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What is Biotechnology(i am trying to keep it very simple)

•Biotechnology is the study and manipulation of living things or their component molecules, cells, tissues, or organs for the benefit of humans (or other animals).

Example -

1Recombinant DNA (rDNA) technology

2Polymerase Chain Reaction (PCR)

3Cloning

4Fermentation

5The creation of

(a)Insulin to treat diabetes

(b)Proteases (enzymes used to remove stains from clothing)

(C)Antibodies (for recognizing and fighting certain diseases

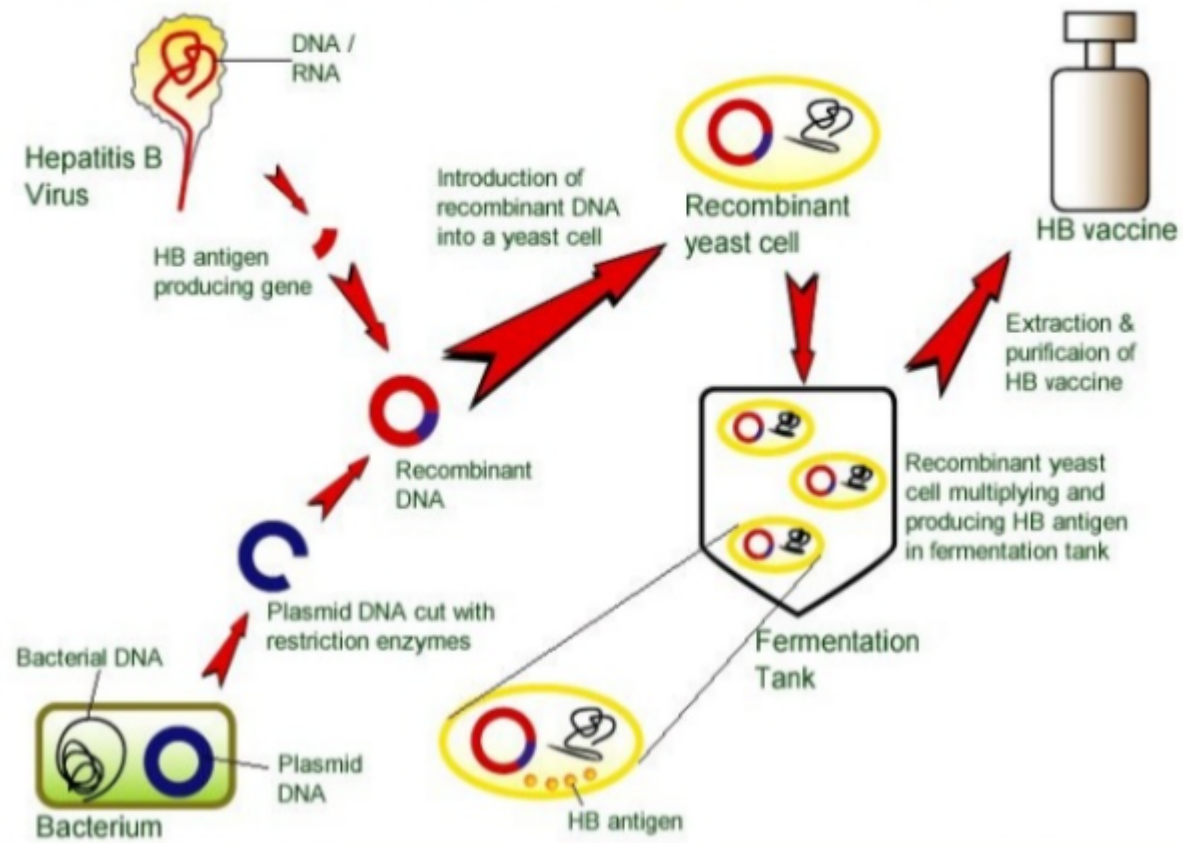
(D)Selective Breeding (dog breeds, flowers, fruits)

