society. People in our society will not have received any training in basic biological concepts like (human) physiology, reproduction, natural cycles and the environment. They will not understand the interactions in living nature and the implications this has for our common future.

Teaching less biology will also in the long term reduce the number of scientists available to do the work. Less attention to science in schools implies that there will be less pupils choosing a career in science. This will hinder any long term competitive strategy where producing top scientists is a cornerstone. A population lacking basic understanding of modern biology will not support its development. We cannot build a strong house on a weak foundation.

The punishment for scientific illiteracy is seen in decision paralysis and lack of good scientists. This is a severe impact.

Unfortunately exactly this is happening; less time is spent on teaching biology in primary and secondary schools. Failing to teach our future generations basic biological concepts as (human) physiology, reproduction, natural cycles and ecosystems means our future generations will not understand there is a connection between these concepts and the pressing issues and choices

they will be facing as an adult. So here, at the age of 4-12 the germ of scientific illiteracy is sown. We also notice a reduction in the amount of knowledge on essential skills as mathematics, chemistry and physics students have when leaving secondary schools. Perhaps the desire to increase the percentage of annual graduates from schools is larger than the desire to increase the quality of the graduates. However if Europe wants to compete globally we need to increase the quality of our secondary school students. Modern biology cannot be practiced without a thorough understanding of biology, mathematics, chemistry, physics and computational sciences.

Cooperative science ?

As has become clear above there will not be a single discipline driving modern biology. It requires close cooperation between all disciplines involved. Therefore a cornerstone of modern biology is to develop systems which support and drive cooperation between sciences.

Understandably, countries in EU have developed differing educational systems over time, at primary, secondary and tertiary educational levels. Even today, with much enhanced interlinkage between EU Member States, there are a range of different qualifications available within individual countries.. These include The International Baccalaureate (IB), Bachelor/Masters/PhD studies as well as individually certified courses in bio-sciences, life-sciences, bio-medicine, bio-technology and bio-chemistry. These differing systems provide differing qualifications which are not truly transportable between Member States. This diversity in biological qualifications enhances the need for, internationally recognized qualifications and professional skills for the practising professional biologist. It was as a recognition of this fact that the concept of a universally tradeable qualification for biologists was proposed. This is EurProBiol.

What does it mean for biologists?

As a biologist we are trained not to mingle in politics, there is always someone who is better with words and besides, we go for science. If you go for fame or money, biology was not the place to be anyway. This has changed with the evolution of biology. Modern biologists hold the keys for solutions of many issues confronting society. Modern biologists also understand nature is not to be underestimated. Having this knowledge carries responsibilities, therefore they have to stand up and claim their place. If it is not for yourself do it for your children.

We should expect resistance and competition. This is good news; resistance makes you better and competition is a clear sign you are in the right place.

Finally

There is a global race to lead the coming biology revolution. Following the 2020 strategy Europe cannot afford not to enter the race. Therefore EU has to draft up and communicate a long term plan to match and surpass the global competition. This plan has to recognise the role of modern biology, including the role of biology at schools as well as industry.

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National Research Council. (2009). A New Biology for the 21st Century: Ensuring the United States Leads the Coming Biology Revolution. National academies press.

Council for Science and Technology (2010). Vision for UK research March 2010 © Crown Copyright URN10/584