SEMESTER INTERNSHIP

Name of the Student : **S.SUBHAHAN**

Name of the College : **Loyola Degree College (YSRR)**

Registration Number : **206036049028**

Period of Internship : **From: 02/03/2023 To: 31/05/2023**

Name & address of the intern organization: GENOMIX CARL Pvt Ltd, Address: #APCARL CAMPUS, OPP.JNTUA ENGG COLLEGE, RAYALAPURAM ROAD, PULIVENUDULA, KADAPA 516390,(A.P)

LOYOLA DEGREE COLLEGE

(YSRR)

(A CHRISTIAN MINORITY COLLEGE)

ACCREDITED BY NAAC WITH B+ GRADE

(Affiliated to Yogi Vemana University)

Pulivendula-516390, Kadapa.

AN INTERNSHIP REPORT

On

IDENTIFICATION OF CLINICAL SYMPTOMS AND DIAGNOSIS AS WELL AS POTENTIAL THERAPEUTIC IMPLICATIONS FOR BRUCELLOSIS

At

GENOMIX CARL Pvt. Ltd.

PULIVENDULA

In partial fulfillment of the requirements for the award of the degree of

BACHELOR OF SCIENCE

SUBMITTED BY

Mr. S.SUBHAHAN

(Reg.No.206036049028)

Under The Guidance of,

Dr. V.Uday Kiran, M.Sc.,B.Ed.,Ph.D
Head Of Zoology

Internship Report Submitted to

DEPT.OF ZOOLOGY

LOYOLA DEGREE COLLEGE (YSRR)

ACCREDITED BY NAAC WITH B+ GRADE

(Affiliated to Yogi Vemana University)

Pulivendula-516390, Kadapa.

CERTIFICATE

This is to certify that the project work entitled **"A STUDY OF IDENTIFICATION OF CLINICAL SYMPTOMS AND DIAGNOSIS AS WELL AS POTENTIAL THERAPEUTIC IMPLICATION FOR BRUCELLOSIS"** is a bonifide project work submitted by **S.SUBHAHAN** bearing **HT NO:-206036049028** submitted to faculty of zoology , in partially fulfillment of the requirement for the award degree of **BACHELOR OF SCIENCE IN BSC-BZC FROM LOYOLA DEGREE COLLEGE (YSRR),PULIVENDULA**

Head Of the Department:

Dr. V. UDAYKIRAN,
lecturer in ZOOLOGY
Loyola degree College, (YSRR)
Pulivendula.

Name of the mentor:

Dr.V.UDAY KIRAN
lecturer in ZOOLOGY,
Loyola degree college,(YSRR)
Pulivendula.

EXAMINERS:

1.

2.

3.

4.

DECLARATION

I hereby declare the project entitled **the study the identification of clinical symptoms and diagnosis as well as potential therapeutic implication for brucellosis** in **"GENOMIX CARL Pvt. Ltd."** submitted by me under the guidance of on Field Supervisor **Mr. G. VINAY CHAND VIDYA SAGAR (Scientist) in Genomix carl pvt ltd.**

I also declare that this project is a result of my own efforts and it has not been submitted to any other university or published any time before.

Place: PULIVENDULA **Mr. S.SUBHAHAN**

Date: (Reg. No. 206036049028)

ACKNOWLEDGEMENT

First and foremost, I would like to express my heartfelt thanks to my Internship Program mentor Dr.**V.Uday Kiran**, for giving me the opportunity to work with his guidance. I am greatly indebted to his for continuous support, motivation, patience and immense knowledge for me and to develop myself as a good performer in internship training.

I express my heartfelt gratitude to my onsite supervisor G. **Vinay Chandu Vidyasagar sir, Dr. Janardhan Reddy sir,** for their immense support, help and valuable suggestions

I gives me great pleasure to express my gratitude to our beloved Principal for granting me permission to do my internship work and their constant support, enormous help and encouragement.