(E)Pharmaceutical drugs

•Cellular manipulation products (growing human ears on mice

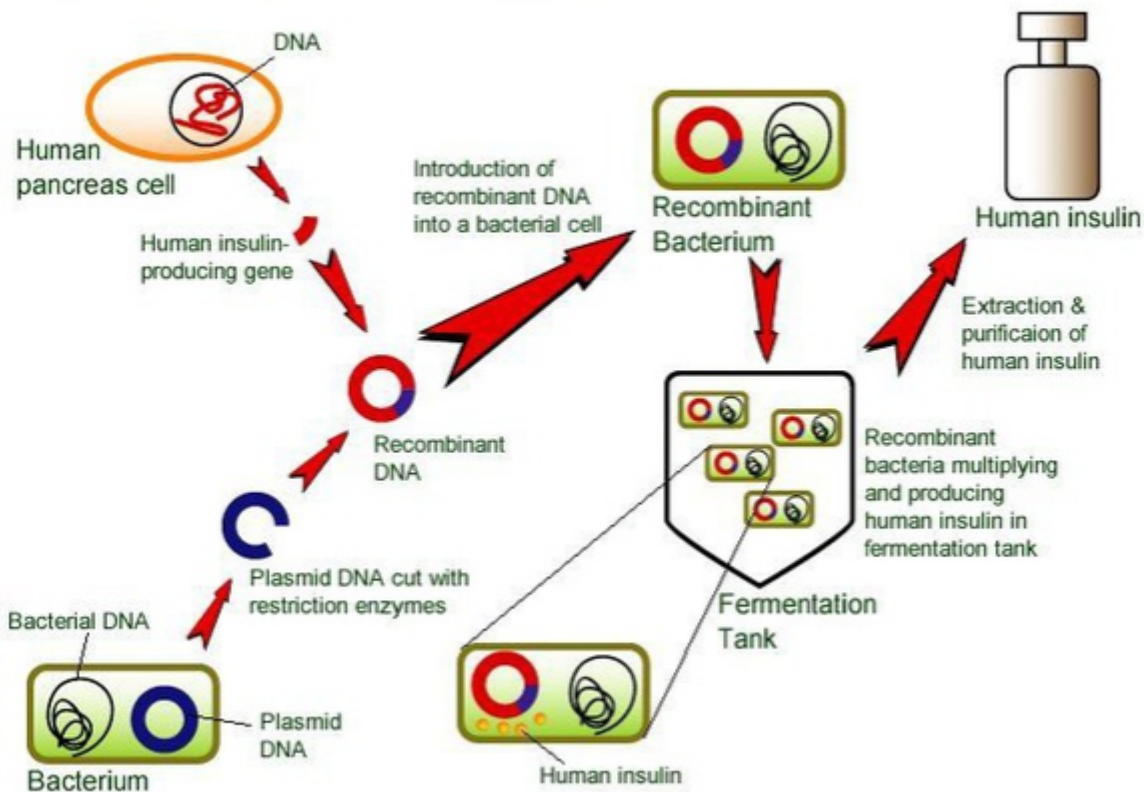
just see how Biotechnology produces Hepatitis B vaccine

Production of Recombinant HB Vaccine



Insulin Production is also a Biotechnology

Human Insulin Production



The biotechnology sector encompasses five segments that cater to different sectors;

- 1-biopharma -
- 2 bio-agriculture
- 3 - bio-service
- 4- bio-industry and
- 5- bioinformatics (or BioIT).

