



Figure 2: Organisation of the network

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ELIXIR

Data for Life: from information to the Medicines and Bio-industries of the Future



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In May 2007 EMBL was awarded a Framework 7 grant of 4.5 Million Euro to run the Preparatory Phase of a project called ELIXIR of which Professor Janet Thornton, Director of EMBL-EBI is the coordinator. The purpose of ELIXIR is to construct a sustainable infrastructure for biological information in Europe. The purpose of the Preparatory Phase is to make the plan for the construction phase which will follow.

ELIXIR is one of six bio-medical projects that are part of the European Strategic Forum on Research Infrastructures (ESFRI) Roadmap. It is very significant that bio-medical projects are part of the ESFRI Roadmap as this is the first time that it has been recognized at this level that biology needs infrastructures in the same way that the physical sciences do. This is necessary because the nature of biological research is changing due to the availability of new high-throughput technologies such as next-generation sequencing.

Biology is changing from an activity engaged in by individuals and small groups to one in which large coordinated projects will make a much larger contribution. The intensive nature of the new technologies means that teams of peoples are required to generate the data and then other teams to process and understand it and to translate that understanding into improvements in healthcare and so on. This in turn is going to need to be a change in the way in which the infrastructure for biology research is funded. This is because the new technologies, as well as being extremely powerful, require much more substantial capital investment than did previous technologies. In particular, they produce vast

amounts of data and there is an urgent need for substantial investment in biological computing infrastructure if Europe is gain maximum benefit from these advances. It is not going to be enough to reorganize the way in which research funding is allocated; there is not enough money there for that to work. Biology has to coordinate its activities and access the sources of funding in a structured way that has, until now, only been employed in the physical sciences. This is the reason for ELIXIR and for the inclusion of biology projects in the ESFRI process.

The Human Genome Project is hardly completed and we are embarking upon the Thousand Genome Project. Further down the line, the Cancer Genome Project is proposing to sequence the genomes and tumor genomes of 25,000 cancer patients. How long will it be before we see the announcement of the Million Genome Project; and then what? Further more, it is not just sequencing technologies that are set to produce prodigious quantities of data; advances in structural biology, proteomics and biological imaging are also poised to add to the deluge. All these data need to be curated, archived and made available to the biological and medical community in useful and relevant ways; hence the need for ELIXIR. All of this activity will also need to be coordinated to ensure that everything is covered in the most appropriate way and that there is no duplication that wastes resources; hence again, the need for ELIXIR.

Although the amount of money that is going to be needed to achieve ELIXIR goals may seem very large, it is in fact quite small compared with the amount of money that will be spent generating the data in the first place. Further more, it is also relatively small in comparison with the amount of money that Europe has spent in the past on infrastructure for the physical sciences. When one thinks that the Grand Challenges facing Europe are biological ones, namely, health-care for an aging population, the need to protect the environment, the need for increased food production, the need to sustain a viable European Biotechnology and Pharmaceutical Industry and so on, the question we should actually be asking is "Can Europe afford NOT to make this investment?".

ELIXIR consists of 32 organizations and institutes from across all of Europe. The Preparatory Phase started in November 2007 and will run for

three years. Its purpose is to produce a plan for building and funding the construction phase which will follow. The plan is intended to cover a ten year period, something unprecedented in the usual grant funding processes used in biology, requiring commitment from the politicians and funding agencies alike. Physicists have been walking the corridors of power for several generations and know how to coordinate their actions to lobby for very large resources; the time has come for us to do the same, but we cannot take another generation to do it, for if we do then Europe will be left behind. Europe already invests less in centrally-organized biological-data management than Japan and the USA and we must not fall behind the emerging economies of India and China.

ELIXIR needs the support of every biologist in Europe, particularly in convincing politicians and funding agencies of its importance - find out more from the ELIXIR web site (www.elixir-europe.org), attend the stakeholders meetings, tell your friends about us and do what you can to make sure that the funding agencies in your country understand the need to contribute to ELIXIR.

The ease with which you will be able to access the fundamental data of biology in the future depends on the success of ELIXIR now!