



Omic sciences in Catalonia

May 2018

Technology Snapshot

ACCIÓ



**Generalitat
de Catalunya**

Strategy & Competitive Intelligence

Omic sciences in Catalonia: Technology Snapshot

ACCIÓ
Government of Catalonia



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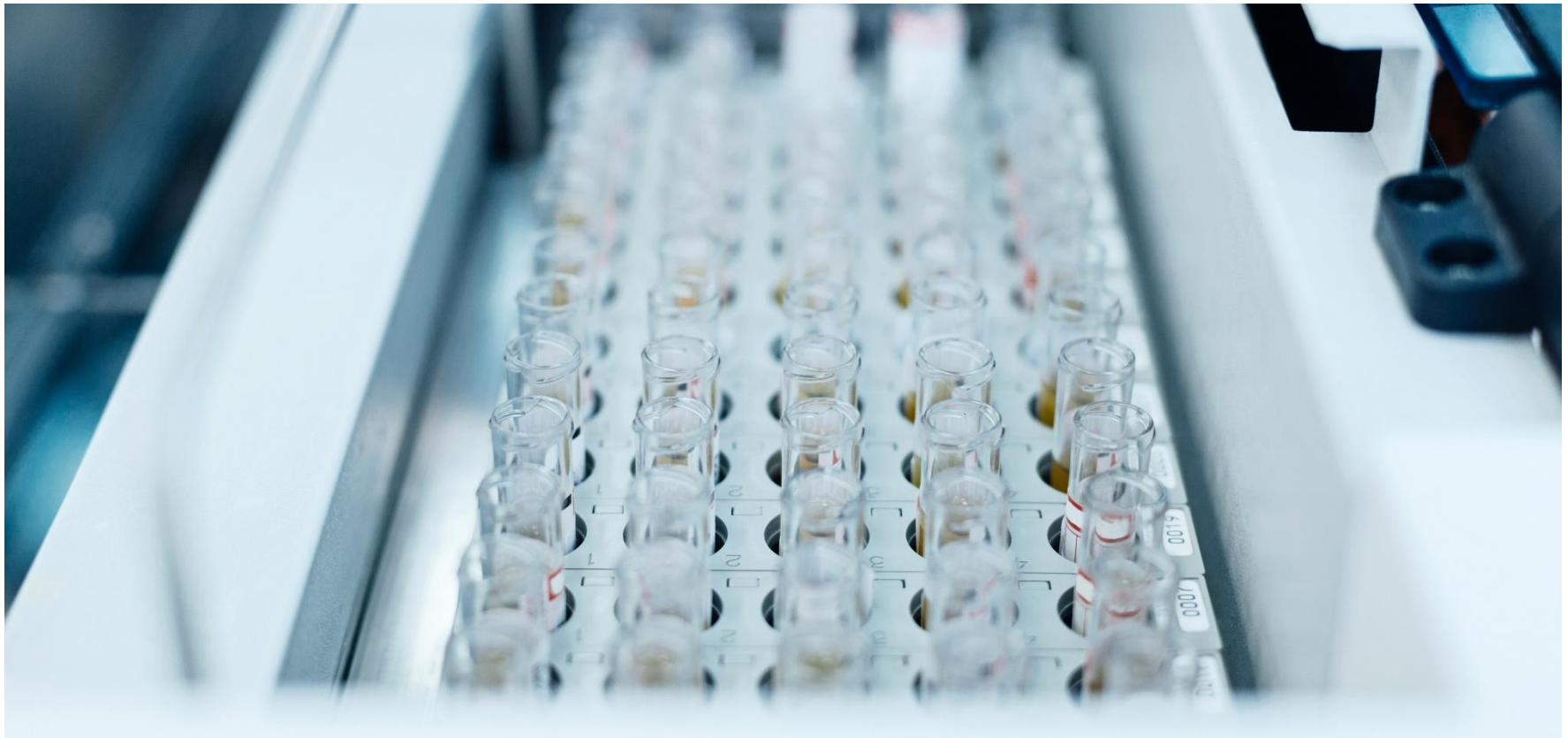
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1. Definition of Omic Sciences and their Importance to Industry



Definition of Omic Sciences

What are they?

Omic sciences are a set of **disciplines related to biochemistry and molecular biology** through which in-depth knowledge can be achieved, in analytical terms, of the features and global content of a biological sample.