1-Biopharma-Bio-pharma industries are into the production of a multitude of

Therapeutic drugs,

Gene therapy vectors

Monoclonal antibodies

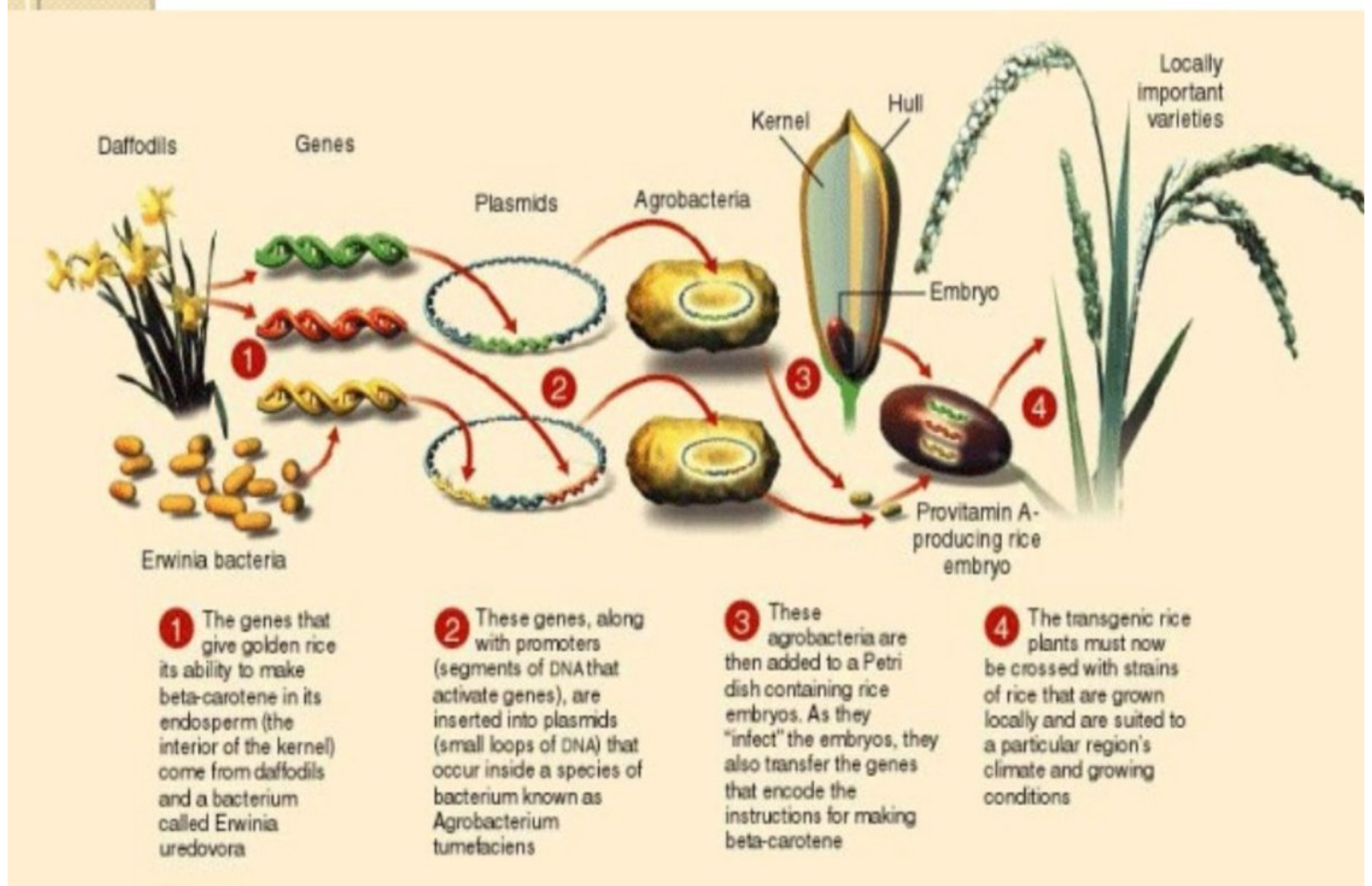
vaccines

fermentation drug like penicillin is example of Biotechnology because here we are using bacterial fermentation to produce it

Similarly Biologic and vaccines, insulin where we are using living organism to for production is a example of Biotechnology

2- Bio agriculture -

GOLDEN RICE TO PROVIDE PRO-VITAMIN



The world's population is increasing rapidly therefore if we don't increase our agricultural produce there will be a time that hunger will overtake