Healing from within: unlocking the body’s capacity for self-repair
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Regenerative Medicine

http://apexbiologix.com

Cells: Microscopic Tissue Engineers

Outline

- Implantable medical devices
- Regenerative medicine
- Rapidly healing cardiovascular devices
IMPLANTABLE MEDICAL DEVICES

Top 10 in US

<table>
<thead>
<tr>
<th>Rank</th>
<th>Device</th>
<th># per year in US</th>
<th>$ per year in US</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Artificial eye lenses</td>
<td>2,582,000</td>
<td>$8-10 billion</td>
</tr>
<tr>
<td>2</td>
<td>Ear tubes</td>
<td>715,000</td>
<td>$1-2 billion</td>
</tr>
<tr>
<td>3</td>
<td>Coronary stents</td>
<td>560,000</td>
<td>$7.5 billion</td>
</tr>
<tr>
<td>4</td>
<td>Artificial knees</td>
<td>543,000</td>
<td>$12 billion</td>
</tr>
<tr>
<td>5</td>
<td>Bone repair hardware</td>
<td>465,000</td>
<td>$4.5 billion</td>
</tr>
<tr>
<td>6</td>
<td>Intra-uterine devices</td>
<td>455,000</td>
<td>$340 million</td>
</tr>
<tr>
<td>7</td>
<td>Spinal fusion hardware</td>
<td>413,000</td>
<td>$10 billion</td>
</tr>
<tr>
<td>8</td>
<td>Breast implants</td>
<td>366,000</td>
<td>$562 million</td>
</tr>
<tr>
<td>9</td>
<td>Cardiac pacemakers</td>
<td>235,567</td>
<td>$4.5 billion</td>
</tr>
<tr>
<td>10</td>
<td>Artificial hips</td>
<td>230,000</td>
<td>$10.5 billion</td>
</tr>
</tbody>
</table>

https://www.businessinsider.com

Cardiac Pacemaker

1960

Today
Coronary Bypass Graft

1955

Today

Lessons from a Splinter

https://www.tips-and-tricks.co

REGENERATIVE MEDICINE
Heart Regeneration

http://news.bbc.co.uk/2h/health/4904914.stm

Early Days

Science. 1993; 260(5110):920-6
Plast Reconstr Surg. 1997; 100(2):297-302

Cells Within Us

- 200 types
- 37 trillion cells
- Stem cells

Skin

Bladder

Cardiovascular Tissues
In Vitro Cell Capture

Rapid Healing in Pig Model

Distal Magnetic

Middle Magnetic

Proximal Non-Magnetic

316L stainless steel (non-magnetic)

2205 stainless steel (magnetic)
Rapid Healing in Pig Model

316L stainless steel (non-magnetic)

2205 stainless steel (magnetic)

Rapidly Healing Vascular Grafts

Non-magnetically cell seeded

Magnetically cell seeded