

## QS World University Rankings by Subject: Life Sciences Explained

### Description

***Martin Ince takes a look at some of the cutting-edge research that is recognised in the latest batch of QS World University Rankings<sup>®</sup> by Subject***

In this cluster of [QS's World University Rankings<sup>®</sup> by Subject](#), we examine three core areas of the life sciences: medicine, the biological sciences, and psychology. These subjects are among the most competitive fields of academic life. They are marked by a ruthless publish-or-perish culture, by big funding from governments, charities and the private sector, and by significant public attention. Graduates in them are among the least likely in the world to be unemployed.

The most tightly-defined of these three areas is psychology. This science has been revolutionized in recent years by brain scanning, which finally allows researchers to see what is happening where in the brain. At the same time, population aging has meant increased attention for psychology because of the growth in age-related degenerative brain conditions such as Alzheimer's and Parkinson's diseases. So psychology is becoming more of a hard science, and less of a social study. It also means big money, which explains why the well-resourced universities of the UK and the US dominate this table.

Harvard is the clear winner here, overall and for academic esteem (worth 50% of our total score), and is beaten only by Cambridge in employer opinion. The top institution for citations, the University of California at Irvine, appears overall in our 101-150 band, with low scores in the two other criteria. While psychology can be studied as a major at Irvine, it is mainly a research and postgraduate subject there.

By contrast to psychology, the biological sciences cover a wide range of topics from ecology, botany and zoology to non-human genetics. Climate change and growing human populations have added to their importance. Agriculture, which is highly concentrated in specialist institutions, is not included in this grouping.

Here too we see the big names of the US East and West coast – Harvard, MIT, Stanford, Caltech and California – dominating the field along with Oxford and Cambridge. Harvard is the employers' favourite in this table, while our academic reviewers prefer Cambridge. The most-cited institution, Arizona State, owes its position to some key papers on techniques for editing DNA sequences which are cited in almost all publications in this area. But we have capped the influence of these outlier papers on a university's overall ranking. This decision also affects Tokyo Metropolitan University, where one of the scientists involved in this work is now based.

Because medicine is a massive area of academic life, our threshold for institutions appearing here is 170 papers listed over five years in the Scopus database, compared to 150 for biological sciences and 50 for psychology.

While all the universities we list train medical professionals, not all have a medical school. An example is MIT, number three in this ranking, which collaborates with Harvard on medical education. Its highly

productive medical researchers are the most cited in the world.

In recent years, advances in science and technology have combined to push biomedical research into new territory. Genomics is finally confirming how complex the relation between genes and human development really is. Biotechnology is enhancing our ability to develop a wide range of cells from simple stem cells. Scanning technologies are letting us see the detailed working of the human body directly for the first time.

As a result, today's best-regarded medical research is not connected to solving a specific disease, but instead tends to be theoretical and of broad application. An analysis of the most cited 20 papers from joint authors at MIT and Harvard over the past five years shows that they were mainly published in general-appeal science journals (nine in Nature, five in Cell, three in Nature and Cell spinoff journals and three elsewhere). One was about diabetes, five about cancer and one about human embryonic development. But five were about stem cells, seven were about genomics and one on nanotechnology. These are all subjects of general application unconnected to specific conditions. The emphasis on stem cells also shows the futility of the Bush administration's attempts to ban the use of federal money for work on human embryonic stem cells. Two of the papers are specifically about work on these cells and one is directly about ways of avoiding their use. It now turns out that embryos are not needed as sources of stem cells, a discovery which Bush's doomed attempt to censor research in this area may well have encouraged.

Despite the success of the UK and the US in the life sciences, smaller nations also regard biomedicine as a national priority. 31 nations have at least one university in the top 200 for these three subject areas.

These subjects are important to countries around the world because every nation needs a supply of doctors and other medical professionals. Demand for them is growing as populations age and as people expect to be healthier for longer.

But biomedical research is also big business. The pharmaceutical industry feeds off academic discoveries and on the flow of talented graduates coming from universities. Many less affluent nations hope that advances in biotechnology and nanotechnology will allow them to imitate this success without the immense expenditure that has gone into the UK and US biomedical sectors. India, Singapore and other nations with high-quality healthcare already bring in significant amounts of foreign exchange from medical tourism as people from overseas travel there for operations, a business which is highly dependent upon the best people and equipment. The appearance of the National University of Singapore in 18th place proves that Singapore's policy of being a top life sciences nation is working. It is the top Asian university here, two places ahead of Tokyo.

However, the long-established medical leaders in the rich world will not give up their positions easily. The UK government has tempted Nobel laureate Sir Paul Nurse back from running Rockefeller University in New York to launch the UK Centre for Medical Research and Innovation, a 1500-person campus in central London involving government, charities and universities. It is one of the few public projects in the UK to have survived the government's vigorous campaign of public expenditure cuts untouched.