

Work programme BIOTEK2021 (2012–2021)

Large-scale Programme
Biotechnology for Innovation – BIOTEK2021



**Large-scale
Programmes**

The RCN initiative
to meet national
research priorities

About the programme

Biotechnology for Innovation – BIOTEK2021

The BIOTEK2021 programme is the Research Council of Norway's most comprehensive research initiative in the field of biotechnology. The programme will run from 2012 through 2021. The BIOTEK21 programme succeeds the Programme on Functional Genomics in Norway (FUGE), which was concluded in 2011. The FUGE programme heralded a new era in biotechnological research in Norway and led to the development of new work forms focusing on national cooperation and task distribution and highly focused research activities. The BIOTEK2021 programme will take this concept to a new level, where Norwegian biotechnological research is to become more international, more industry-oriented and more at the forefront in selected areas.

Large-scale programmes are an important tool at the Research Council towards realisation of prioritised central research policy. They shall provide enhanced knowledge in the long-term national sense, with an eye towards stimulated innovation and increased added-value or generate knowledge that contribute to solving prioritised social challenges.

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1 Summary

The BIOTEK2021 programme is a strategic, long-term initiative designed to further develop the Norwegian biotechnological research and shift its focus more towards innovation. The programme is part of the implementation of the National Strategy for Biotechnology which was presented in December 2011. The strategy states that biotechnology is an enabling technology that is vital to addressing societal challenges, especially in the agricultural, marine, industrial and health sectors. The strategy also identifies four cross-cutting focus areas: biotechnology and society; international cooperation; industrial development; and knowledge base and infrastructure. The strategy provides a framework for research initiatives in the interface between societal challenges, national competitive advantages and the opportunities created through biotechnology activities.

The BIOTEK2021 programme has a distinctly industry-oriented profile. The objective is to develop biotechnological innovation and put focus on the application of research results as a means of promoting value creation and industrial development related to solving major societal challenges in a responsible manner.

The Research Council will employ all of its relevant funding schemes in the effort to implement the national strategy, and the BIOTEK2021 programme will work closely together

with the other initiatives that encompass biotechnological research, including the open competitive arenas (the FRIPRO funding scheme for independent projects, the National Financing Initiative for Research Infrastructure FORINFRA), the Programme for User-driven Research-based Innovation (BIA) and the Eurostars programme) and a number of other thematic programmes.

The national distribution of tasks established under the now-concluded Programme on Functional Genomics in Norway (FUGE) will be further developed in the form of national cooperation, constructive task distribution and carefully targeted research activity. To achieve the programme's objectives, a variety of project types will be used and further developed. The programme will focus on funding large-scale, long-term projects that are of relevance to industry and that incorporate clearly defined research questions and approaches. The need to develop other project types to ensure that projects are relevant to society and industry will also be assessed. Cooperation and distribution of tasks among thematically oriented programmes must be developed to expand biotechnological expertise in the industries addressed by such programmes. The BIOTEK2021 programme will complement these programmes, thus enhancing industrial potential in sectors where the Research Council does not have thematic programmes.





BACKGROUND



This work programme establishes the framework for the large-scale programme on Biotechnology for Innovation (BIOTEK2021), which succeeds the Programme on Functional Genomics in Norway (FUGE). Biotechnology was one of three technology areas prioritised in the Government's white paper on research from 2005, *Commitment to Research*. The subsequent white paper from 2009, *Climate for Research*, also identified biotechnology as a strategic area in which the Government seeks to promote industry-oriented research.¹ Thus, the BIOTEK2021 programme will maintain a distinctly industry-oriented profile, whereas more of the funding of basic biotechnology research will be dealt with under the FRIPRO funding scheme for independent projects.

The programme employs the following definition of biotechnology: *The application of science and technology to living organisms, as well as to parts, products and models thereof, to alter living and non-living materials for the production of knowledge, goods and services.* This is the same definition used by the OECD and in Norway's National Strategy for Biotechnology.

Biotechnology is not an industry in itself, but an umbrella term for a broad spectrum of *enabling technologies* that can be used to stimulate new industrial development, enhance the competitiveness of existing industrial activity, and not least, help to solve major societal challenges related to the environment, energy, food production and health.