My sincere thanks to **Dr. P.Ratnagiri, sir, CEO of Genomix .Carl.Pvt.Ltd.** Near JNTU,Pulivendula for his excellent support and providing DBT-DST lab facilities to complete internship training.

I express my heartfelt thanks to all my Classmates for their timely help and support throughout my internship training.

I am greatly indebted to my Parents, and all my family members for theirunconditional love, care, patience and support throughout my internship training.

S.SUBHAHAN

Certificate from Intern Organization

This is to certify that **S.Subhahan , Reg.No. 206036049028** of Loyola Degree College (YSRR) underwent internship in Genomix. Carl.Pvt.Ltd **From: 02/03/2023 To: 31/05/2023**

The overall performance of the intern during her internship is found to be satisfactory.

Authorized Signatory with date and Seal

Contents

Chapter-1
Executive Summary

This internship report is based on a two month short term internship programme that I successfully completed in GENOMIX, Carl. Pvt. Limited under Hands on training on Molecular techniques based on zoonotic diseases -? from 01.10.2022 to 18.11.2022 as a requirement of New Education Policy (NEP) and part of my B.Sc programme at Loyola Degree College (YSRR), Pulivendula, YSR- Kadapa (Dt)- 516390, affiliated to Yogivemana University.

Every hour spent at the GENOMIX was spent viewing labs and handling equipment. It has given me a wealth of knowledge that is indescribably valuable. They were all helpful to my career, though. This report outlines the duties of a researcher or scientist at the Department of Animal Biotechnology, potential divisions and work distribution in the lab, the recruitment process, training and development initiatives, ways to maintain intern motivation as well as ways to control insubordination, discipline, research activities, and the advantages of planning and leading, etc. I formerly worked for the production-based company GENOMIX Carl Pvt.Ltd. in the animal biotechnology department. It has a wide range of research resources. It successfully upholds the organisational duties. The GENOMIX. Carl. Pvt.Ltd. staff is a highly competent and structured group. During the first six weeks of my internship programme, I received hands-on training in molecular techniques based on zoonotic diseases, so , I began my work with the full support of the research wing, spent the following three weeks working with the training wing, the following two weeks becoming attached with the help of the data planning and result analysis team, and the final one week working with the administration wing for the preparation and planning of document presentations.

I have experience using several working methods in Genomix. My two-month internship included training in tissue culture for the detection of various parasites and chocolate making. I have mostly helped the training team at the organization's training wing with suggestions for managing molecular tools, laboratory equipment, sample collecting, and equipment cleaning given the amount of trainings they have completed throughout my internship. My personal opinions regarding the GENOMIX Pvt. Ltd., Carl With my limited education and experience, I did my best to put my real- world experience into this report and make it as comprehensible as possible.

Additionally, the different restrictions on process improvement and upholding moral norms in a research environment have been encountered. Before making any conclusions based on this research, it should be emphasized that it was rushed to completion and that the data is lacking. However, the paper may still be helpful in planning any future research to assess the animal

biotechnology research field for newcomers. Genomix Biotech Inc., and its sister-concerned companies joined hands with APCARL as Public Private Partnership (PPP) project to bring state of the art R&D and Manufacturing facility in vaccine and diagnostic fields which will in return support the livestock healthcare and as well improve the livestock production in AP and in our country at Large. Genomix is an international company, supported and funded by several International and national network projects through Dept. of Biotechnology on Brucellosis and through NIVEDI, TRPVB (TANUVAS), IIL, NIAB on other animal pathogens and by collaborations with other international institutions like CDC and NIH (USA), APHA (UK) and Institute of Tropical & Veterinary Medicine (Germany). Genomix has a DSIR recognized R&D facility with ISO 9001-2008, ISO 13485-2008, GLP FDA and WHO - GMP certified Production unit related to human, veterinary *in vitro* diagnostic products and handheld instrumentation for point of care at resource limited areas. Genomix is also committed to train, motivate and guide research Scholars for their Ph.D., program and young scientists in translational research related to animal and zoonotic biotechnology in Andhra Pradesh.

