2.9. Biosciences

Recent advances in biosciences can help achieve a wide range of economic and social objectives, improving health, the environment, and industrial, agricultural and energy production. Core scientific articles identify the most influential contributions to research. Citations to core articles in biosciences provide a measure of research activity in this field.

Bioscience covers a wide variety of scientific fields. Among them, four are increasingly multidisciplinary: brain research, genomics, regenerative medicine and plant science research.

Research activities show a clear orientation towards biosciences in a minority of OECD countries. Eight report a share of citations above the world average in brain research, genomics or regenerative medicine and eleven in plant science research.

The United States and Switzerland have the largest relative share in all four research areas. The United Kingdom ranks third in brain research and genomics, the Netherlands in regenerative medicine, and Denmark in plant science research.

In China, Italy, Japan and Spain the share of citations to biosciences is below the world average in all four areas.

Research in biosciences

Clusters of articles with similar research subjects were identified via co-citation analysis. Cocitation is a form of citation in which a set of articles is simultaneously cited by other articles. A total of 64 958 highly cited articles, i.e. the top 1% of cited articles in the database from 2001 to 2006, were clustered on the basis of co-citation relationship. The co-citation analysis identifies four areas of biosciences in which there has been active research in recent years: brain research, genomics, regenerative medicine and plant science research.

Brain research has a long history and is particularly active these days, with diverse research methods. A typical example of brain research is functional neuro-imaging, which measures different aspects of brain function.

Genomics refers to the study of the genomes of organisms. Intense efforts are made to determine the entire DNA sequence of organisms and to carry out genetic mapping at a fine scale. Genomics is developing stronger ties with fields such as chemistry, physics, computer science, mathematics and clinical medicine.

Regenerative medicine using stem cells is attracting attention in a broad research community. Research activities in this area are expected to progress in directions beyond regenerative medicine, such as the development of new pharmaceuticals.

Plant science research is opening up new possibilities through its convergence with traditional sciences, such as agronomics, and new research fields, such as biosciences.

Source

OECD calculations, based on Scopus Custom Data, Elsevier, July 2009.

Going further

Igami, M. and A. Saka (2007), "Capturing the Evolving Nature of Science, the Development of New Scientific Indicators and the Mapping of Science", OECD Science, Technology and Industry Working Papers 2007/1, OECD, Paris, www.oecd.org/sti/working-papers.

Figure notes

The average annual growth rate of the number of citations to core articles is based on the year of publication of the citing articles.

Calculation of a country's share is based on the address of the institution to which the authors belong, and fractional counts.

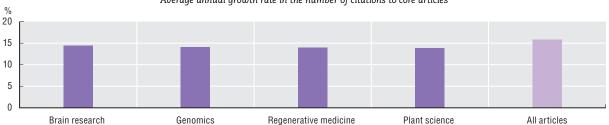
Only countries with a share of core articles over 1% are included.

A country's relative share in core articles is calculated by dividing the country's share in core articles by the country's share in all articles in all scientific fields.

2.9. Biosciences

Trends in core articles in biosciences, 2002-07

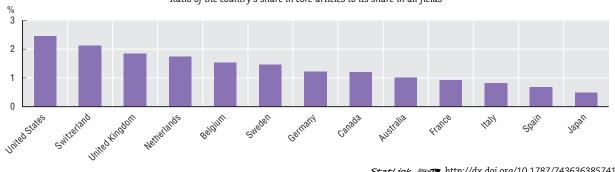
Average annual growth rate in the number of citations to core articles



StatLink http://dx.doi.org/10.1787/743610808633

Countries' relative share in core articles in genomics, 2001-06

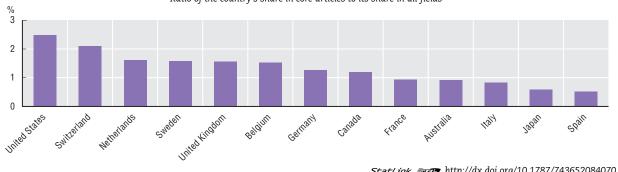
Ratio of the country's share in core articles to its share in all fields



StatLink http://dx.doi.org/10.1787/743636385741

Countries' relative share in core articles in regenerative medicine, 2001-06

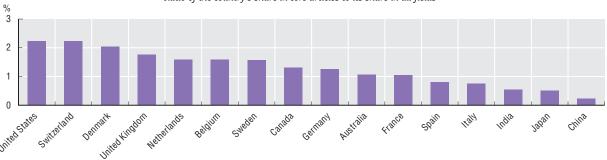
Ratio of the country's share in core articles to its share in all fields



StatLink http://dx.doi.org/10.1787/743652084070

Countries' relative share in core articles in plant science research, 2001-06

Ratio of the country's share in core articles to its share in all fields



StatLink http://dx.doi.org/10.1787/743661146214



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