the world . The only way we can do this is by the adoption of the methods of agricultural biotechnology.

Agricultural biotechnology, also known as agritech, is an area of agricultural science involving the use of scientific tools and techniques, including genetic engineering, molecular markers, molecular diagnostics, vaccines, and tissue culture,

to modify living organisms: plants, animals, and microorganisms. Crop biotechnology is one aspect of agricultural biotechnology

Aim is to

<https://t.co/QghBKqbPzF> the plant pest resistance

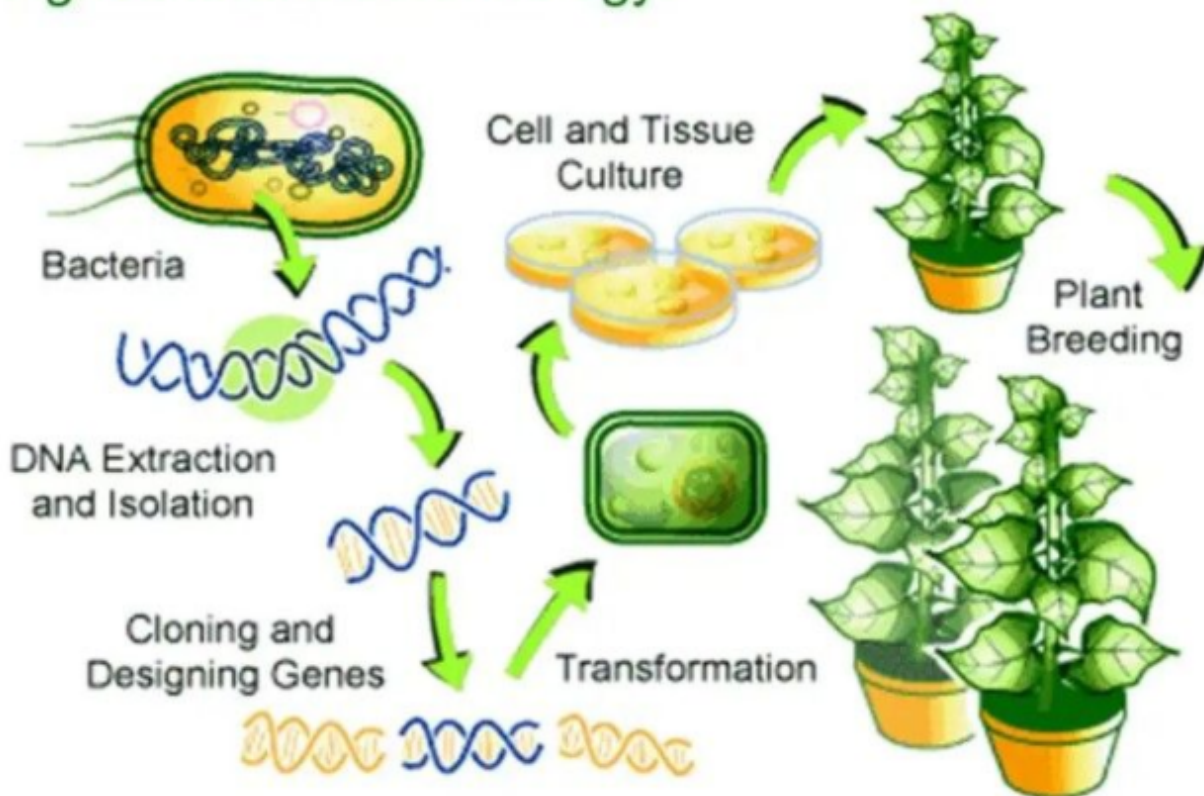
2. Producing foods with a higher protein or vitamin content

