Trends in the biotech literature

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The US remains the most productive country in terms of biotech-related papers, with MIT and Harvard the leading universities. But numbers of papers from the EU surpassed the US last year (with Germany and the UK ahead of most EU countries); elsewhere, Korea, China and Japan also publish frequently. Overall, the number of biotech papers in NCBI's PubMed has more than doubled in the past decade (1,890 in 1994; 5,913 in 2004). Research in fields such as RNAi and proteomics appears particularly fertile.

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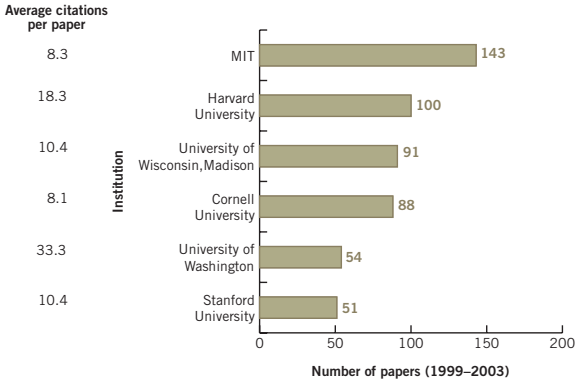
US universities publishing biotech

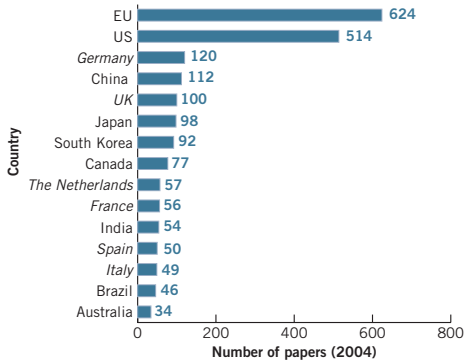
In the US, MIT and Harvard publish most of the highly-cited biotech papers.



Source: In-Cites, University Science Indicators

Number of biotech journal articles by country

Papers originating from EU countries surpassed the US in 2004.



Source: PubMed search for papers containing term 'biotechnology'

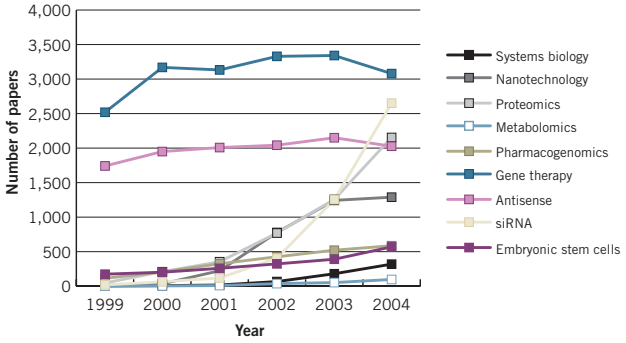
Top cited paper by field

Field	Author	Title	Citation	Times cited
RNAi	Kamath, R.S. *et al.*	Systematic functional analysis of the *Caenorhabditis elegans* genome using RNAi.	*Nature* **421**, 231–237 (2003)	294
Gene therapy	Hacein- Bey-Abina, S. *et al.*	LMO2-associated clonal T cell proliferation in two patients after gene therapy for SCID-X2.	*Science* **302**, 415--419 (2003)	155
ES cells	Chambers, I. *et al*	Functional expression cloning of Nanog, a pluripotency sustaining factor in embryonic stem cells.	*Cell* **113**, 643–655 (2003)	108
Fluorescence imaging	Wu, X.Y. *et al.*	Immunofluorescent labeling of cancer marker *Her2* and other cellular targets with semiconductor quantum dots.	*Nat. Biotechnol.* **21**, 41–46 (2003)	101
Proteomics	Foster, L.J. *et al*	Unbiased quantitative proteomics of lipid rafts reveals high specificity for signaling factors.	*PNAS* **100**, 5813--5818 (2003)	81
Nuclear transfer	Hubner, K. *et al.*	Derivation of oocytes from mouse embryonic stem cells.	*Science* **300**, 1251–1256 (2003)	78
DNA vaccines	McConkey, S.J. *et al.*	Enhanced T-cell immunogenicity of plasmid DNA vaccines boosted by recombinant modified vaccinia virus Ankara in humans.	*Nat. Med.* **9**, 33–39 (2003)	67
Biosensors	Looger, L.L. *et al.*	Computational design of receptor and sensor proteins with novel functions.	*Nature* **423**, 185–190 (2003)	66
Environmental biotechnology	Methe, B.A. *et al.*	Genome of *Geobacter sulfurreducens*: metal reduction in subsurface environments.	*Science* **302**, 1967–1969 (2003)	29
Plant biotechnology	Shi, H.Z. *et al.*	Overexpression of a plasma membrane Na+/H+ antiporter gene improves salt tolerance in *Arabidopsis thaliana*.	*Nat. Biotechnol.* **21**, 81–85 (2003)	27

Source: ISI Web of Knowledge, as of March 8

Historical trends in biotech fields

RNAi, proteomics and nanotech have seen explosive growth recently.



Source: Data from NCBI's PubMed using fields (e.g., proteomics) as search term

Biotech journal impact

Primary research journal	Impact factor
Nature Biotechnology	17.7
Genome Research	9.6
Molecular and Cellular Proteomics	8.3
Bioinformatics	6.7
Molecular Therapy	6.1
Pharmacogenetics	5.9
Stem Cells	5.8
Gene Therapy	5.3
Human Gene Therapy	5.0
Review journal	
Nature Reviews Drug Discovery	17.7
Annual Review of Biomedical Engineering	7.9
Trends in Biotechnology	7.5
Current Opinion in Biotechnology	6.9

Source: ISI categories Biotechnology & Applied Microbiology; Engineering, Biomedical