

# Biotechnology

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**Submission date:** 11-Feb-2022 07:37PM (UTC+0700)

**Submission ID:** 1760002492

**File name:** Biotechnology\_in\_Veterinary\_Medicine.pdf (446.42K)

**Word count:** 2474

**Character count:** 14931



# Biotechnology in Veterinary Medicine

Yusnidar Yusuf<sup>1\*</sup>, Phong Thanh Nguyen<sup>2\*</sup>, E. Laxmi Lydia<sup>3</sup>, K. Shankar<sup>4</sup>, Robbi Rahim<sup>5</sup>

<sup>1</sup>Universitas Muhammadiyah Prof. Dr. HAMKA, Indonesia

<sup>2</sup>Department of Project Management, Ho Chi Minh City Open University, Vietnam

<sup>3</sup>Professor, Vignan's Institute of Information Technology(A), Department of Computer Science and Engineering, Visakhapatnam, Andhra Pradesh, India

<sup>4</sup>Department of Computer Applications, Alagappa University, India

<sup>5</sup>Sekolah Tinggi Ilmu Manajemen Sukma, Medan, Indonesia

Received: 13/09/2019

Accepted: 22/11/2019

Published: 20/12/2019

## Abstract

In various areas of medicine biotechnology is considered as already established approach, but to revolutionize veterinary practice with the potential in veterinary medicine field it has only begun to emerge. For animal breeding and veterinary medicine it has proposed new dimensions with the continuous growth of modern biotechnology. To discard any possible genetic disorder it ultimately permits to consequently and detect through genome analysis of important breeding species. It can also detect more reliably and easily the infectious diseases. With improved productivity and health it opens the possibility to generate animals with the production of transgenic livestock and it introduced a less time taking program of breeding.

**Keywords:** biotechnology, veterinary medicine, genetic disorder, breeding.

## 1 Introduction

To reconstruct or improve a product, for peculiar purposes to evolve micro-organisms, to ameliorate plants or animals, to use substances or living organisms ability is defined as the term Biotechnology (1-3). The gathering and reproducing of phenotypically wanted people is a perfect outline of a settled use of biotechnology involve in conventional animal breeding (4). From the recent breakthroughs like limits and directs every one of the elements of living life forms, the innate substances in every single living creature from microbes to an elephant, recombinant Deoxyribonucleic Acid (DNA) comes the latest biotechnology (5, 6). For the well-being of humanity by genetic manipulations utilizing vector and microorganisms hosts embryo manipulation technology, DNA technology and its corresponding techniques, Polymerase chain reaction (PCR), monoclonal antibody techniques have underlined attain abilities. (7, 24). The usage of natural procedures, life forms or frameworks to deliver items that are foreseen to improve human lives is named biotechnology. Comprehensively, this can be characterized as the building of creatures with the end goal of human use. It can likewise be characterized as the range

of abilities required for the usage of living frameworks or the affecting of regular procedures in order to create items, frameworks or situations to support human improvement.

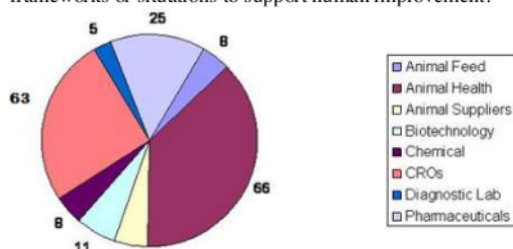


Figure 1: In industry role of Veterinarians

Right now biotechnology puts more accentuation on the foundation of half breed qualities pursued by their exchange into living beings in which a few, or all, of the quality isn't typically present. In ancient occasions, a crude type of biotechnology was rehearsed by agriculturalists who built up better-quality types of plants and creatures by techniques for cross-fertilization or cross-rearing. Past types of biotechnology incorporate the preparation and specific rearing of creatures, the development of harvests and the usage of small scale living beings to deliver items, for example, cheddar, yogurt, bread, lager and wine. Early horticulture focused on delivering nourishment.

**Corresponding author:** Yusnidar Yusuf, Universitas Muhammadiyah Prof. Dr. HAMKA, Indonesia. E-mail: [yusnidar\\_yusuf@yahoo.co.id](mailto:yusnidar_yusuf@yahoo.co.id)

Phong Thanh Nguyen, Department of Project Management, Ho Chi Minh City Open University, Vietnam. E-mail: [phong.nt@ou.edu.vn](mailto:phong.nt@ou.edu.vn)