3. Developing drugs that can be grown and isolated in plant products

4. Using animals as a source of medically valuable proteins

4. Designs and testing of drugs and genetic therapies

Agricultural Biotechnology:



3-Bio-Services

After Biopharmaceuticals, Bio-services are the second largest sector of the Indian biotech sector, with about 33% market share. The bio services industry includes CRO's, both Clinical Research Organizations (that carry out clinical trials of potential therapeutic

drugs before they are launched in the market) and Contract Research Organizations (that manufacture bulk chemicals or API's on a contract basis for larger international firms).

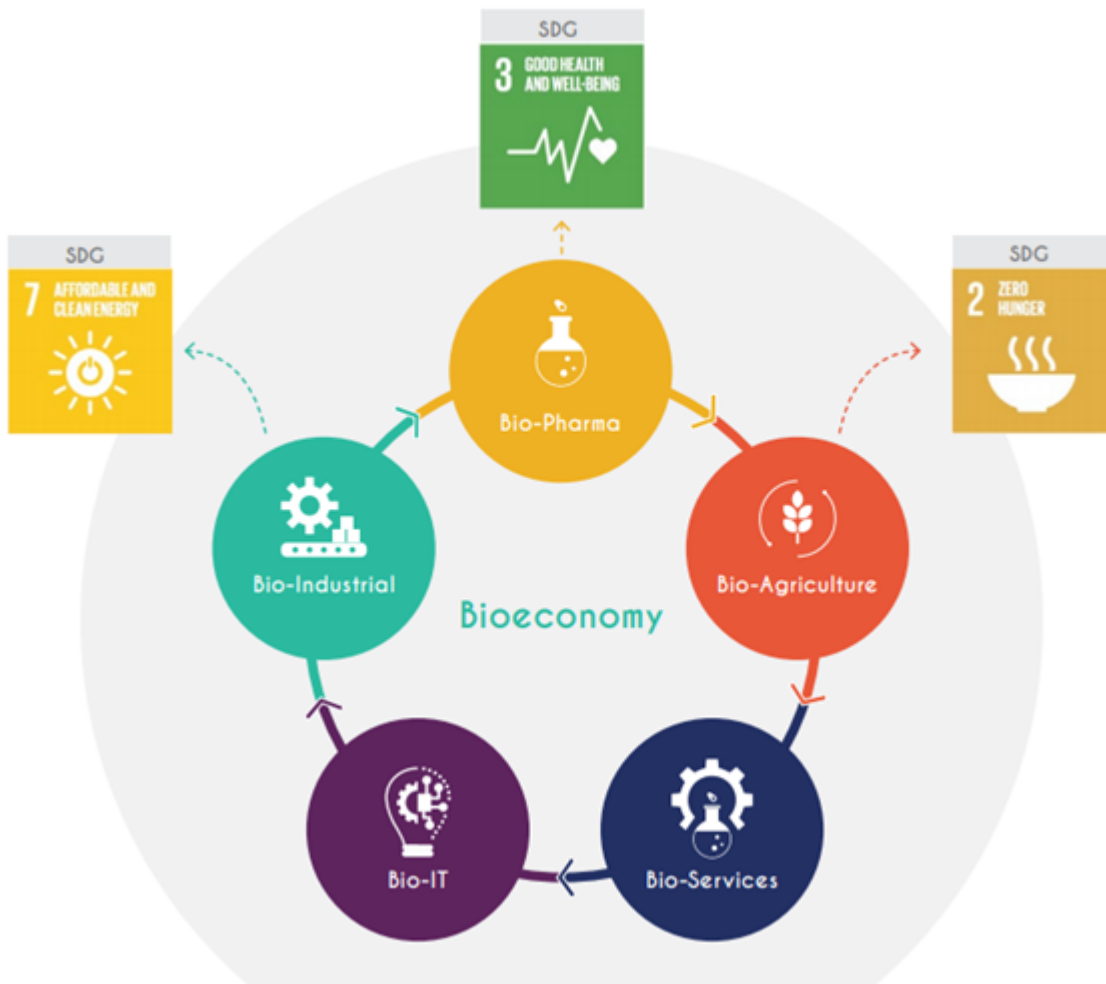
4-Bio-Industrial

The bio-industrial sector mainly comprises of enzymes that have multiple industrial uses and the generation of bio-energy through sources such as biomass and biofuels.

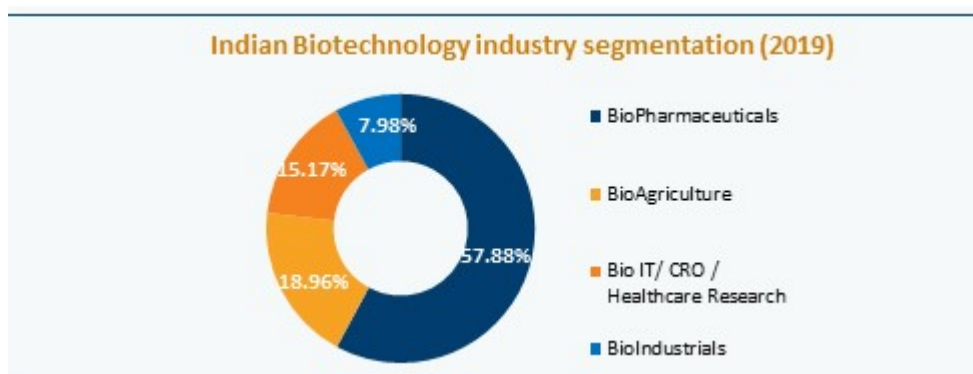
5-Bioinformatics

It contributes to the smallest part of the biotech industry in India. This sector deals with the creation maintenance of extensive electronic databases on various biological systems , the tools and software to analyze the information derived from these databases

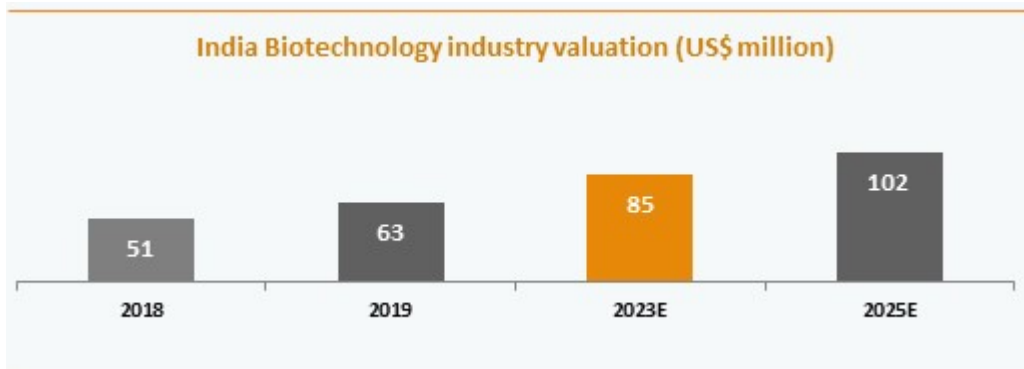
See how all sectors are interlinked



The Indian Biotechnology industry that was valued at \$70 bn in 2020 will reach \$150 bn target by 2025.