Chapter – 2
Overview of the Organization
General Introduction

Genomix Biotech Inc. is founded in 2003 and is engaged in developing tools for affordable and quality healthcare using biomedical research, biotechnology and/or biopharmaceuticals. In the first quarter of 2007, its sister concern **Genomix Molecular Diagnostics Pvt. Ltd.** and **Genomix Healthcare (India) Pvt. Ltd.** (2013) are established in Hyderabad, India. Recently, **Genomix CARL Pvt. Ltd.,** a public Private Partnership joint venture is initiated in the year 2015 in collaboration with Government of Andhra Pradesh at APCARL, Pulivendula. The philosophy behind **Genomix** is to provide highest quality healthcare needs of the selected Resource limited population, Point of Care areas and extend to the rest of the world. The focus of Genomix is to identify the crucial needs, explore the problems through fundamental research and develop best quality diagnostics tools, compounds and or biopharmaceuticals for therapeutic intervention of disease processes. Genomix Biotech augments its product line by securing manufacture technologies from partners worldwide TRPVB (TANUVAS), ICMR, Yogi Vemana University, NIAB, and Centers for disease Control and Prevention (CDC) and other national and International Institutions. Genomix is funded by DBT, and NIH that it is well poised to be the Livestock biotech leader. Genomix Biotech has a world-class research team, an experienced management from internationally renounced institutes like NIH, CDC to lead and excellent partners who believe in teamwork and success. R&D team has extensive hands on experience in the areas of fundamental and applied research fields to develop rapid diagnostic kits, ELISA, Isothermal PCR novel instrumentation and innovative methodologies. Genomix is ISO 9001-2008, ISO 13485 certified and manufacturing more than 86 diagnostic assay products under GMP and GLP conditions with Drug Control approvals. Genomix has obtained several funded projects from DBT, US Army, CDC and trained hundreds of young scientists worldwide.

Genomix manufactures broad range of Rapid diagnostic kits, ELISA and Isothermal PCR based molecular diagnostic assays and handheld instrumentation to detect pathogens affecting human including HIV, Hb(S) Ag, HCV, Dengue, Chikungunya and canine, poultry and veterinary health care including Brucellosis, Wild animal and bovine TB, Leptospira, New Castle Viral Disease, IBD, Foot and Mouth disease, Blue tongue disease, PPRV, Listeria etc. One of our focuses is also to develop assays and kits to help people at resource limited areas and economically challenged populations in the world. Our R&D team includes large number of young scientists working towards their Ph.D., degree registered at different universities.

A Bout Genomix CARL:

Genomix Carl Private Limited is a firm established under Public Private Partnership with Government of Andhra Pradesh, incorporated on 26th November, 2015 as Non-Government Company and is registered with Registrar of Companies, Hyderabad based at Pulivendula, Kadapa district of Andhra Pradesh with an authorized share capital of ₹100,000 and its paid up capital of ₹100,000. The vision of the firm is to be a centre of excellence for advanced research on livestock and with a mission to find solutions to problems of livestock health and production and transfer the technologies. The major thrust areas of the firm include animal health care, diagnostics, vaccines, biopharmaceuticals for Point of care and resource limited areas with a prime goal to improve animal health and productivity for the benefit of farmers. The firm is established in the sector specific special economic zone (SEZ) for biotech sector (Gazette notification of Government of India issued on 24-08-2009) of Indira Gandhi Centre for Advanced Research on Livestock (IGCARL) land with Andhra Pradesh Industrial Infrastructure Corporation (APIIC) as the developer. The SEZ is established in an area of 600 acres with a million sq. ft. of space with two BSL-3 laboratories and a 32 room animal house with a dedicated BSL-3 laboratory.