2.1 Strategic perspectives

The Research Council has administered a variety of initiatives on biotechnology for the past 10 years. The largest strategic initiative, the Large-scale Programme on Functional Genomics in Norway (FUGE), had a budget of NOK 1.6 billion and was concluded in 2011. Large sums have also been allocated to biotechnology research under several of the other thematic programmes as well as the open competitive arenas such as the FRIPRO funding scheme, the Programme for User-driven Research-based Innovation (BIA) and the Centres of Excellence (SFF) (eight of twenty-one SFF centres, as well as four of twenty-one Centres for Research-based Innovation (SFI), involve the field of biotechnology). Additionally, biotechnology holds a prominent position in several of the joint international programmes in which Norway participates, e.g. the Eurostars Programme.

According to an external evaluation, the FUGE programme has played a major role in developing the field of biotechnology research.² Better coordination and more effective distribution of tasks at the national level have helped to boost the quality of research, enhancing its international competitiveness in certain areas. Nationally coordinated projects and the development of infrastructure have been instrumental in this regard. The most important recommendations from the evaluation are to:

- build a new initiative on the basis created by the FUGE programme, continuing among other things the technology platform concept;
- promote the development of excellence in research in niche areas;
- increase focus on internationalisation;
- increase cooperation and communication with trade and industry;
- place greater strategic focus on societally robust research;
- strengthen cooperation among activities within the Research Council.



¹ Report No. 30 (2008–2009) to the Storting, *Climate for Research*, Chap. 8.

² Evaluation of the FUGE programme: <http://www.forskningsradet.no/publikasjoner>. ISBN 978-82-12-02885-2

▶▶▶ The BIOTEK 2012 process,³ which included input from about 60 Norwegian R&D actors in the areas of human health, food production, the environment/climate, energy, sustainable industry and robust technology development, produced a state-of-the-art review of the field that was used extensively in the preparation of the Government's National Strategy for Biotechnology.⁴ The national strategy gives priority to initiatives in the interface between economic profitability, societal challenges and national advantages. The efforts under the BIOTEK 2012 process clearly showed that the complex dynamics associated with addressing major societal challenges require cross-sectorial cooperation involving new approaches to management and governance of research and innovation processes. Furthermore, the input to the BIOTEK 2012 process made it evident that more knowledge about the ethical, social and legal aspects of biotechnology will be essential if the impact of the biotechnological advances will have on people's daily lives are to truly be understood. Other recommendations that emerged from the BIOTEK 2012 process included establishing a framework to ensure that biotechnology is developed as an integral part of value chains that lead to value creation and industrial development and that generate economic and social assets. The generic elements should be made nationally available resources (technology, expertise, networks), as this will enhance the integration of biotechnology in societal development and the establishment of the knowledge-based bioeconomy.

Research activities and technological innovations are rarely developed, carried out or studied in isolation. The white paper from 2009, *Climate for Research*, states: "A common feature of more recent research and innovation theory is that research and innovation take place in a complex interaction between the actors in the R&D and innovation system. The linear development from basic research via applied research to product and service development in trade and industry is rejected as a universal model." Another term used in this regard is *co-production*.⁵ This means it is crucial to grasp how basic, translational and applied research and direct implementation of research results are much more intertwined with each other and have a far more complex relationship to society and production processes in general than has previously been understood.

The Innovation Strategy for the Research Council of Norway emphasises that research results must benefit the private and public sectors in Norway. Along with the other enabling technologies (ICT and nanotechnology), biotechnology is a priority area with a sound Norwegian knowledge base. Research can

stimulate innovation and generate the basis for growth in existing and new industry. At the same time, the Research Council's innovation strategy states that it is an objective that future innovations will be sustainable along three dimensions: economic, environmental and social.

In the transition from the FUGE programme to the BIOTEK2021 programme, the activities of the past ten years of FUGE will be divided among three schemes: the FRIPRO funding scheme, the BIA programme and the BIOTEK2021 programme. The BIOTEK2021 programme will work together with these and other programmes as a strategic, long-term initiative. The Research Council's international strategy provides an additional guideline for the efforts to integrate national biotechnology activities into large-scale international initiatives in cooperation with key countries.

2.2 Scientific perspectives

Many areas of society, from health services to the processing industry, have made use of modern biotechnology in recent years. Biomedicine and health are currently the dominant fields in biotechnological R&D with many examples of successful business start-ups. But there still remains a great untapped potential in the health field for innovation and industrial growth.

