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In September 2005, under UK presidency the political decision was taken to create the ERC for the funding of basic sciences, including social sciences and humanities, by the FP budgeted. The funding should be based on no other criteria than Scientific excellences as defined by independent peer review process as required by the scientific community.

However, two common key points were not included in the initial political agreement and in fact these are still open i: The creation of the ERC as areal European Institute ii. The creation of a mechanism preferably under the ERC umbrella to fund collaborative (Bottom up) basic research. Today such a position still acts as a powerful blocking factor against greater contributions by scientists to scientific strategic steering of EU science policy.

Anyhow campaign for the creation of ERC and for the funding of bottom up research by the EU-FP exclusively on scientific ground was a unique event in the history of European Science policy. Initially, this was a movement led by some large European Scientific Societies like FEBS and other Euro Science federation joined by a few rather independently managed organization as the ESF, EMBO etc. As well as individual scientists.

Horizon 2020 was Europe's flagship programme for research and Innovation. Among the main objectives of the program were leverage excellence and foster cross border collaboration, boost the European Health and wealth, close the gap between research and market. Although Horizon is an interesting programme the scientific community has faced it with scepticism. As can be seen from the results of the mid-term evaluation, among the main points of criticism are: the low percentage of the budget available for basic research, the overall success rate below 13% (compared with ~20% for FP7), high bureaucracy and problems with reviewer selection.

Towards shaping of FP9 the commission appointed a committee called "Lamy high level group" for suggestions. The committee made eleven recommendations and the general group mandate was: "To formulate a vision for the future EU research and Innovation, to draw strategic recommendation on maximizing the impact of EU R&I programmes in the future".

In the same time Scientific federations between them "Alliance for Biomedical Research in Europe whose FEBS is full and very active member made important recommendations for the EU's ninth framework programme between them: Strongly support the lamy report's recommendation in double the overall budget of the next framework programme advocating dedication of 25-30% of the FP9 budget to biomedical and health related research, increased funding for ERC and basic clinical and translation research, improving the low success rate of application through balanced and broader calls, as well as a rigorous selection at 1st stage and continuity in funding for successful networks established in previous frame work programmes.

IS-15

A RESEARCH TRAINING CENTER MODEL: THE WEIZMANN INSTITUTE OF SCIENCE

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The Weizmann Institute conducts research and offers graduate education in the breadth of scientific disciplines, with an emphasis on cross-disciplinary investigation. The Weizmann Institute is comprised of five faculties, constituted of 18 departments and additional service units. The Faculty of Chemistry advances the dream of Dr. Chaim Weizmann, an organic chemist, who was the original visionary of the Institute. Research in the Faculty is ranging from theory to experimentation, and from the Nano to the planetary scales. The Faculty of Physics advances research in the physics of complex systems, condensed matter physics, and particle physics and astrophysics. There is about an equal number of experimentalists and theorists. The Faculty of Mathematics consists of the Department of Mathematics and the Department of Computer Science and Applied Mathematics. The research carried out in the faculty ranges from abstract and theoretical studies within mathematics and computer science in other sciences, to their application in concrete industrial developments. The Faculty of Biology together with the Faculty of Biochemistry, span research efforts towards understanding of life at all levels, from the molecule to the cell and the entire organism, from immunology, the human brain, to the body's development and

regulatory processes. Biochemistry research focuses on the processes of life at the levels of molecules, cells, organs, organisms and ecosystems. At the basis of all these levels of organization are the biomolecules, including DNA, RNA, proteins, polysaccharides and small molecules. Graduate studies at the Weizmann Institute of Science are conducted through its Feinberg Graduate School which awards M.Sc. and Ph.D. degrees in life sciences, chemical sciences, mathematics and computer science, and physics. It also awards non-thesis MSc degrees in science education. Graduates go on to senior positions in academia and industry. All students are integrally involved in research conducted at the Institute, working collaboratively with faculty members and postdoctoral fellows. All students receive full scholarships and living stipends so that they can devote their time to research and study.