<https://t.co/Bu9a9FYQI1>



•Early ancestors took advantage of microorganisms and used fermentation to make breads, cheeses, yogurts, and alcoholic beverages such as beer and wine these are all Biotechnology only

Another simple article on Biotechnology <https://t.co/1SMzuxUbMb>

<https://t.co/TkE4bppSsc>

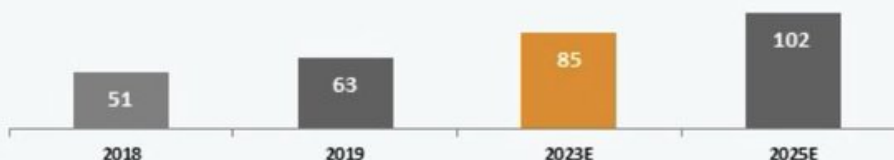


BIOTECHNOLOGY



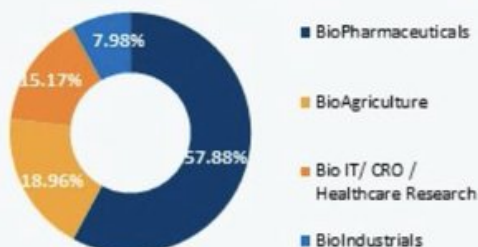
MARKET SIZE

India Biotechnology industry valuation (US\$ million)



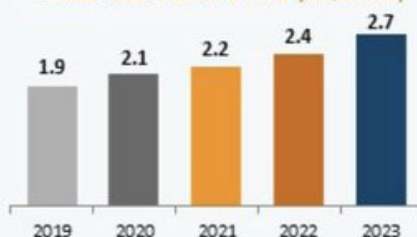
SECTOR COMPOSITION

Indian Biotechnology industry segmentation (2019)

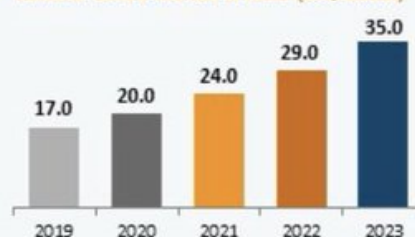


KEY TRENDS

Clinical trials market in India (US\$ billion)



Medical device market in India (US\$ billion)



GOVERNMENT INITIATIVES



Make in India



Biotech Parks



National Biopharm Mission

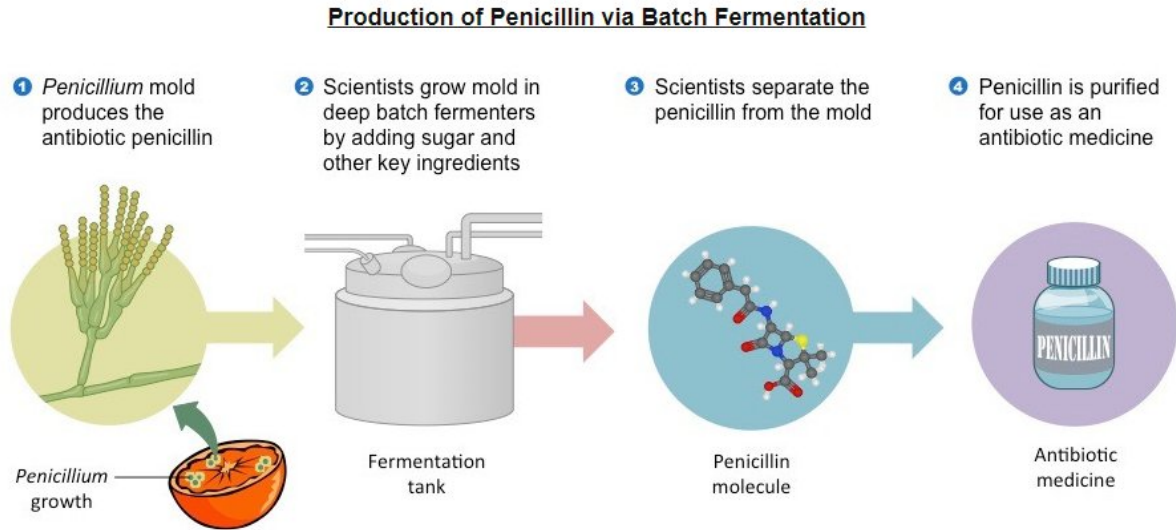


ADVANTAGE INDIA

- **Skilled human capital:** With a total population of 1.3 billion, 50% being under the age of 25, India has large pool of young and skilled workforce.
- **Infrastructure facilities:** Central and state governments have worked to set up several incubators and life science clusters across India.
- **Policy support:** 100% under automatic route for greenfield projects for pharmaceuticals.
- **Epidemiological factors:** Patient pool expected to increase over 20% in the next 10 years, mainly due to rise in population.

Read how insulin is manufactured using biotechnology <https://t.co/J9lfGPIKnr>

Penicillin production via fermentation biotechnology



oldest Biotechnology - wine production

FERMENTATION PROCESS OF WINE PRODUCTION

HARVESTING

first step in wine making process. Grapes are the only fruit that contain the necessary acids, tannins, esters which are required to make a natural wine

SQUASHING

After the grapes are sorted they are then de-stemmed and squashed. Mechanical stomping is done as it has improved the sanitation of the wine as it avoids contamination and thus has increased the quality of the wine



Source: oceania.ohaus.com

BOTTLING

Bottling is the final stage of wine making process.