The biosciences and biotechnology will also contribute to the development of new or improved products, services, industrial processes and energy production which comprise a part of the knowledge-based bioeconomy. The EU refers to this part of the economy as the sustainable production and processing of biomass for a variety of foods, health products, fibre, industrial products and energy.⁶ In recent years there has been a growing understanding that biotechnology is a basic prerequisite for the development of such a knowledge-based bioeconomy. The National Strategy for Biotechnology gives a prominent place to the development of the bioeconomy and the significance of biotechnology in this context. Companies based on biotechnological expertise have been developed within the primary industries, especially within aquaculture (feed, vaccines and breeding) and agriculture (breeding, biobanks and seeds/plants). Industrial biotechnology is a relatively underdeveloped field in Norway, but has in recent years been more employed in connection with biorefining of various types of biomass.

The National Strategy for Biotechnology identifies four sectors on which efforts will be focused:

³ BIOTEK2012, State-of-the-art review of the field (in Norwegian): <http://www.forskningsradet.no/publikasjoner>. ISBN 978-82-12-02854-8

⁴ National Strategy for Biotechnology: <http://www.regjeringen.no>

⁵ The terms "co-production" and "co-evolution" are used in the research and innovation literature in English. See e.g. Gibbons et al (1994), *The New Production of Knowledge*.

⁶ Innovating for Sustainable Growth: A Bioeconomy for Europe. European Commission, 2012. <http://ec.europa.eu/research/bioeconomy>



Marine biotechnology

It is highly likely that marine resources will constitute a large share of the bioeconomy of the future. The production potential of the ocean remains unutilised in many areas, and ocean areas may play a key role in future access to safe, healthy food, renewable energy, health and welfare. Marine biotechnology was a thematic priority area under the FUGE programme. In addition, activities under the programme Aquaculture – An Industry in Growth (HAVBRUK) and the national marine bioprospecting initiative have contributed to positive developments in marine biotechnological research in recent years. Thus, a firm foundation is now in place for

value creation and industrial development in this area. Biotechnology is relevant for addressing problems and issues relating to profitable, sustainable cultivation of existing and new farmed species within the aquaculture industry, such as production and adaptation of new feed, more effective gene sequence-oriented breeding technology, new reproduction technologies, new vaccine development technologies, new methods of disease diagnosis, and improved utilisation of the produced biomass. In addition to the aquaculture industry, there is great potential within marine bioprospecting and the industrial utilisation of various types of marine biomass.





►►► **Biotechnology in agriculture**

Agricultural food and biomass production is expected to play a key role in the international bioeconomy of the future. Since Norway will continue to have subsidised food production for the foreseeable future, biotechnology used in Norwegian agriculture and the food industry may help to reduce production costs. This will become even more important in relation to the challenges Norwegian agriculture will likely face as a result of climate change. Biotechnology will also play a significant role in increasing national self-sufficiency with regard to important grain varieties and to breeding

plants and animals with e.g. fatty acids that can prevent lifestyle diseases. Moreover, new biotechnological innovations in the sector aimed at reducing greenhouse gas emissions, improving utilisation of sustainable feed, increasing efficiency of gene sequence-oriented breeding and processing technologies, and promoting new reproduction technologies and new production methods that enhance food quality, will lead to industrial activity with significant export potential. The same applies to new biotechnology that makes it possible to use land-based biomass for the production of biofuel and other products.



Photo: Shutterstock

Medical biotechnology

An increasing number of medicines and diagnostic tools are now being developed and produced using biotechnological methods. New forms of treatment based on biotechnology, such as the use of stem cells and gene therapy, are approaching clinical application. Biotechnology also has the potential to improve public health through enhanced, individually tailored prevention and treatment of complex diseases based on genomic information, phenotypic data and mathematical descriptions of human physiology. Medical biotechnology is one of the most well-developed areas of biotechnology in

Norway. Research activities under the FUGE programme and a significant amount of funding from other instruments at the Research Council have contributed to the accumulation of expertise in this area. In addition, research conducted by the regional health authorities has also helped to build significant competence within this field. There is a considerable amount of industrial activity based on medical biotechnology as well. Biotechnology-based medical products and services that can promote better health for each Norwegian krone invested have great economic potential and help at the same time to address major societal challenges. ►►



