

Quests for scientific excellence: China, S Korea, India

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Sources

- Forums in China
- Nature and Nature journals' statistics
- Visits by me and colleagues
- Feedback
- Articles in publications (Nature, Science, SciDev.Net..)

Quasi-evidence-based! This informal and partly subjective talk is no substitute for a formal survey.

South Korea – some highlights

- Stem cells – recovery in progress
- Seoul National University, Korea
Advanced Institute of Science and Technology and Pohang University notably active in materials chemistry, nanomaterials, spintronics and information storage materials.
- Share of science publications increased 0.8% to 2.7% from 1995-2004

India – some highlights

- National Centre Biological Sciences, Bangalore;
 - National Centre for Plant Genome Research, Delhi
 - Centre for Cell and Molecular Biology, Hyderabad,
 - National Centre for Cell Sciences, Pune
 - Indian Institute of Science, Bangalore
 - Indian Centre for Genetic Engineering and Biotechnology Delhi
 - All India Institute of Medical Sciences, Delhi
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- 23 Wellcome Trust fellows
 - Vibrant biotechnology and pharmaceutical sectors (eg Nature survey 28 July 2005)
 - Papers in ISI Thomson database grew from 12,500 to 15,600 from 1999-2003
 - India ranks highest in citations and publications per GDP per capita

China – some highlights

- China's share of the scientific literature climbed from 2.1% to 6.5% from 1995-2004
- Growth in PNAS, PRL, JACS, plateau in Science and Nature, small growth in Cell
- Increasing flux of high-level returnees from US, funds to CAS and MOST
- Increasing attention to misconduct and ethics in research
- Improved peer review in NNSFC

Nature journal submissions 2003-6

- China's annual submissions to *Nature* climbed 638-944 (48%)
- China's submissions to seven Nature biology journals climbed 253-484 (91%), *N Materials* 69-221 (220%)
- India's submissions to *Nature* climbed 267-338 (22%)
- India's submissions to seven Nature biology journals climbed 105-171(63%), *NMat* 20-62 (210%)
- S Korea's submissions to *Nature* climbed 152-170 (12%)
- S Korea's submissions to seven Nature biology journals climbed 128-245 (91%), *NMat* 32-113 (253%)

Acceptance rates 2003-6

Nature average

- Japan 4%
- S Korea 2%
- China 1%
- India 0+%

Nature bio (NMat) av.

- Japan 5% (6%)
- S Korea 4% (4%)
- China 1% (1%)
- India 2% (2%)

National research commitment

- Funding stability
- Low bureaucratic burdens
- High and enforced ethical standards
- Strong IP framework

National research culture

- Is the evaluation system international?
- Is the evaluation system transparent?
- Is the evaluation system unbiased?
- Are institutions well geared to preventing and punishing fraud and plagiarism?
- Are ethical standards high and rigorously applied eg for research on human subjects and on animals?
- Does education breed critical dialogue and creativity?

Local research culture

- Does lab culture breed critical dialogue and creativity?
- Does lab culture breed high ethical standards?
- Do researchers have to leave the lab if they don't deliver?
- Chinese researchers, both in US and in China, have pointed to the need to develop on local and national fronts.
- Indian researchers have highlighted a need for 'irreverent environment' and sanctions against low productivity

Why Asia can prosper in stem cells

- Ethical standards are becoming more rigorous (in India, China and S Korea)
- Different ethical values allows types of research countries that are not permitted in US or some parts of Europe
- China and S Korea have 'research factory' strength: obtaining appropriate conditions and results requires very laborious work; scientists are willing to dedicate themselves to narrow aspects of the process.
- Stem cell research is still in its infancy, and at a phenomenological stage.

Incentives: bonuses

- Institutes in China and S Korea pay bonuses for publications in high-impact journals, \$000 - \$0000.
- Dangers: incentive for hype or even misconduct.
- Advantages: is an up-front incentive to be ambitious. (Also, the financial incentives are usually small compared to the benefits a high-impact publication will bring.)
- Nevertheless, this doubles the need to ensure good research practice.

Beware 'Can do' culture

- Top-down pressures and emphasis on short-term gains breeds a culture of insufficient experimental care.
- Will the task of developing ethical standards and frameworks (eg institutional committees) be hindered by these pressures?
- If culture does not encourage creativity and independent thinking, strong investment will lead to plentiful science that can support applications and skills but does not lead the world in the delivery of new insights.

Responsibilities of co-authorship

- Hwang, Schön cases unlikely to have arisen with due co-author scrutiny
- Foreign co-authors can help resist national pressures on researchers to deliver at unacceptable cost
- Dangers of part-time lab colleagues who are in fact full-time in another country – exploitation of junior researchers, inadequate attention to research, inadequate development of labs
- Collaborations, expressed in co-authorship, should genuinely support the development of science, scientific integrity, and contributions to the scientific literature by all collaborators.