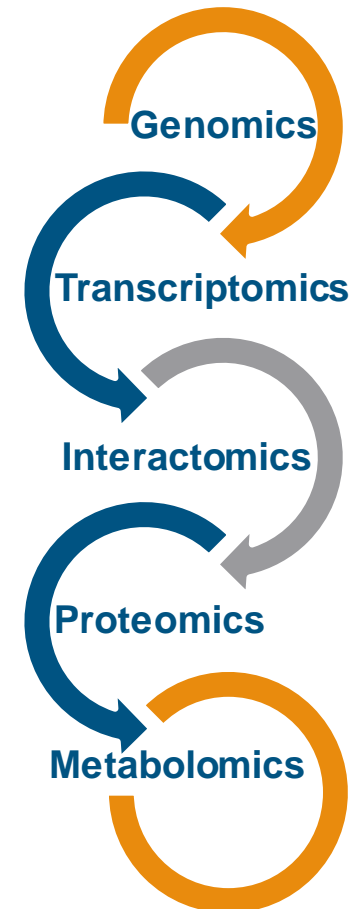
What are they based on?

Omic disciplines focus on the study of a specific kind of biomolecules; so, for example, genomics analyses genes or genomes, while proteomics focuses on the identification and quantification of all proteins and peptides.

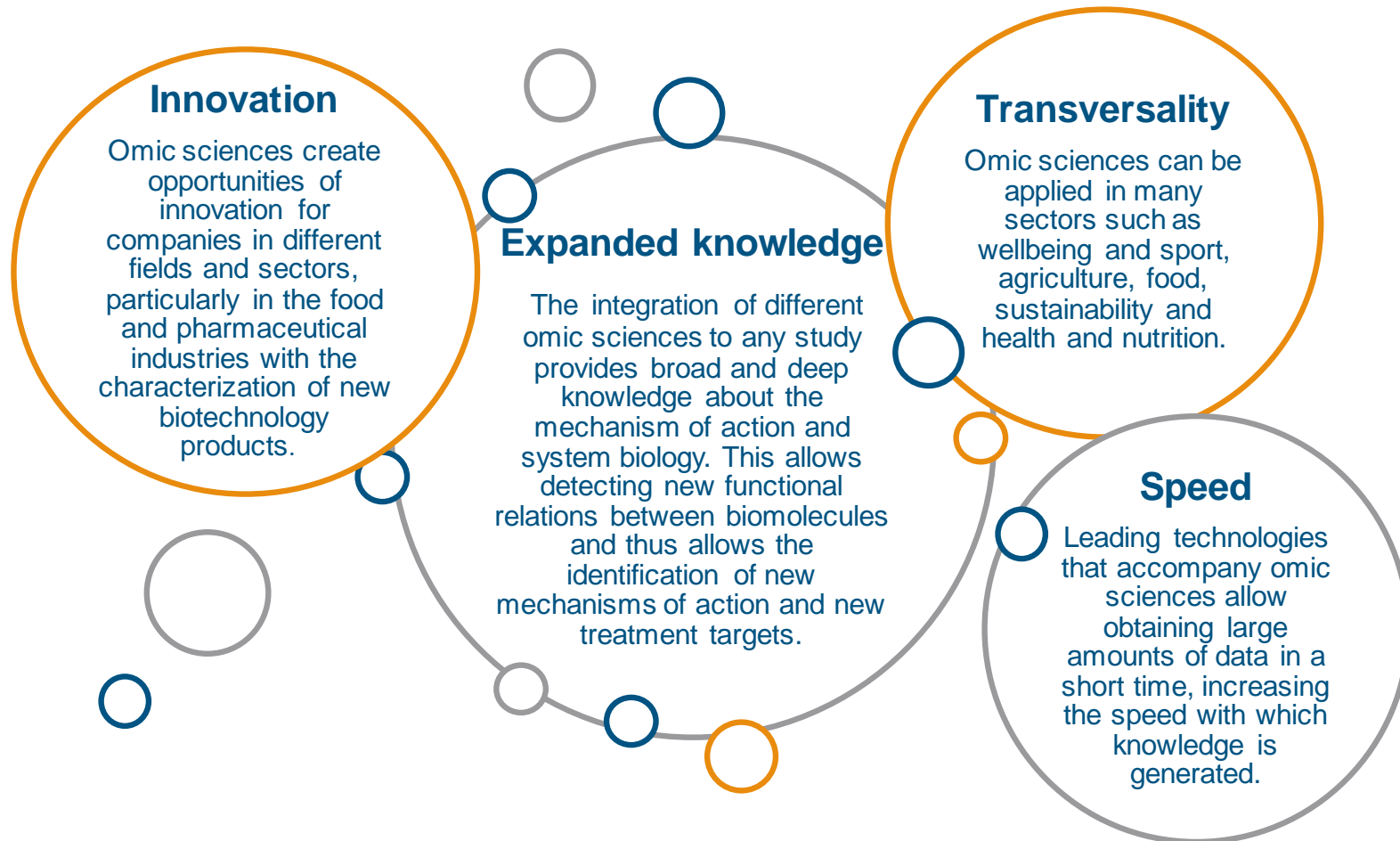
The joint processing of this information provides an integrated view of the biology of the sample, as well as of the biochemical processes that take place within it as well as allowing identifying the involvement of the different molecules, incorporating the data of each of the different layers of information.