▶▶▶ Industrial biotechnology

Industrial biotechnology entails the use of biotechnology in the production of chemicals, materials and bioenergy. Compared with conventional chemistry, biotechnological solutions are often more environment-friendly, as they result in fewer bi-products and lower energy and water consumption in the production process. Biocatalytic processes involving microorganisms or isolated enzymes may lead to new production methods and unique products in many different sectors such as food, animal feed, drugs, fine chemicals, cosmetics, textiles, paper and wood processing, polymers,

plastics production, waste management and energy. This technology is expected to share an interface with systems biology and synthetic biology in the coming decades. Both the OECD and the EU expect industrial biotechnology to gain wide-ranging economic and social importance in the coming decades, and it is regarded as essential for the development of the knowledge-based bioeconomy. Industrial biotechnology is often based on raw materials and other input factors from the other sectors, and thus may be regarded as an overall activity with a variety of goods and services of great relevance to all sectors.



3 OBJECTIVES OF THE PROGRAMME

3.1 PRIMARY OBJECTIVE

The BIOTEK2021 programme will generate biotechnology that contributes to value creation and innovation in order to solve societal challenges in a responsible manner.

3.2 Secondary objectives

The programme will:

- 1 Develop the generic elements within biotechnology, thus enabling Norwegian research groups in academia and industry to compete at an international top level
- 2 Address the various needs and special features of each sector in a manner that activates synergies and fosters cooperation;
- 3 Ensure the responsible development of technology that addresses global societal challenges in the areas of health and sustainable food and industrial production;
- 4 Ensure the responsible development of technology that addresses global social challenges in the areas of health and sustainable food and industrial production;
- 5 Establish conditions that promote cooperation, constructive task distribution and highly focused research activity within Norwegian biotechnology research;
- 6 Communicate with specified target groups to ensure that biotechnology research and development are in line with the needs of society.



4



PRIORITY RESEARCH TASKS



4.1 Scientific priorities

In line with the National Strategy for Biotechnology, the BIOTEK2021 programme will provide funding to research and development projects in the interface between economic profitability, societal challenges and national advantages.

Although the BIOTEK2021 programme is a large-scale programme by Norwegian standards, it administers only 20 per cent of the Research Council's funding for biotechnological R&D. To achieve maximum effect, the programme must therefore balance its grant allocations with other existing funding opportunities for biotechnology projects within the four sectors, as well as with the volume and quality of biotechnology research being conducted in each of these sectors.

The BIOTEK2021 programme will focus on those areas where the use and development of biotechnology itself may make a difference. In general, the programme will assume different roles in those sectors that have large-scale, thematically oriented programmes as opposed to those sectors without such programmes.





▶▶▶ The programme will establish priorities in consultation with relevant programmes and external actors, and will present these in annual action plans. Activities under the programme are to be based on cooperation between leading knowledge environments and national and international users. Furthermore, the activities must also be adapted to the knowledge base found within each of the sectors. Within:

The Marine sector, the knowledge base for biotechnology must be expanded to ensure that Norwegian research groups remain at the international forefront of research. Priorities for this sector are also set out in the national strategy for marine bioprospecting.⁷

The Agricultural sector, the knowledge base will be expanded in selected areas through national and international cooperation.

The Medical sector, the biotechnology knowledge base will be expanded while at the same time focus will be placed on better utilisation of existing research results. It will be taken into account that commercialisation of medical products and services is typically more time-consuming than in the other sectors, and priority will be given to industry-oriented research at R&D institutions.

The Industrial biotechnology sector, a stronger knowledge base will be developed in selected areas through national and international cooperation. This sector is crucial for the ability to utilise R&D results in the three other sectors, and the programme's priorities for this sector will therefore be viewed in relation to the project portfolio in the other sectors.

Biotechnology as an area of expertise shares an interface with a number of subject areas such as biology, chemistry, physics, mathematics and engineering. To make practical use of biotechnology, expertise in the social sciences, the humanities and law is also needed. The development of biotechnology therefore requires a high level of diverse competencies and knowledge. Thus, interdisciplinary activity will be essential for the further development of biotechnology.

Some of the most innovative, future-oriented perspectives in biotechnology are emerging in the area of overlap between nanotechnology and information technology. The BIOTEK2021 programme will therefore follow the developments taking place in these areas closely, and will cooperate

with other enabling technology programmes in order to find effective ways of developing Norwegian research. Developments within bioinformatics are crucial for utilising the knowledge obtained from the ever-increasing number of sequenced species.