The Genomix CARL is equipped with modern state of art R & D facilities in the field of live stock research. The main focus of Genomix CARL R&D is to identify the crucial needs of commonman, neglected/under-served rural communities, economically challenged populations, resource limited areas and explore the problems through fundamental research and develop best quality compounds or biopharmaceuticals for therapeutic intervention of disease processes and diagnostics and vaccines and instrumentation with state of the art technologies.

List of Livestock Healthcare Technologies Genomix is bringing Vaccines Diagnostics

- Peste des petits ruminants virus (PPRV) Brucellosis
- Infectious Bursal Diseases (IBD) Listeria
- New Castle Disease (NDV) Leptospirosis (Bovine, Canine, Human)
- Brucella Foot and Mouth Disease (FMD)
- Foot and Mouth Disease (FMD) Blue tongue Disease (BTV)
- Blue tongue Disease (BTV) Peste des petits ruminants virus (PPRV)
- Black Quarter (BQ) Hydatid
- Hemorrhagic septicemia (HS) Newcastle disease (NDV)
- Infectious Bursal Diseases (IBD)
- Early Pregnancy test for cattle

- Bovine Tuberculosis (BTb)
- Anthrax
- Taxoplasma
- Glanders
- Equine Infectious Anaemia (EIA)

Other Related Areas

- Collagen Wound healing creams
- Fish and Animal feed from sea waste
- Chitosan
- All purpose pen side cleaning solutions

Instruments

- Hand Held isothermal PCR For Resource Limited Areas-Pen Side
- Hand Held ELISA Reader For Resource Limited Areas-Pen Side
- Genomix CARL in PPP ("public private partnership") mode has focused on

Company Ownership

Genomix headquarters are located at 2620 Braithwood Road, Atlanta, GA 30345 and is a registered privately held incorporated company according to Georgia state company act. The majority shares are owned by Dr. Rathnagiri Polavarapu, and are the President and CEO of the company. The Genomix Biotech Company is a research driven Biotech Company with strong research background in human and animal healthcare and in biotechnology industry.

Future Products and Services:

Genomix CARL is also working very closely with Animal Husbandry Departments of A. P. and other states to identify the customary needs and brings the latest technology to the common man

i.e. the farmer. Genomix will bring Diagnostic kits to the market quickly and initiate R&D regarding the multivalent vaccines for future production based on the state needs. Genomix CARL is also initiating to establish an incubator to train new research staff and budding entrepreneurs. Genomix CARL will also initiate sperm cryopreservation and embryo transfer to obtain better varieties of cattle. **Major Achievements within two years of establishment:**

- Received five national grants from national funding agencies
- Included as a major partner in Brucella free Programme
- Designated Southern head quarter of APCARL for Brucella free programme
- Established Diagnostics production Unit

- Recruited 20 students for Ph.D. program
- Launched five products through Dept. of Biotechnology

Certifications:

- ISO 9001: 2008 Certification
- As in-house R & D Unit by Department of Scientific & Industrial Research
- GMP Certified
- IEC Certified
- Drug Control Administration Certified