How important are they?

Omic sciences provide major advances in the basic understanding of biological issues. They also represent a huge development in the field of the analysis of cell functionality and their biotechnological applications, and also become a key tool for innovation in sectors where products or substances of biological origin play an important role, such as the food industry, the environment, health and biotechnology research.



Importance of Omic Sciences to Industry



2. Omic Sciences Worldwide



Global Leaders in Omic Sciences: Key Players



World Omic Sciences Market

GENOMICS

In 2016, the world market was valued at approximately \$13,450 M, with an expected annual growth rate of 10.2% to reach \$23,880 M. in 2022.

The growth of this market is attributed to factors such as:

- Increased personalized treatments.
- Increased public and private investment.
- Increasing applicability of genomics in the field of diagnostics.

In the European context, in 2015, **Next-Generation Sequencing (NGS)** services had a market of \$444M and it is expected to reach \$1,152M in 2020. It is one of the techniques of preference with regard to sequencing due to its speed and efficiency in relation to cost.



- Application of genomics in the discovery of new drugs
- Collaboration between companies, research centres and universities
- Increase in the prevention of hereditary diseases
- Increase in the prevalence of cancer

TRANSCRIPTOMICS

Regarding transcriptomics, in 2013 it had a market valued at \$1,743.2 M. With a view to 2019, an annual growth rate of 13.7% is foreseen, reaching a figure of \$3,773 M by 2019.

The main factors to explain this forecast are:

- Technological progress in the field of omics and the application of sequencing technologies and RNA analysis.
- Increased public and private investment. The formation of biotech companies.
- The application of RNA analysis in the search for biomarkers (personalized medicine).

Source: Markets and Markets

World Omic Sciences Market

PROTEOMICS

The expected growth for the proteomics market between 2016 and 2021 is 11.7% per annum, expected to reach a figure of \$21,870M by 2021. The main factors that favour this forecast are:

- The increase in personalized treatments.
- The applicability of proteomics in the field of diagnostics and the discovery of new drugs.

METABOLOMICS

The forecast annual market growth rate for the same period is 14.6%, reaching \$2,390 M in 2021.

This market's potentiality is strengthened by:

- The need for more accurate diagnoses.
- The demand for personalized medicine and treatment.
- Technological progress and the promotion of biotechnological research by private companies and public bodies.