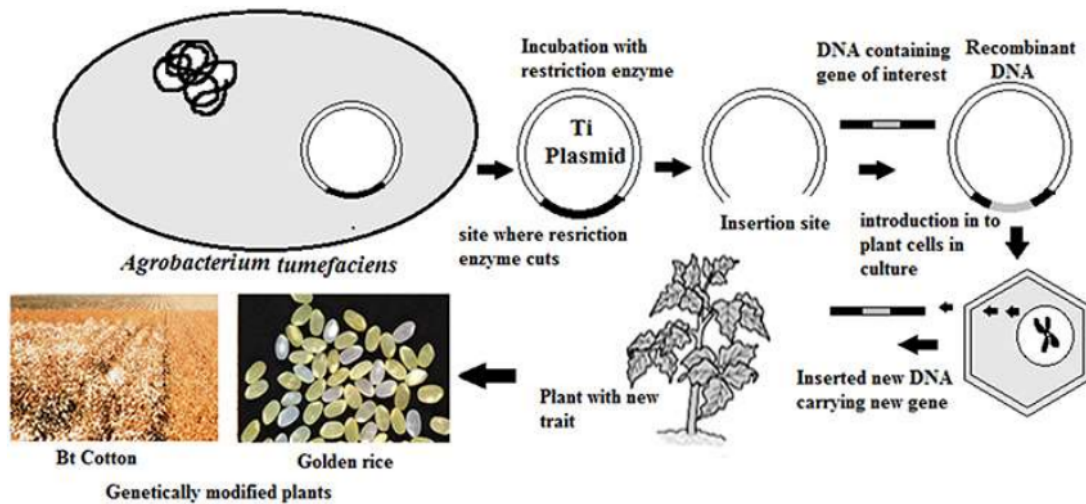


Figure 2: Development of biotechnology

Table 1: Categories of biotechnology

Category	Description
Green: Agricultural biotechnology	Products and applications related to livestock and crop production, and agricultural production of biotechnology products.
White: Industrial biotechnology	Modification or improvement of industrial processes such as paper processing, bioremediation, and chemical and organic compound synthesis.
Red: Medical biotechnology	Drugs and other agents to treat, cure, or prevent disease, and products that assist in the diagnosis of diseases or measurement of crucial factors in health and disease.

#### Applications of Biotechnology in Veterinary Medicine

In the diagnosis current biotechnology is regularly utilized. The creation of business veterinary medications and antibodies which can possibly altogether influence the manner in which veterinarians will rehearse veterinary medicine (8, 23). To animal health the biotechnology application dominantly prophylactic concerns incorporate: immunocastration and other biotechnological applications, molecular gene cloning, advanced veterinary diagnostic procedures, the development and generation of helpful items and biotechnologically inferred immunizations (9, 21, 22).

For several applications the Biotechnology is used, the factors are including:

- Agricultural practices that sustainable for environmentally are promoting
- To eliminate genetic-based diseases and infectious diseases increase host resistance
- Diagnostic tools and improved animal medicinal products are promoting
- It should ensure that production is affordable food supply, safe and abundant.
- Protecting and benefitting animal health and public health
- For the safety of human food and animal feeds improve nutritional value and utility value.

The production of new advancements through research and the reasonable use of that information is an important

subordinate to veterinary medication. Accordingly, the advancement of these advances ought not be obstructed inasmuch as they don't contrarily affect wellbeing, security, or welfare of people, creatures, or the earth.



Figure 3: Health care, Animal medicine, Veterinary medicine

Biotechnology has potential applications in the administration of a few creature sicknesses, for example, foot-and-mouth infection, old style swine fever, avian influenza and ox-like spongiform encephalopathy. The most significant biotechnology-based items comprise of immunizations, especially hereditarily built or DNA antibodies. Quality treatment for sicknesses of pet creatures is a quick creating region on the grounds that huge numbers of the advancements utilized in clinical preliminaries people were created in creatures and huge numbers of the ailments of felines and canines are like those in humans. RNA obstruction innovation is currently being applied for research in veterinary medication. Atomic conclusion is accepting a significant spot in veterinary practice. Polymerase chain response and its changes are viewed as significant. Fluorescent in situ hybridization and protein connected immunosorbent measures are additionally generally utilized. More current biochip-based advancements and biosensors are likewise finding their way in veterinary diagnostics. Biotechnology items are endorsed

by the Center for Veterinary Medicine of the FDA. Administrative issues important to creature biotechnology are portrayed. In the Environment role of Veterinary Medicines

In surface waters, ground waters and soils around the world currently researcher have distinguished low degrees of veterinary prescriptions. In spite of the fact that it have been researched the associated impacts and environmental occurrence of certain mixes for example chose antibacterial compounds, It is not surely known the effects of numerous different substances found in nature. Accordingly, questions have emerged about the impacts of veterinary prescriptions on living beings in nature and on human wellbeing.