IS-16

BIOLOGY IN THE THIRD MILLENNIUM: TOOLS, PROMISES, CHALLENGES AND ETHICS

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The early 2000 were characterized by the publications of several eukaryotic genomes of major importance (*Homo sapiens* or *Arabidopsis thaliana* for examples, even if the *Saccharomyces cerevisiae* genome was previously released in 1996) and at the time they were considerate as a critical data sets for future functional analysis. However, an incredible number of new high-throughput technologies (genome, transcriptome, proteome, interactome, metabolome, etc.) directly related to the development of new bioinformatics approaches have emerged each couple of years. The massive usage of these new tools is at the origin of a tremendous acceleration of biological information: an incredible burst of knowledge.

We proposed to observe how few of these new tools for deciphering life have introduced changes to conduct biological analysis; to reveal what was hitherto the domain of the unknown (gut, deep ocean); the link between traditional description of living organism and their genome (the come-back of Natural History); the positive and negative role of "model organisms".

Due to the genomic tools, the biodiversity so frequently cited but still widely unknown, starts to reveal its incredible complexity. The corresponding data have strongly modified the tree of life and in addition revealing how important is the horizontal transfer of genetic elements. These incredible new data sets, scientifically interpreted, could be used for potential positive application for the human societies as for examples identifications of a new generation of antibiotics; improving teaching efficiency based on brain imaging that facilitate a better understanding of the human brain function in space and time; production of cereal genomes fully sequenced and annotated (wheat for example) is a perfect data set to do breeding in a knowledge-based way. In addition genetics tools are used to determine both the function of genetic elements but also to modify all kinds of genomes. This last point was discussed as an important bio-ethical question (43rd FEBS Congress, Prague 2018, July). The consequences of this burst of knowledge are multiples, the high production of data introduce the notions of: data bank quality (EMBL-EBI for ex.), long-term storage of all data, quality of publications and accessibility (paywall and unpaywall), misconducts, fake science, plagiarism and intellectual property. Another consequence for our working group: what to be teach in the future in molecular science education? This is a very important open question.

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IS-17

JOINT RESEARCH WITH THE INDUSTRY

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During the last few decades the shift from uni-directional flows of funding and innovation between government, academia and industry to the

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Triple Helix concept, characterised by multi-directional flows of knowledge, financial resources, and social benefits, resulted in improvement of the academic-industrial collaboration. Yet, academia is still more focused on teaching and research, while industry tries to articulate and meet the consumers' needs. However, due to the Triple Helix concept, the strategic mission of universities has moved beyond education and research toward a "third mission" related to technology absorption, adaptation, and diffusion, as well as the improvement of collaboration with industry and direct contribution to the economic growth and development (1). Yet, the further enhancement of the collaboration between academia and industry is crucial for the improvement of education and training as well as skills development, but also because it enables generation of new knowledge and provides its acquisition and application (innovation and technology transfer) (2). The collaboration between universities and industries also promotes entrepreneurship through the start-ups and spin-offs establishing. Furthermore, there is a wide range of benefits rising from university-industry collaboration such as achievement of synergies and complementarities of scientific and technological capabilities, expansion of the relevance of research carried out in public institutions, promotion of the commercialization of public research and development (R&D) outcomes, and increase the mobility of labour between public and private sectors (2). Academic-industrial collaboration and technology transfer play especially prominent role in biomedical sciences e.g. through advancing the development of new drugs and other biomedical technologies. Although it can result in both important public health benefits and a source of income for universities, some ethical concerns, particularly when research involves human subjects, may raise (3). Despite multiple and wide-reaching benefits of the collaboration between academia and industry, the historically defined missions of these two "cultures" (education and discovery driven by intellectual curiosity vs. translational research, commercialization, and profit making) still upbear walls between them. This is why, it is of utmost importance to undertake measures by both parts, but particularly by the government that will promote, encourage and facilitate academic-industrial collaboration. Some of them are the policies that promote university-industry collaboration; R&D incentives and grants; performance-based funding of universities and reward systems for researchers; intellectual property rights regime and technology transfer offices; science parks, spin-offs, and business incubators, but particularly supporting the enhancement and improvement of education and training in accordance with the industry needs (2). However, beside the governmental measures that are undoubtedly important, both academia and industry should recognise the advantages and mutual benefits of collaboration and actively contribute to its establishing and development. For the beginning, universities should consult industry in curricula development, offer entrepreneur-ship educational contents, promote joint supervision of PhD students, while industry should explore capacities of researches conducted at the universities, offer more internships for the students, encourage participation in teaching among the experts, shear the state-of-the-art technologies with academicians etc.