Limitations to the growth of the markets

High equipment costs + Lack of specialized researchers

Source: Markets and Markets

3. Omic Sciences in Catalonia



Omic Sciences in Catalonia: Main Mapping Conclusions

Omic sciences in Catalonia



24 companies

€80M turnover related to omic sciences

1,160 employees

Companies in the process of internationalization

12.5% of companies have subsidiaries abroad

37.5% of companies export

95.8% are SMEs

1 in 3 companies (33%) have a turnover over €500,000

It is an emerging sector: 46% of companies are under 5 years of age

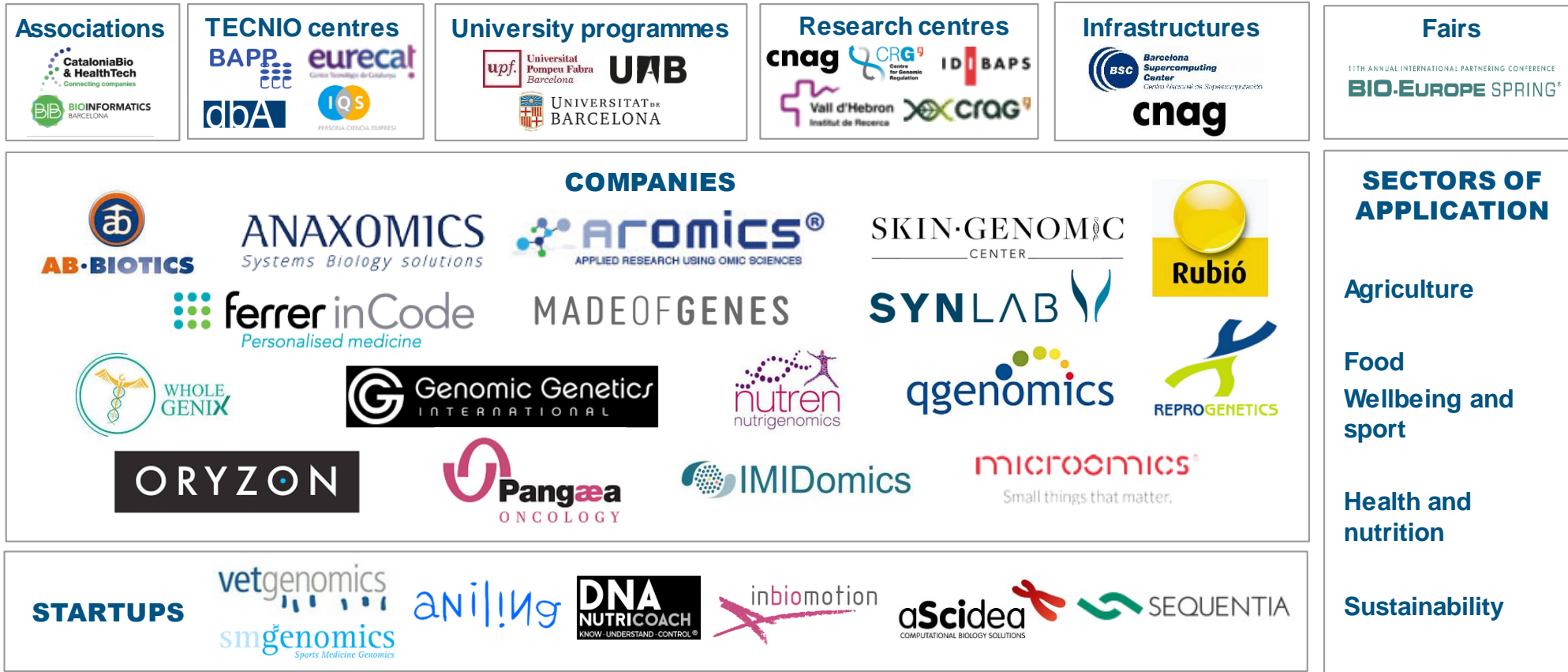
Main specializations (according to the number of companies):

1. Genetic tests (42%)
2. Genomics (25%)
3. Bioinformatics (13%)

Source: authors' own following Orbis, ACCIÓ, Eurecat and *Barcelona and Catalonia Start-up Hub* Directories.

Ecosystem and agents map of Omic Sciences in Catalonia

Partial illustrational table



Note: The use of these brands is merely for information purposes. The brands mentioned in this report belong to their respective owners and under no circumstances are they the property of ACCIÓ. This is a partial representation for the purpose of illustrating the main companies that belong to the omic sciences ecosystem in Catalonia, but other companies may exist that have not been included in the study.

Source: Authors' own

4. Trends and Applications by Demand Sector



Trends in Omic Sciences

TECHNOLOGICAL IMPROVEMENT

Single-cell omics

Discovery of new cell processes and mechanisms that are masked when the approach is at tissue level.

Dried-fluid spots

Analysis of biomolecules from a single drop of body fluid (blood, urine, saliva, cerebrospinal fluid).

Big-data

Increase in bioinformatic tools for the integrated analysis of data from different omic sciences.

PERSONALIZATION

21st century medicine

Omic sciences allow developing optimized medicine to get early diagnosis and personalized treatment.

Microbiota

The new methods for analysing omic data can generate maps of the microbiota of each individual and their relationship with their health.

Personalized nutrition

The identification of genetic variants and metabolic predisposition allows formulating a diet plan tailored to each person.

PRODUCT DEVELOPMENT

Foodomics

All the information generated in the food sector thanks to omic sciences is applied to improve human and veterinary nutrition. Functional foodstuffs and nutritional supplements are developed.













Pharmacology

The integration of different omic sciences accelerates the discovery of molecular and metabolic mechanisms associated with diseases, increasing the possibility of detecting treatment targets and generating new drugs.