CLARIFICATION

Wine is transferred into a different stainless steel tank. Wine is then clarified by filtration. Filtration occurs by using a filter to capture the larger particles in the wine. The clarified wine is then transferred into another vessel & prepared for bottling or for future aging.

FERMENTATION

Fermentation begins naturally within 6-12 hours when aided with yeast in the air. 4 The fermentation continues until all the sugar is completely converted into alcohol and dry wine is produced.

@Tehwan.com

Read this excellent document by Government of India on Biotechnology <https://t.co/n86buDfS3f>

Top Biotech companies in India

KEY PLAYERS IN INDIA

Top Indian Biotech Companies:

Company	CEO	Revenue(USD Mn 2018)
Biocon	Kiran Mazumdar Shaw	590
Serum Institute of India	Cyrus Poonawala	590
Panacea Biotec Limited	Sandeep Jain	65.40
Dr. Reddy's Laboratory Limited	G.V Prasad	2100
Wockhardt	Murtaza Khorakiwala	560
Jubilant Life Sciences Co	Shyam S Bhartia	1053
Bharat Serums and Vaccines Limited	Bharat V. Daftary	98
Indian Immunologicals Limited	K. Anand Kumar	-

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TYPES OF BIOTECHNOLOGY

Like the stripes of the rainbow, the different biotechnology applications are grouped into seven colours or research and development areas.

Red biotechnology. This is the health branch and responsible, according to the Biotechnology Innovation Organization (BIO), for the development of more than 250 vaccines and medications such as antibiotics, regenerative therapies and the production of artificial organs.

Green biotechnology. It is used by more than 13 million farmers worldwide to fight pests and nourish crops and strengthen them against microorganisms and extreme weather events, such as droughts and frosts.

White biotechnology. The industrial branch works to improve manufacturing processes, the development of biofuels and other technologies to make industry more efficient and sustainable.

Yellow biotechnology. This branch is focused on food production and, for example, it carries out research to reduce the levels of saturated fats in cooking oils.

Blue biotechnology. This exploits marine resources to obtain aquaculture, cosmetics and health care products. In addition, it is the branch most widely used to obtain biofuels from certain microalgae.

Grey biotechnology. Its purpose is the conservation and restoration of contaminated natural ecosystems through, as mentioned above, bioremediation processes.

Gold biotechnology. Also known as bioinformatics it is responsible for obtaining, storing, analysing and separating biological information, especially that related to DNA and amino acid sequences.

Richcore Lifescience (Acquired by Laurus) they are having all their Biotech products AOF (animal origin free) so less chances of contamination and allergic reaction

Product list

Products	Applications
Recombinant Human Albumin	Cell culture Stem cell research Carrier protein
Recombinant Trypsin	Insulin and vaccine manufacturing Cell culture, Stem cell research Proteomics
Recombinant Transferrin	Cell culture Stem cell research Targeted drug delivery
Recombinant Thermolysin	Cell culture Stem cell research Proteomics Detergent preparation
Recombinant Carboxypeptidase B	Insulin manufacturing Proteomics Biomedical research
Ready to use AOF cell dissociation agent	Cell culture Stem cell research