Figure 4: In the environment role of veterinary medicine

## 2 Diagnostic systems in Veterinary Medicine

Various strategies have been utilized to distinguish and recognize illnesses and analyze their causal operators, extending from the most customary strategies utilizing biochemical and biochemical procedures to an expanding number of immunological and sub-atomic systems from present day biotechnology. These immuno-enzymatic strategies are by and large constantly improved and fuse innovations, for example, fast symptomatic strip tests, which are exceptionally simple to utilize, even at creation unit level, and yield a quick outcome. Moreover, the advancement of sub-atomic science has opened up tremendous conceivable outcomes in demonstrative methods which are quick getting to be boundless in veterinary indicative research centers (10, 19, 20).

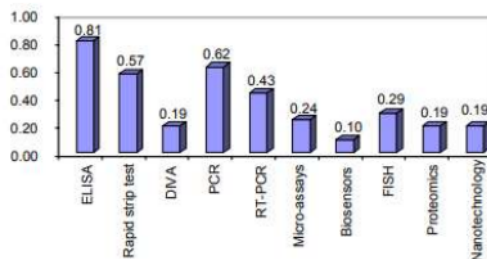


Figure 5: In many countries used diagnosis technique

## 3 Ethical Issues

Biotechnology makes certain to be a piece of things to come of veterinary drug; animal health and management. Nonetheless, any new innovation conveys a moral duty regarding an effective application and the acknowledgment that there are potential unexpected risks that may accompany the gigantic positive potential. Consequently moral concerns, including creature welfare issues, can rise at different stages in the engendering and life expectancy of an individual hereditarily built creature. The succeeding section specify a portion of the worries that have radiated during the friend driven prerequisite advancement methodology and related effect examination conferences directed by the Canadian Council of Animal Care (CCAC). The CCAC achieves a satisfactory ethic of animal use in science, which incorporate; hypothesis of the Three Rs (Reduction of animal populace, Refinement of authorizations and ranch administrations to abridge suffering and despondency, Replacement of animals with non-animal surrogate any place fundamental.

## 4 Modern Initiatives

### 4.1 Cows Genomics Program

The office has started a task on dairy cattle genomics program. The venture visualizes producing phenotypic information of five high milk yielding indigenous cows breeds, their genomic examination, recognizable proof of SNPs and advancement of chips for assessment and determination of value creatures. The fundamental point of the proposition is to foresee reproducing estimation of a creature utilizing genomic data with execution record, hereditary worth at an early age. The capacity to choose a first class creature at an early age will help improving the profitability.

### 4.2 Program on Bovine Tuberculosis (DTB)

The division after a few rounds of conceptualizing gatherings has planned a Bovine Tuberculosis Network program as a team with the Bill and Melinda Gates Foundation. The system program incorporates a few explicit segments concentrating on bTB reconnaissance for bTB predominance, bTB control program through BCG inoculation, foundation of storehouse, and preparing of youthful researchers. The program has been together financed by Bill and Melinda Gates Foundation and DBT and has been actualized at 8 scholastic and national establishments including almost 80 PIs, Co-PIs and research researchers.

### 4.3 Canine Health Research Program

So as to actualize PAN program on Canine Health Research the division has started a program including specialists from colleges and foundations to address serious issues of Canine upkeep and support as far as wellbeing, nourishment and treatment and so on to counteract zoonotic contamination through incorporation of human and veterinary medication interface for tending to One Health idea in canine. Under this program two Canine Research focuses have been set up, 6 systems figured, 42 ventures have been upheld at more than 15 state veterinary

universities, national research organizations, national focuses and private businesses including about 240 PIs, Co-PIs and research researchers.

#### 4.4 *Brucella Free Village Program*

So as to control Brucellosis, a plan of Brucella Free Village has been arranged and to execute this plan a pilot study has been proposed. Under this examination fifty towns have been chosen from 10 states wherein the creatures and people will be screened for brucellosis and control measures as far as creature isolate for tainted creatures, treatment for contaminated people and immunization for powerless creatures will be performed to make the town free of brucellosis.

### 5 Conclusion

To reconstruct or improve a product, for peculiar purposes to evolve micro-organisms, to ameliorate plants or animals, to use substances or living organisms ability is defined as the term Biotechnology. In various areas of medicine biotechnology is considered as already established approach, but to revolutionize veterinary practice with the potential in veterinary medicine field it has only begun to emerge. With improved productivity and health it opens the possibility to generate animals with the production of transgenic livestock and it introduced a less time taking program of breeding.