Regardless of sector, activities under the BIOTEK2021 programme will be focused on thematic areas and associated research questions on which the development and use of biotechnology will have a critical impact.

4.2 Strategic priorities and project types

Biotechnological R&D is funded not only through the Research Council, but also through direct government allocations to the institutions, through Innovation Norway, and from industry-specific research funds as well as trade and industry.

The BIOTEK2021 programme will continue the culture for national cooperation, constructive task distribution and highly focused research activity established under the FUGE programme. This will be done by promoting cooperation between several project partners, including cooperation between projects involving a variety of financial stakeholders.

The institutions should assume greater responsibility for continuing effective cooperation and distribution of tasks related to biotechnological expertise and infrastructure. However, there is a gap between the need for biotechnological infrastructure and funding opportunities under the Research Council's National Financing Initiative for Research Infrastructure (FORINFRA). The BIOTEK2021 programme alone cannot close this gap, but it will provide funding to specific biotechnology projects in cooperation with the FORINFRA initiative.

To foster innovation and industrial development, it will be necessary to promote forms of cooperation and networks involving close cooperation between academia, research institutes, trade and industry, public innovation and funding agencies and private capital. Interdisciplinarity and cooperation between actors are prerequisites to success in research and industrial development, and are often used as specific criteria to qualify for much of the available research funding. Networks such as these will enable research and technological innovations to meet market needs. The networks can thus promote sustainable industrial development within a specific thematic area. The joint input from the universities⁸ and trade and industry⁹ on the BIOTEK 2012 process emphasises the value of networking such as this.

The BIOTEK2021 programme will put together functional project portfolios for each funding announcement and assist the research institutions with accessing existing networks for

⁷ Nasjonal strategy for marine bioprospecting:

http://www.regjeringen.no/nb/dep/fkd/dok/rapporter_planer/planer/planer-og-strategier-2009/marin-bioprospektering--en-kilde-til-ny-.html?id=575822

⁸ Joint letter from six universities.

⁹ Letter from the Association of the Pharmaceutical Industry in Norway, the Norwegian Biotechnology Association and the Oslo Cancer Cluster.



communicating with trade and industry as well as with other stakeholders if relevant. To achieve the most benefit from the networks, good cooperation between the BIOTEK2021 programme and other thematically oriented programmes is needed. Cooperation with the open competitive arenas will also be necessary.

As a whole, the Research Council's funding instruments are to ensure that all links in the value chain can be funded and that there are no gaps in the development cycle from research to commercial products, goods or services. This applies especially to projects related to the p phase or the demonstration phase for which it is currently difficult to find funding. The same is true for the development of expertise in and a culture for converting research-based innovations into market-oriented product development projects within existing companies or as new business start-ups. Figure 1 illustrates the programme's position in relation to the other funding instruments under the Research Council.

Figure 1 illustrates the programme's position in relation to the other funding instruments under the Research Council.

Figure 1. The BIOTEK2021 programme falls between the FRIPRO and BIA/FORNY open competitive arenas.



To achieve the programme's objectives, several funding schemes will be used and further developed. The most relevant of these are:

- Researcher projects that are large in scale and relevant to industry and that involve several partners working together on issues of relevance to society and industry;
- Researcher projects that are smaller, targeted and more strategic within specific areas the programme seeks to address;
- Applied R&D projects that are designed to further develop promising research results towards application with a view to subsequent proof-of-concept projects for commercial use. This may be combined with commercialisation grants in which researchers receive payroll compensation so they may take a leave from their academic positions to further develop ideas and research results leading to commercial use;
- Knowledge-building projects and innovation projects for the industrial sector within specifically defined areas for the purpose of e.g. reducing the R&D risk for participating companies and triggering the potential for value creation in trade and industry.

The type of participants and involvement of trade and industry in the projects will vary from one sector to the other. The Research Council will work to build networks that address specific issues and incorporate diverse partner constellations as a means of promoting cooperation and constructive task distribution among already dynamic research communities with participation by relevant companies and other actors in society at large.



INTERNATIONAL COOPERATION

The Research Council's Strategy on International Cooperation states that international activities under the Research Council are to be an integral part of the corresponding national activities. In other words, many ongoing and new biotechnology-related initiatives under the European Research Area (ERA) must be viewed as a part of the overall efforts in biotechnology. Bilateral cooperation with selected countries outside of Europe will be relevant as well.