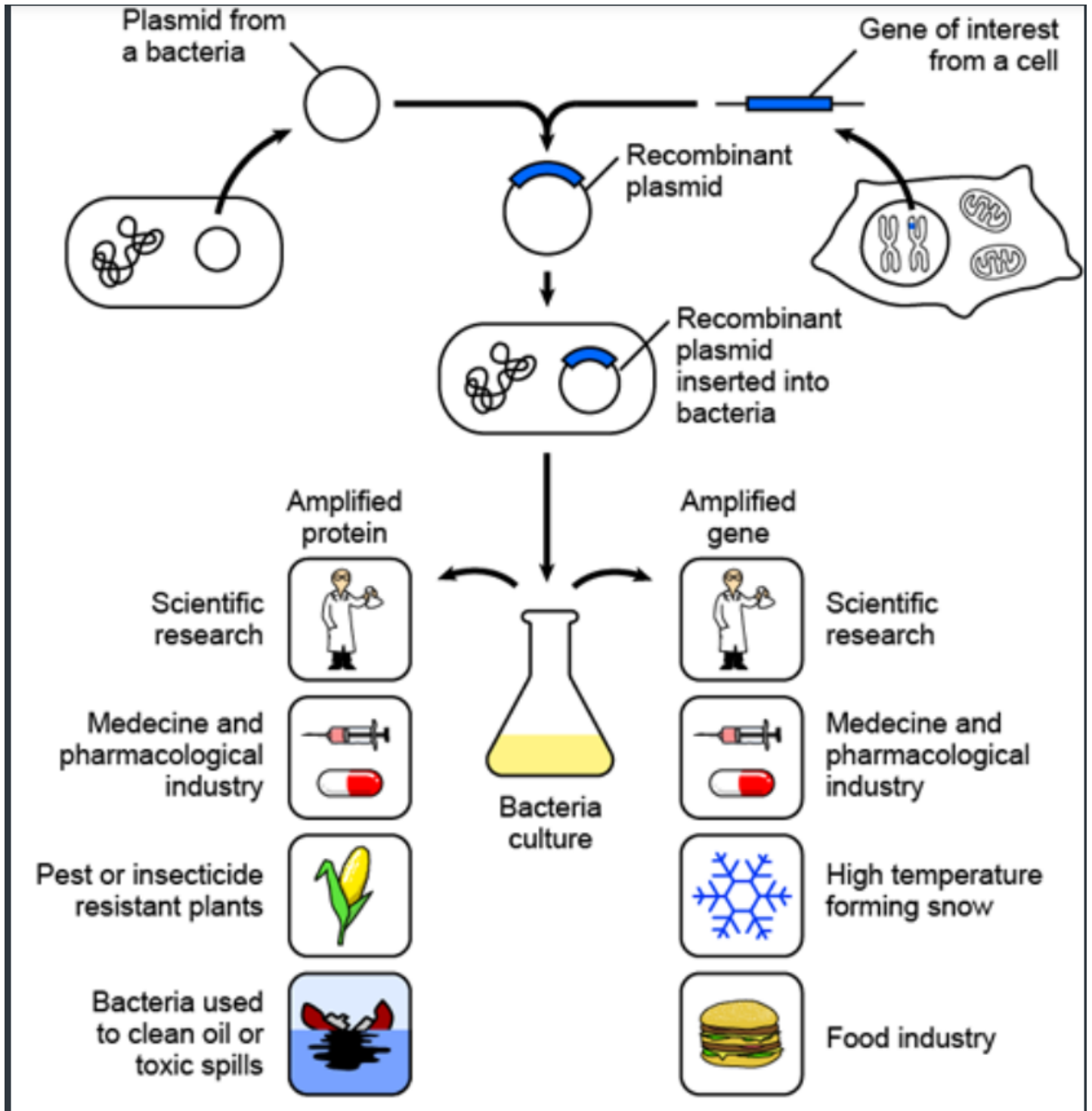
Recombinant Human Serum Albumin (Rec. HSA) - which is one of the product of Richcore (Laurus)is animal origin free expressed in E.coli without animal or human derived raw materials. It is also free from other contaminating serum proteins.

Recombinant human serum albumin (rHSA) is genetically engineered and derived from a rice-based expression system. It is a highly purified and completely animal-, virus-, and bacteria-free product that was developed as an alternative to plasma-derived HSA

The global Recombinant Human Serum Albumin market size is projected to reach USD 107.6 million by 2026, from USD 67 million in 2020, at a CAGR of 8.2% during 2021-2026.(Another big player in Albumin market is Reliance life which is Having human source albumin not Recombinant one

<https://t.co/UIqZ4tpzYC>

Another Diagram to understand Biotechnology in simple way



Pichia pastoris (*P. pastoris*) is a yeast and Recombinant albumin of Laurus Richcore is developed on *Pichia pastoris* cell line (Animal origin free) other source of albumin are 1 Human Serum 3- Bovine serum

albumin is sourced from human plasma or Bovine plasma that contains viruses, bacteria, and other infectious agents. Most of the donated plasma is treated to eliminate infectious agents.

However, in many cases, it still leads to infection and disease transmission, which may hamper industry growth. Recombinant albumin is manufactured by using transgenic rice seeds on yeast culture media (Animal origin free) i used some simplistic words to clarify the process.

Biotechnology-Richcore-Laurus - Animal origin free <https://t.co/yqFnzJbWyb>

Laurus labs#[lauruslabs](#)

Richcore lifesciences

New capacity of 2,00,000lts is ready

Despite covid19, could manage to set up the project at record time

N Laurus reaches life high of 448today

Dec 2016-IPO at price of 428

April 2021-life high of 448(face value of 2rs) <pic.twitter.com/vRQppief50>

— Shreenidhi P (@nid_rockz) [April 13, 2021](#)

See this video to understand Biotechnology <https://t.co/X2NKPz4LYD>

<https://t.co/FsamvknyyG>(Another video on Biotechnology)

Biotechnology for Animal food <https://t.co/nEvNV1r3IE>