### References

1. Tierärztlichen Institut, Georg-August-Universität, Göttingen, "Biotechnology in veterinary medicine and animal production", Dtsch Tierarztl Wochenschr. 1994 Mar;101(3):96-9.
2. Vijayakumar S, Sasikala M. Application of biotechnology: A current review. International Journal of Pharmacy, 2012;2:59-66.
3. Raju SR, Suma MS, Nalina M, Chandrashekara KN. Basic concept of biotechnology. Laxmi Book Publication, India, 2015:240-322.
4. Rege JEO. Biotechnology options for improving livestock production in developing countries with special reference to sub-Saharan Africa. Third Biennial Conference of the African Small Ruminant Research Network UICC Kampala Uganda, 1994:5-9.
5. Ahmed S Khosa AN. An introduction to DNA technologies and their role in livestock production: A review. The Journal of Animal & Plant Sciences, 2010;20:305-314.
6. Cobb M, Oswald Avery. DNA and the transformation of biology. Current Biology, 2014;24:55-60.
7. Okonko IO, Olabode OP, Okeleji OS. The role of biotechnology in the socio-economic advancement and national development: An Overview. African Journal of Biotechnology, 2006;5:2354-2366.
8. Liew PS, Hair-Bejo M. Farming of plant-based veterinary vaccines and their applications for disease prevention in animals. Advances in virology. 2015;2015.
9. Borroto CG. Biotechnology and its application to veterinary science conf. office international des epizooties (OIE). World organization for Animal health, 2008:231-240.
10. Schmitt B., Henderson L.– Diagnostic tools for animal diseases. Rev sci tech Off int Epiz, 2005;24(1):243-50.
11. Vercruyse J., Knox D.P., Schetters T.P., Willadsen P.– Veterinary parasitic vaccines: pitfalls and future directions. TRENDS in Parasitology 2004;20(10):488-92.
12. Martínez R., Carpio Y., Gómez Y. et al.– Acuario I estimula el metabolismo anaerobio y el sistema inmune innato de las larvas de goldfish y tilapia. Biotecnología Aplicada 2006;23:289-95.
13. Park WJ, Park BJ, Song YJ, Lee JB, Jang YG, et al. Induction of immunocastration in pre-pubertal boars immunized with recombinant gonadotropin-releasing hormone conjugated with B. Japanese Journal of Veterinary Research, 2015;63:73-81.
14. Maharana BR, Tewari AK, Saravanan BC, Sudhakar NR. Important protozoan diseases of livestock: Challenges in current diagnostics and therapeutics: An update. Veterinary World. 2016;9:487-495.
15. VanGuilder HD, Vrana KE, Freeman WM. Twenty-five years of quantitative PCR for gene expression analysis. Biotechniques, 2008;44:619-626.
16. Verweij JJ, Stensvold CR. Molecular testing for clinical diagnosis and epidemiological investigations of intestinal parasitic infections. Clinical Microbiology Reviews, 2014;27:371-418.
17. Kaikabo AA, Kalshingi HA. Concepts of bioinformatics and its application in veterinary research And vaccines development. Nigerian Veterinary Journal, 2007;28:39-46.
18. Cutrera J, King G, Jones P, Kicenuik K, Gumpel E, et al. Safe and effective treatment of spontaneous neoplasms with interleukin 12 electro-chemo-gene therapy. Journal of Cellular and Molecular Medicine, 2015;19:664-675.
19. Pagar T, Ghotekar S, Pagar K, Pansambal S, Oza R. A review on bio-synthesized Co<sub>3</sub>O<sub>4</sub> nanoparticles using plant extracts and their diverse applications. Journal of Chemical Reviews. 2019;23:260-70.
20. Itodo AU, Itodo OM, Iornumbe E, Fayomi MO. Sorptive chelation of metals by inorganic functionalized organic WO<sub>x</sub>-EDA nanowires: adsorbent characterization and isotherm studies. Progress in Chemical and Biochemical Research. 2019 Oct 18;1(1, pp. 1-59):50-9.
21. Shafiee AH, Shafieeb MR. Determination of Clozapine by Air Assisted Dispersive Liquid-Liquid Microextraction Based on Solidification of Organic Droplet Followed by HPLC in Human Serum.
22. Ganni B, Kumar R, Jain M, Kumar VB, Shrivastava S, Kumar P. Development and Validation of Stability Indicating HPLC Method for the Determination of Process and Degradation Related Impurities in Telmisartan Drug Substance. Chemical Methodologies. 2019 Mar 1;3(2, pp. 145-275):145-65.
23. Andayesh R, Elhami S. Application of modified sawdust for solid phase extraction, preconcentration and determination of trace lead in water samples. Asian Journal of Green Chemistry. 2019 Oct 1;3(4, pp. 418-549):536-49.
24. Kosareva ON, Dinova GE. Seasonal development of introduced apple-tree varieties under arid conditions of Western Kazakhstan. EurAsian Journal of BioSciences. 2019;13(2):717-27.

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