In addition, the projects may use some of their funding to procure research services or research cooperation outside of Norway. This assumes that the international partner will make a significant scientific contribution to the project.

The most important arena for cooperation will be initiatives under the EU's Framework Programme (FP7, Horizon 2020)¹⁰ and participation in various ERA-NETs in areas such as plant biotechnology (ERA-CAPS), industrial biotechnology (ERA-IB2), synthetic biology and systems biology. The Research Council is the coordinator for the Coordination and Support Action (CSA) on marine biotechnology, which aims to establish an ERA-NET in this field. Participation in new ERA-NETs will be assessed on an ongoing basis.

The Eurostars programme is funded in part (25 per cent) by FP7 and the remainder by the participating countries. The BIOTEK2021 programme will work actively with Norwegian biotechnology companies to promote participation in the Eurostars programme and assess how the companies may be linked with relevant large-scale projects and networks.

The future expansion of infrastructure for use in biotechnological R&D must be viewed to a greater extent in an international context. Whereas the FUGE programme promoted a national distribution of tasks related to infrastructure (the technology platforms), the future distribution of tasks within biotechnology must have a stronger international perspective. In particular, Norwegian research communities should make active use of the many initiatives being established under the European Strategy Forum on Research Infrastructures (ESFRI).

New cooperative arenas within the ERA are being developed as well. Joint technology initiatives (JTI) are funded in cooperation between the FP7 and large private companies. The JTI known as Innovative Medicines Initiative (IMI) could hold opportunities for Norwegian actors in medical biotechnology. In addition, the Joint Programming Initiatives (JPI) bring together individual countries to address the grand societal challenges. Biotechnology will play a role in a number of these initiatives.

An important part of the BIOTEK2021 programme's activities will be to assess which international programmes and bilateral cooperation should be given priority and to what extent. The programme will continually assess the use of different support such as funding for positioning, mobility schemes and institutional cooperation aimed at encouraging more international cooperation.

¹⁰The current EU Seventh Framework Programme for Research and Technological Development (FP7) and the new Framework Programme for Research and Innovation (Horizon 2020) as from 2014.



6 COMMUNICATION AND DISSEMINATION ACTIVITIES



Communication and dissemination are key objectives of the Research Council's activities and consist of a general set of measures for various target groups. The Research Council is responsible for:

- General information and profiling;
- Dissemination of research results to relevant users;
- Networking and development of dynamic forms of cooperation between various relevant actors.

Target groups for research dissemination include:

- Research institutions, trade and industry, industry organisations;
- Government authorities, including ministries and political circles;
- Special interest organisations and society at large;
- Children and adolescents;
- The Research Council's various activities/divisions.

The BIOTEK2021 programme will develop communication plans that are focused and dynamic in relation to the programme's target groups, funding announcements and particular opportunities. The Research Council's administration will assist to ensure that the communication and dissemination activities in the biotechnology area are well integrated. It is especially important to be aware of the dissemination requirements established for the individual projects funded under the programme.



7 BUDGET

BIOTEK2021 is funded by the Ministry of Education and Research, the Ministry of Fisheries and Coastal Affairs and the Ministry of Trade and Industry.

In the initial year, 2012, the total budget is approximately 145 million NOK, a financing level which is expected to be maintained during the first years of the program period.

8

COORDINATION WITH OTHER RELATED



INSTRUMENTS AT THE RESEARCH COUNCIL

To achieve a comprehensive funding that extends across the entire value chain from basic research to innovation and demonstration projects, it is essential to ensure coordination between the BIOTEK2021 programme and the Research Council's other funding instruments with biotechnology as an area of responsibility.¹¹ The need for better coordination within the Research Council was also mentioned in the evaluation of the FUGE programme. Coordination with Innovation Norway will be important during the demonstration phase of projects.

Coordination with the FRIPRO funding scheme for independent projects

The FRIPRO funding scheme for independent projects plays a part in the Research Council's overall strategic funding on biotechnology by financing basic research in the field. The FRIPRO scheme awards funding solely on the basis of scientific merit. Although the projects are selected on this basis, significant synergies can be realised by viewing the BIOTEK2021 and FRIPRO portfolios in connection with each other.

