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**Background**

Biopharmaceuticals are mostly therapeutic recombinant proteins obtained by biotechnological processes. They are derived from biological sources such as organs and tissues, microorganisms, animal fluids, or genetically modified cells and organisms.

**Research and Development**

- Basic Research → Drug Discovery
- Clinical Trials ← Pre-Clinical
- Phase 1, Phase 2, Phase 3 → FDA Review
- Post-Approval Research & Monitoring

Figure 1. The 15 Year process for a medication to be approved by the FDA.

**Opportunity**

Worldwide Revenue of the Pharmaceutical Market:

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>500</td>
</tr>
<tr>
<td>2005</td>
<td>601</td>
</tr>
<tr>
<td>2010</td>
<td>889</td>
</tr>
<tr>
<td>2015</td>
<td>1,073</td>
</tr>
<tr>
<td>2018</td>
<td>1,290</td>
</tr>
<tr>
<td>2021</td>
<td>1,400</td>
</tr>
</tbody>
</table>

Figure 3. As shown in the job market has increased from 2001-2021.

**Education**

Career Profile: Technician

Opportunities at biomedical, biopharmaceutical and biomanufacturing organizations where products such as vaccines, medicines, enzymes and cell cultures are created. Level requirement entry is an Associate Degree.

References:

- Figure 2. BioProcess International.com
- Figure 3. DPS Educationn.com
- aboutbioscience.org
- Science Daily.com
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