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IS-18 POST-GRADUATE ACADEMIC PATH TIPS FOR YOUNG SCIENTISTS

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For young scientists, the relevant choice of adequate postdoctoral position will greatly contribute to building a successful research carrier. How to ride the good tide is a complex problem wherein – in optimal cases - supervisors and the young scientists need to work together.

This talk will focus on the academic possibilities of guiding your career forward. In this aspect, the choices are more numerous than it seems. Within a postdoctoral opportunity, you can actively shape your career by considering how the scientific job can be complemented by additional science-related activities. Making the most of your postdoc is a complex challenge and this talk will address some helpful tips to achieve this.

There are numerous issues to consider both on behalf of the young scientist who wishes to apply for a postdoctoral position as well as for the senior scientists (previous and future supervisors). First of all, it is of high importance that the supervisor recognizes the need of the young scientist to pursue independent research in a new field and in a different lab. The supervisor may facilitate choice of the cognate and relevant future host for the young scientist relying on their research network.

Also, the supervisor can help the young scientist by proposing new research fields and promoting possibilities in applications for postdoctoral studies, and may contribute greatly to all aspects listed below. However the major part and responsibilities lie with the young scientists themselves.

Among these responsibilities, some of the most important factors are the following:

- 1 Identification of interesting, currently yet open, and widely influential research areas
- 2 Finding a good postdoctoral position, with a relevant supervisor who is capable of building a mutually beneficial partnership with the young scientist. In this respect, carriers of previous post postdoctoral fellows in the lab will be highly revealing.
- 3 Working on publication skills. Publications are of course the very measure of the success of research studies, so care needs to be taken to proceed with these skills both in manuscript writing and conference presentations
- 4 Consideration of future possible carrier stages, choice and preparation.

IS-19 POST-GRADUATE INDUSTRIAL PATH

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Pharmaceutical and biotechnology industry positions have become more attractive to many recent graduates but especially PhD graduates, and consequently highly competitive. According to the Nature's 2017 Graduate Student Survey more than half of the respondents said that, they would like to work in industry, and nearly one-quarter said an industrial position was what they most wanted (1). Unfortunately, the reports from the employers from pharma and biotech industry indicate the existence of a considerable gap between the skills required by employers and those possessed by recent graduates (2). Therefore, an adequate education and training, as well as skills development that will meet the industry needs, on both graduate and postgraduate level, have become a huge challenge for the universities but also for PhD supervisors. On the graduate level, curricula are predominantly created by the faculty members/academicians thus reflecting their views and expectations, in most cases without consultations with industry. Consequently, curricula might or might not be aligned with student needs upon graduation and entrance into industry positions. Some survey revealed that academic research environment appreciates more knowledge in basic sciences and skills in laboratory and research methodologies, whereas industry appreciates more communication skills, skills related to teamwork and self-efficacy. Yet, both environments equally appreciate skills related to problem solving, self-directed learning, and having a big picture (2). Thus, it is hard to expect from academicians to create and to run curricula that will enable to students the development of the skills needed for the successful industry career, without close and tight collaboration with the colleagues from industry. On the postgraduate level, the problem is relinquished to the supervisors, who often do not have any experience with industry, so not being aware of skills needed for industry positions. The Nature's 2017 Graduate Student Survey revealed students' dissatisfaction with supervisor's advising regarding student's careers outside academia, encouragement to attend career training and events, and help with finding future employment, in more than 30% of respondents (3). Thus, many recent graduates are left to themselves regarding the recognising and developing skills needed for industry career. Therefore,