Coordination with the Programme for User-driven Research-based Innovation (BIA)

The BIA programme provides funding primarily to Innovation Projects for the Industrial Sector, as well as to some Knowledge-building Projects for Industry. The programme complements the thematically oriented programmes by providing funding to companies and areas of specialisation that are not covered by one of the thematically oriented programmes. Industries of relevance for biotechnology are biomedicine, the processing industry and environmental technology. Thus the BIOTEK2021 programme and the BIA programme will prepare a plan for role sharing as soon as possible.

Coordination with thematically oriented programmes

Several thematically oriented programmes (e.g. Programme for Sustainable Innovation in Bio-based Industries (BIONAER), Programme for Aquaculture – An Industry in Growth (HAVBRUK), Programme for Stem Cell Research (STAMCELLER), Programme for Human Biobanks and Health Data (BIOBANK) and Programme for Clean Energy for the Future (RENERGI/ENERGIX) provide funding for biotechnological research. The BIOTEK2021 programme will enter into a dialogue with the programmes to establish good routines for coordination, which will facilitate cooperation on larger, integrated projects and make it possible to address broader challenges. A specific example of such cooperation would be issuing joint or coordinated funding announcements.

Coordination with other enabling technologies

Developments within ICT are critical for the further development of biotechnology. Likewise, parts of the nanotechnology field are developing in the direction of medical and biological science. To address this, it may be beneficial to issue joint or coordinated funding announcements with the Large-scale Programme on Core Competence and Value Creation in ICT (VERDIKT) and the Programme for Nanotechnology and Advanced Materials (NANO2021) which address issues at the interface between ICT and/or nanotechnology.

Coordination with the Programme on Ethical, Legal and Social Aspects of Biotechnology, Nanotechnology and Cognitive Science (ELSA)

The BIOTEK2021 programme will cooperate with the Programme on Ethical, Legal and Social Aspects of Biotechnology, Nanotechnology and Cognitive Science (ELSA) in order to create a coordinated, integrated initiative on ELSA-related issues.

Coordination with the National Financing Initiative for Research Infrastructure (FORINFRA)

Many of the activities under the FUGE programme were related to the expansion of infrastructure in the form of national technology platforms. The evaluation of the FUGE programme recommended following up this initiative in some way. The BIOTEK2021 programme's budget is not large enough to follow up a similar initiative on infrastructure. To do this, it will be necessary to establish cooperation between the INFRASTRUKTUR initiative and several ESFRI initiatives.

Coordination with the Programme for Commercialising R&D Results (FORNY2020)

The Programme for Commercialising R&D Results (FORNY2020) provides funding to proof-of-concept projects which are not regarded as research. Those who apply for proof-of-concept funding include commercialisation actors (Technology Transfer Offices, etc.) and new business start-ups. The BIOTEK2021 programme will establish a dialogue with the FORNY2020 programme to identify natural interfaces between the two programmes to ensure that the various stages from research to commercialisation are covered as much as possible.

¹¹Independent projects – FRIPRO, User-driven Research based Innovation – BIA, Sustainable Innovation in Food and Bio-based Industries – BIONAER, Clean Energy for the Future – RENERGI, Core Competence and Value Creation in ICT – VERDIKT, Nanotechnology and Advanced Materials – NANO2021, Ethical, Legal and Social Aspects of biotechnology, nanotechnology and neurotechnology – ELSA, Functional Genomics – FUGE, European Strategy Forum on Research Infrastructures – ESFRI, Commercialising R&D results – FORNY2020.

The BIOTEK2021 has the status of a large-scale programme in accordance with the decision taken by the Executive Board of the Research Council in November 2011. The programme board is appointed by the Research Board of the Division for Innovation and complies with the mandate for large-scale programmes.

At the start-up of the programme, the programme board will have nine members, and have the following profile:

- Five members with business experience, one from each of the following sectors: marine, including bioprospecting, agriculture, industry and health. Members must have experience in establishing business activity based on biotechnological R&D and in late-phase/international market introduction of biotechnology products.
- Three members with experience in basic research/technology development.
- One member with experience in the ELSA field and issues related to society and technology.

The day-to-day activities will be run by a programme administration under the direction of a programme coordinator. The size of the programme administration may vary over time, but will include a coordinator, four advisers and an executive officer.

www.forskingsradet.no/biotek2021

9 ORGANISATION





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