Chapter -3

Internship Part

The Department of Zoology , Loyola Degree College (YSRR), Pulivendula has organized Two Months Internship and Training program entitled " Hands on training on molecular techniques based on Zoonotic diseases - Approach on Biotechnology, Cell Culture and Bioinformatics Research" 1St October – 18th November 2022. The program started with interaction session with participants and the team from Genomix company. The CEO briefed about the facilities available in the institute and wished the participants fruitful learning experience. The supervisor of training team Dr. Vinay sir briefed about the objective of the program and schedule for six weeks. A total of 24 students from our college participated in the program. The program was divided into 06 weeks working procedures, field experience and practicals of training sessions. During the training students were familiarized with the animal cell culture techniques – laboratory biosafety, basics of cell culture, cell line passaging, cell counting, preparation of media and the components, significance of the equipment used in a tissue culture lab; Bioinformatis - Database, data formats, drug ligand binding studies, gene manipulation technique using CRISPR/CAS9, designing gRNA etc; Molecular Biology – Preparation of Buffers, Isolation of DNA from various sources, agarose gel electrophoresis and hands on training of PCR; Microbiology – 3 Preparation of Medium, Microbial assay, sterility testing of pharmaceutical preparations and biological examination of water. Also the exposure was given to the students for animal experiments (Dept. of Animal Biotechnology), Analytical Techniques specifically LC-MSMS (Dept. of Veterinary Pharmaceutical Analysis) and Formulation Development. As part of training the students were taken to field visit to Genomix entire campus and different division of departments , where the students visited vaccine manufacturing unit, GMP animal house facilities and the Pasteur museum in this company and get live experience about the practical's. As the company have beautiful locations as a curtsey and extended by the Principal, the students were taken for sightseeing to Avalanche which was well appreciated by the students. The participants were requested to give their feedback on the program where most of the participants appreciated the practical sessions and hands- on training provide during the course of the program and the support received from department UG students. Few of the students expressed their interest to join back the department for caring out their project work by next semester. The informal valedictory function was organized at Board Room of the Genomix company where The CEO interacted with the students and received the feedback of the program and distributed the certificates to the participants.

ACTIVITY LOG FOR THE FIRST WEEK

Day & Date	Brief Activity	Learning Outcome	Person-in-Charge Signature
Day 1 **02-03-2023**	Orientation programme; introduction to departments, safety rules, and transport systems.	Understood company structure, safety guidelines, and basic lab environment.	
Day 2 **03-03-2023**	Visit to various labs; observation of workflow and scientific operations.	Learned basic use and purpose of major laboratory instruments.	
Day 3 **04-03-2023**	Overview of Genomix products like vaccines and diagnostics.	Understood types, importance, and applications of vaccines in society.	
Day 4 **06-03-2023**	Visit to animal sheds; observation of animal care and sample collection.	Learned safe animal handling, biosafety, and sampling methods.	
Day 5 **07-03-2023**	Participated in lab practical sessions and observed procedures.	Gained basic hands-on skills in lab tools and practical protocols.	
Day 6 **08-03-2023**	Introduction to equipment used in antiserum/antidote production.	Understood specifications and principles of biological production tools.	

Activity report on first week:

On the first day of our internship programme, we assembled on the campus of Loyola Degree College (YSRR) at exactly 8:30 AM. After gathering together, we met our esteemed Principal,, to seek his permission and blessings for the internship. With his encouragement, we proceeded to the Genomix Company under the guidance of our mentor, **Dr. V. Uday Kiran Sir**.

We reached Genomix Company at **9:15 AM**. With the support of our mentor, we entered the premises, and he introduced me and my classmates to several members of the Genomix team, including **Dr. Vinay Sir**, **Dr. Janardhan Sir**, Research Scholar **Mr. Muni Sir**, and Research Scholar **Ms. Mounika Madam**. Finally, we had the opportunity to meet the CEO of Genomix, **Dr. Ratnagiri Sir**, to whom we submitted our internship approval letter.

Dr. Ratnagiri Sir kindly accepted our request and provided our mentor with a signed copy of the acceptance. He then arranged an **orientation workshop** for all of us and also invited our Principal to participate. During the session, our Principal gave us valuable guidance and shared important safety instructions to be followed throughout the programme.

Following this, **Dr. Giri Sir** delivered an insightful lecture covering various essential topics such as the fundamentals of research, an overview of Genomix Company, and potential career opportunities for students from a biological sciences background. His six-day series of lectures was an enriching experience for all of us. He explained the company's history, practical techniques, the importance of laboratory tools, and the scientific principles involved in Genomix's work with exceptional clarity.

On the sixth day, after completing the lecture series, we visited the entire Genomix campus along with staff members **Vinay Sir**, **Muni Sir** and **Janardhan Sir**. We explored various departments and gained a complete understanding of the company's workflow. At around **3:45 PM**, we concluded the tour, left the campus, and began planning for the next day's activities.

