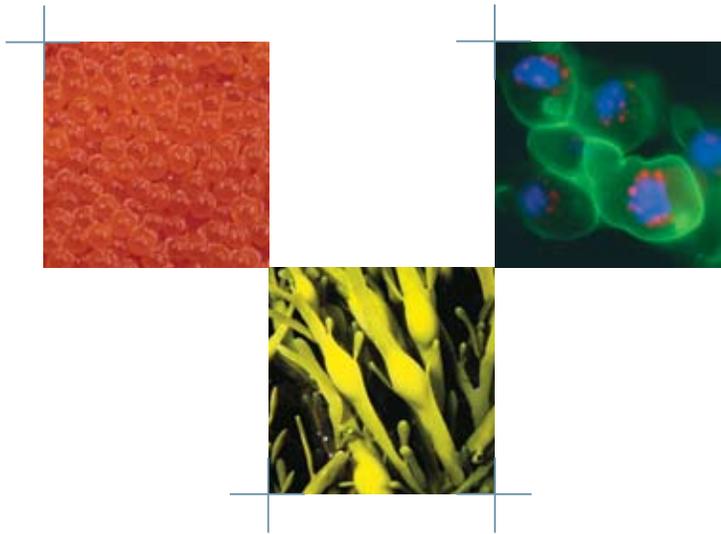


# Norway's largest biotechnology initiative

Large-scale Programme  
Functional Genomics in Norway – FUGE



## Large-scale Programmes

The RCN initiative  
to meet national  
research priorities

# Functional genomics research will lead to improved health, safer food and a better environment.

The field of functional genomics is related to and includes elements of biotechnology. Functional genomics has been termed «the new biology», where the interface between computer technology and knowledge about the genomes of humans and other species has opened new doors for scientists.

Functional genomics will change our society by providing: tailor-made medicines, improved animal welfare, specially adapted crops, safer food, and defences against disease epidemics. Research in functional genomics will play a pivotal role in future industrial and commercial development.

Norway has a number of national advantages within biotechnology: extensive health registers for both humans and animals, combined with some of the world's largest animal and human biobanks. Norwegian aquaculture has used biotechnology for many years to provide consumers with farmed salmon that maintains high health levels without excessive use of antibiotics.

The Research Council of Norway established the FUGE research programme in 2002 in response to a proposal submitted by a unified Norwegian research community.

## **FUGE – a national plan for research in functional genas**

**Programme period:** 2002–2012

**Annual budget:** Approx.

NOK 165 million

**Target groups:** Research institutions, trade and industry, regional health authorities, other public authorities, the government administration and the general public.

### **Objectives**

**FUGE – Functional Genomics in Norway** will strengthen research expertise in this field, bringing Norway up to top international standards and making it an attractive partner for international collaboration.

### **The programme will**

- › Encourage national cooperation and task sharing between research institutions to maximise value from funding.
- › Ensure that each researcher in this field has access to the newest technology.
- › Ensure that basic biological research, medical research and marine research generate knowledge and applications for the benefit of the Norwegian health care services and aquaculture industry.
- › Increase industry competence and ensure access to the newest technology in the field

The programme for functional genomics research, covers research into genomes, genes and genetic products.



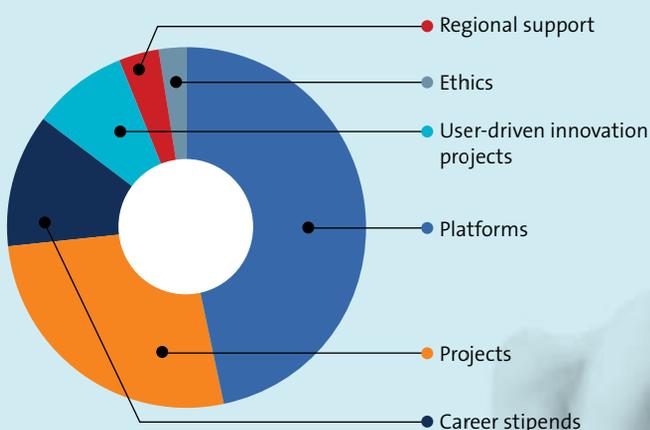


## Research results

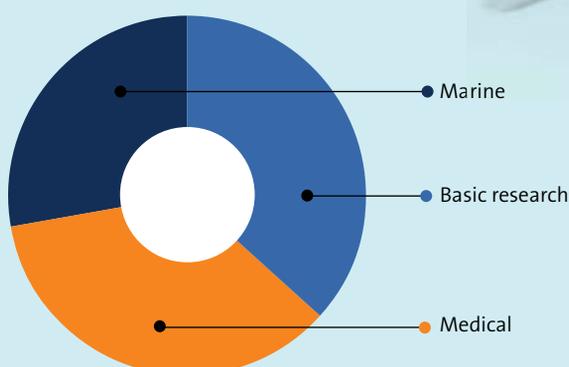
Results from research and innovation have given us:

- > A better understanding of the causes of a range of diseases
- > Faster and more precise disease diagnosis
- > Medicines and vaccines against diseases that affect farmed salmon, humans and animals
- > Healthier and more robust crops that, for example, require less pesticide use.
- > Defences against potential disease epidemics
- > Improved monitoring of environmentally hazardous substances in nature and in foodstuffs, and a greater understanding of how these substances affect living organisms
- > A better understanding of the interplay between heredity and environment
- > A better understanding of the ethical and social challenges associated with biotechnology
- > A growing biotechnology industry

### Grant allocations by project type:



### Grant allocations by thematic research area:



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The **FUGE** programme is one of the Research Council of Norway's seven Large-scale Programmes. The Large-scale Programme initiative was established to promote strategic, long-term knowledge development and innovation within areas of national priority.

The **FUGE** programme has established national technology platforms to ensure that individual researchers and companies have access to high calibre technology and competence. The nine platforms cover the following areas:

- > Bioinformatics
- > Proteomics
- > Molecular imaging
- > Microarray technology
- > Human biobanks
- > Structural biology
- > Genome analysis and sequencing
- > Transgenic technology with zebra fish as model organism
- > Genetic research on salmon and cod

The **FUGE** programme allocates funding to research, industry and technology platforms in open competition based on assessment of scientific merit. An action plan has been drawn up to provide direction to activities carried out under the programme.

Thematic priority areas under the programme comprise basic biological research, marine research and medical research:

**Basic biological research:** The objective is to strengthen basic research that increases understanding of biological systems.

**Medical research:** The objective is for Norwegian health care services

to quickly exploit new knowledge and methods from biotechnological research and innovation.

**Marine research:** The goal is high quality genetic research on strategically important species and the further development of Norwegian aquaculture.

The **FUGE** programme allocates ten percent of its budget for industrial development. Industry is encouraged to make use of the national technology platforms.

The **FUGE** programme intends to allocate five per cent of its budget to research on ethical, legal and social problems related to biotechnology. FUGE works closely with the ethics programme under the Research Council.

The **FUGE** programme takes active part in, and seeks to contribute to, increased international cooperation within its field. The programme participates in two European networks within plant genomics and systems biology. It is also involved in R&D cooperation with North America in aquaculture.

The **FUGE** programme promotes transparency, receptiveness and communication. The programme relays news, research findings and general information via its webpages as well as a newsletter. News articles are circulated by e-mail, through press releases and in reports. The programme provides support to organised events and other measures for disseminating knowledge to the general public, children and young people.





## Challenges

### **Improved human health**

Norway has one of the world's largest human biobanks, a well documented population and good health registers. This combination gives Norway a unique opportunity to research the causes of certain diseases, which in turn, in the long-term, may lead to the development of medication to treat these diseases. To promote more rapid advancement in this area, the FUGE programme has established a separate technology platform and will work closely with the regional health authorities and hospitals to encourage increased research and innovation.

### **Innovation and industrial development**

It is vital that research results are exploited and utilised to produce necessary and useful products. This requires a significant degree of interaction between research institutions and trade and industry – which is not always easy to achieve. The FUGE programme will encourage greater collaboration through conferences and network building.

### **Improved animal welfare**

Norwegian red cattle are a popular export item, as are the Norwegian pig and farmed salmon. Biotechnology is an important component of these industries, as biotechnology research and applications provide insight into the reactions of breeding animals to stress and fodder. Minimising stress and optimising fodder quality will give the animals a better life and provide humans with better quality food.

### **Ethics**

Biotechnology provides humans with many new opportunities that were not available in the past. For example, we can find out what diseases will affect us in the future; we can alter the genetics of plants and animals; and we can discard fertilised eggs that are diseased. However, with these opportunities come complex choices and new ethical dilemmas we have not had to address before. The fact that we are able to do something technologically does not necessarily mean that we would want to, or should do it from an ethical perspective.

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