Applications by Demand Sector

Sector	Application				
<p>Health and nutrition</p>	 <p>Discovery of new drugs</p>	 <p>Detection of predispositions to diseases</p>	 <p>Personalization of treatments</p>	 <p>Discovery of new biomarkers</p>	 <p>Diagnosis</p>
<p>Wellbeing and sport</p>	 <p>Microbiota studies</p>	 <p>Personalized diets</p>	 <p>Intolerances</p>	 <p>Functional foods</p>	 <p>Detection of banned substances</p>
		 <p>Enhanced performance</p>	 <p>Cosmetics</p>		

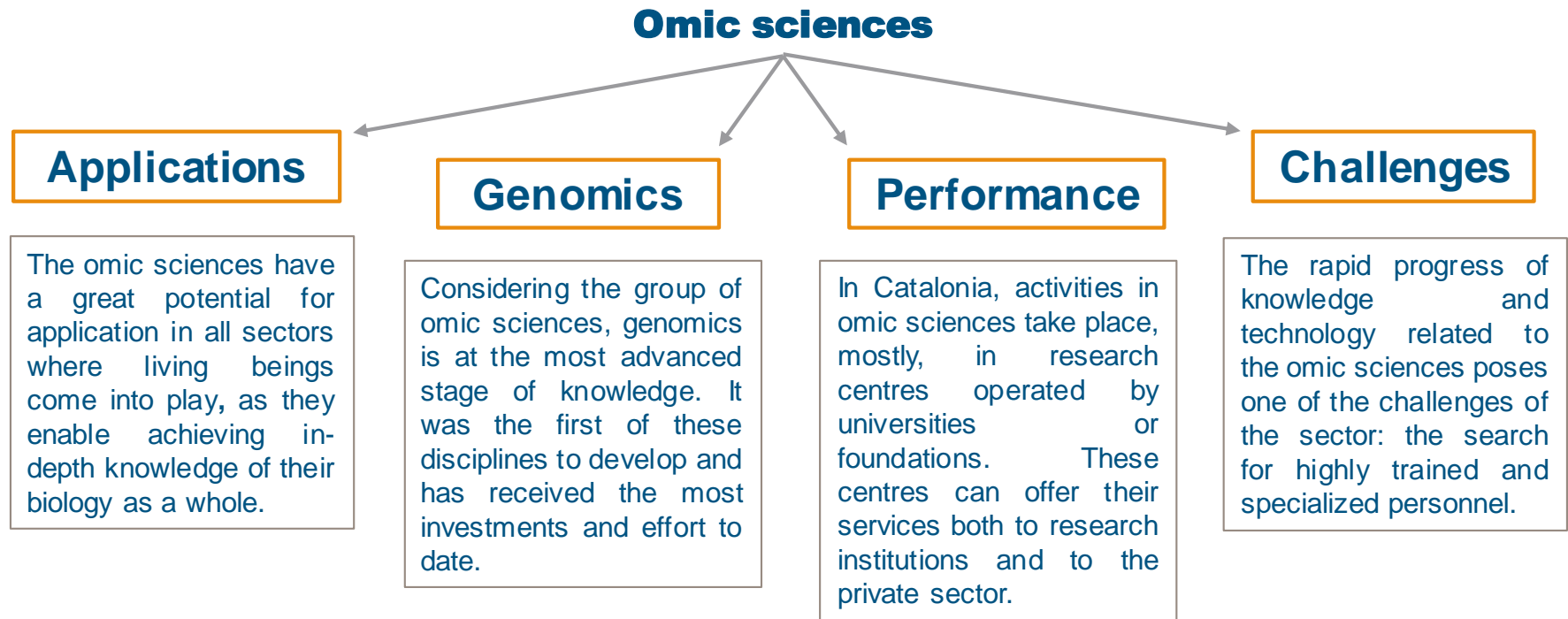
Applications by Demand Sector

Sector	Application					
<p>Sustainability</p>	 <p>Bioleaching processes</p>	 <p>Species identification</p>	 <p>Soil detoxification</p>	 <p>Monitoring and management of wild populations</p>	 <p>Wastewater treatment</p>	 <p>Biofuels</p>
<p>Agriculture</p>	 <p>Selection of varieties</p>	 <p>Pharmacology</p>	 <p>Transgenic crops</p>	 <p>Veterinary</p>	 <p>Animal health and welfare</p>	 <p>Alternatives to pesticides and fertilizers</p>
<p>Food</p>	 <p>Food safety</p>  <p>Fraud control</p>  <p>Toxicology</p>					

5. Conclusions



Conclusions





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Passeig de Gràcia, 129
08008 Barcelona
www.accio.gencat.cat
www.catalonia.com
@accio_cat
@catalonia_ti

See the full report here:

<http://catalonia.com/innovate-in-catalonia/rd-in-catalonia/technological-snapshot.jsp>



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