ACTIVITY LOG FOR THE SECOND WEEK

Day & Date	Brief Description of Daily Activity	Learning Outcome	Person-in-Charge Signature
Day 1 **09-03-2023**	Introduction to tissue culture techniques; overview of inoculation chambers and basic operational procedures.	Gained understanding of tissue culture fundamentals and handling of inoculation chambers.	
Day 2 **10-03-2023**	Explanation of biosafety precautions and laboratory entry protocols demonstrated in an interactive manner.	Learned essential biosafety measures to follow before entering and working in the laboratory.	
Day 3 **11-03-2023**	Introduction to biosafety equipment with detailed demonstrations of their functions and applications.	Understood proper use of biosafety equipment and materials during laboratory work.	
Day 4 **13-03-2023**	Explanation of biosecurity practices and essential care to be taken in laboratory environments.	Gained experience in implementing biosecurity precautions during practical sessions.	
Day 5 **14-03-2023**	Detailed explanation of various biosecurity methods and safety precautions to be followed.	Strengthened understanding of laboratory safety and biosecurity protocols.	
Day 6 **15-03-2023**	Introduction to PCR (Polymerase Chain Reaction); explanation of techniques and workflow.	Gained hands-on exposure and practical knowledge of PCR principles and procedures.	

Activity report on second week:

On the first day of the second week, the Genomix staff gave us a brief yet informative explanation about tissue culture and the techniques commonly used in the laboratory. We learned the operating principles, standard procedures, and the rules and regulations that must be followed while performing tissue culture practicals. During this session, Dr. Vinay Sir also shared his practical knowledge on maintaining laboratories, strong rooms, and cold chambers, helping us understand how controlled environments are preserved for sensitive biological work.

As part of the ongoing training, Dr. Janardhan Sir explained the essential precautions and biosafety measures required in biotechnology laboratories. This knowledge was very valuable to us because, although we had received earlier guidance from Dr. Giri Sir, the practical and in-depth explanation given by Janardhan Sir helped us clearly understand how to maintain safety and discipline inside the lab. It was also a fantastic opportunity for our team to interact directly with a leading scientist like **Dr. Ratnagiri Sir**, whose presence and guidance motivated us. Throughout the sessions, the staff members explained how to properly handle laboratory equipment, follow operational techniques for different biological tools, and maintain ethics while performing experiments, enabling us to quickly grasp and follow the procedures.

During the practical sessions, several highly advanced and expensive instruments were introduced to us. We observed the operation of PCR machines, laminar airflow units (often called “chocolate instruments”), digital weighing balances, rotors, autoclaves, and many other essential laboratory tools. Working with such sophisticated equipment under the supervision of skilled and experienced staff gave us an excellent learning experience. Overall, the practical exposure, combined with expert guidance, made the second week extremely valuable and strengthened our confidence in handling laboratory techniques.

ACTIVITY LOG FOR THE THIRD WEEK

Day & Date	Brief Description of Daily Activity	Learning Outcome	Person-in-Charge Signature
Day 1 **16-03-2023**	Introduction to zoonotic diseases; explanation of disease transmission, animal–human interactions, and major zoonotic pathogens.	Understood different types of zoonotic diseases and their significance in animal-based disease transmission.	
Day 2 **17-03-2023**	Overview of *Brucella* species and the disease brucellosis; discussion on etiology and public health importance.	Gained knowledge about *Brucella* bacteria, brucellosis, and its impact on human and animal health.	
Day 3 **18-03-2023**	Explanation of pathogenicity of *Brucella*; discussion on disease symptoms, virulence factors, and clinical characteristics.	Learned about the pathogenic mechanisms, symptoms, and major characteristics of brucellosis.	
Day 4 **20-03-2023**	Demonstration of sample collection from Brucella-infected animals; training on safe handling and biosafety precautions.	Understood proper sample collection techniques, handling methods, and biosafety measures.	
Day 5 **21-03-2023**	Procedure for culture media preparation in the tissue culture laboratory; explanation of steps and sterilization techniques.	Gained practical knowledge of media preparation, sterilization, and laboratory procedures.	
Day 6 **22-03-2023**	Demonstration on Brucella detection methods including culture, staining, and diagnostic approaches.	Learned techniques used to detect *Brucella* pathogens and confirm infection.	

