Stem Cells and the New “Age of Discovery”

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AUTM Central Regional Meeting
Minneapolis, Minnesota
July 23, 2006

Christopher Columbus in the Sargasso Sea, 2003

He says his name is Venter

Bioscience: The New Maps

Foster et. al.
PCell Biology,
April 2005

Human Embryonic Stem Cell Research Policy

Global Stem Cell Research Centers

Countries in brown represent 3.8 billion people. Those in light brown allow research on IVF donations. Those in dark brown also allow nuclear transfer / research cloning. All have banned human reproductive cloning.

Global clustering of stem cell research centers and institutes. The United Kingdom, Singapore, South Korea and China are investing heavily in the embryonic stem cell field.
Global Bioscience Clusters

EMBO reports, Science & Society, February 2006

The World is Spiky: Population

Map by Tim Golden, University of Maryland
With permission.

The World is Spiky: Light Emissions

Map by Tim Golden, University of Maryland
With permission.

The World is Spiky: Patents

Map by Tim Golden, University of Maryland
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The World is Spiky: Scientific Citations

Map by Tim Golden, University of Maryland
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Stem Cell Politics on Capitol Hill

Congressman Mark Kirk
10th Congressional District of Illinois
Remain at Forefront of Biomedical Research

- Americans are innovators, explorers, inventors and scientists.
- Since 1790 the United States Patent Office has granted more than 6 million patents.
- Americans invented the light bulb, telegraph, telephone, skyscraper, computer, and space shuttle.

**Federal Stem Cell Research Funding**

<table>
<thead>
<tr>
<th>Country</th>
<th>Million $/yr</th>
<th>hESC research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>20</td>
<td>Most funding</td>
</tr>
<tr>
<td>Canada</td>
<td>30</td>
<td>Most funding</td>
</tr>
<tr>
<td>China</td>
<td>10–15*</td>
<td>Most funding</td>
</tr>
<tr>
<td>France</td>
<td>15</td>
<td>Most funding</td>
</tr>
<tr>
<td>Germany</td>
<td>15</td>
<td>Most funding</td>
</tr>
<tr>
<td>India</td>
<td>2</td>
<td>Most funding</td>
</tr>
<tr>
<td>Israel</td>
<td>15</td>
<td>Most funding</td>
</tr>
<tr>
<td>Japan</td>
<td>10</td>
<td>Most funding</td>
</tr>
<tr>
<td>Singapore</td>
<td>25</td>
<td>Most funding</td>
</tr>
<tr>
<td>South Korea</td>
<td>45 (5000 in 2004)</td>
<td>Most funding</td>
</tr>
<tr>
<td>Sweden</td>
<td>10</td>
<td>Most funding</td>
</tr>
<tr>
<td>Switzerland</td>
<td>5</td>
<td>Most funding</td>
</tr>
<tr>
<td>United States</td>
<td>570</td>
<td>40</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>100</td>
<td>Most funding</td>
</tr>
</tbody>
</table>

Note: These are rough estimates from a variety of sources including UKSCI.
* China’s funding is expected to increase substantially.

An international gap in human ES cell research


Research Cloning: Global Competition

“Where now for stem-cell cloners?”

“Problems with landmark paper may set field back by years.”

Erika Check, Nature, December 22, 2005

Leonardo da Vinci’s *mappamundi*, 1514

An “octant” map, one of the first world maps that used the name “America.”
Leonardo da Vinci
The Fetus in the Womb, 1512