Activity report on third week:

During this week of training, we received valuable guidance from Genomix employees such as **Dr. Vinay Sir**, who briefly explained various human and animal disorders. Since the Pulivendula region in Rayalaseema has limited medical and diagnostic facilities, gaining hands-on exposure to animal diseases and their characteristics became an important part of our training. The supervisors provided detailed explanations about different animal diseases, their pathological features, and visible symptoms in diseased animals, which greatly helped us understand field-level disease identification.

Vinay Sir delivered an informative lecture on **zoonotic diseases**, explaining how infections can spread from animal to animal and from animals to humans. He particularly focused on *Brucella* and the disease **Brucellosis**, describing how it transmits to humans mainly through the consumption of unpasteurized milk, close contact with infected animals, and unhygienic handling of livestock. This session helped us understand the public health importance of zoonotic infections, especially in rural dairy-based communities.

We also learned that recent research findings show widespread damage caused by *Brucella* in dairy animals such as buffaloes, cows, cattle, goats, and sheep. Despite these challenges, the Genomix staff are continuously working on developing pathogen detection kits and producing antidote-related products such as antigen kits for Brucella treatment, although these products are still under development and not yet available for general use.

Through hands-on training, we gained practical experience in how tissue culture laboratories prepare culture media, maintain sterile environments, and follow strict safety precautions. Additionally, we observed and learned the basic techniques involved in **Brucella detection**, including sample handling and diagnostic procedures.

This week's training provided us with a strong understanding of zoonotic diseases, pathogen detection, and laboratory practices essential for infectious disease research.

ACTIVITY LOG FOR THE FOURTH WEEK

Day & Date	Brief Description of the Daily Activity	Learning Outcome	Person In-Charge Signature
23-03-2023 (Day-1)	Learned and observed the materials and methods involved in pathogen detection.	Gained understanding of fundamental pathogen detection techniques.	
24-03-2023 (Day-2)	Received an explanation of various chemicals used in the experiments.	Learned to identify different laboratory chemicals and understand their names and uses.	
25-03-2023 (Day-3)	Performed practical work related to *Brucella* detection following laboratory safety protocols.	Developed hands-on experience and awareness of essential safety and security measures during pathogen handling.	
27-03-2023 (Day-4)	Operated various biological instruments in the Animal Biotechnology Laboratory to obtain values from biological samples.	Acquired practical knowledge and real-time experience in handling and operating laboratory equipment.	
28-03-2023 (Day-5)	Received training on how to interpret and record the values displayed by laboratory instruments after sample insertion.	Gained experience in correctly noting and documenting equipment-generated results.	
29-03-2023 (Day-6)	Understood the process of analyzing the obtained values for pathogen detection methods.	Learned effective data interpretation skills through real-time value analysis.	

Activity report on fourth week:

We regularly discuss the materials, procedures, and experimental workflow with our supervisor before proceeding to work with the instruments and chemicals used in disease detection research. These interactions help us understand the chemical components involved and their relevance to diagnostic studies. Our in-charge officer also guides us on the proper handling of laboratory tools and supplies, ensuring that we follow safe and accurate experimental practices. His continuous support has been valuable in clarifying our doubts and strengthening our practical skills.

Dr. P. Janardhan sir provided a detailed explanation of *Brucella* infections. With the identification of multiple species—*Brucella abortus, B. suis, B. neotomae, B. ovis, B. canis,* and recently emerging marine mammal strains—the complexity of the disease has significantly increased. Each species exhibits different epidemiological patterns and interactions with humans. The picture remains incomplete, as new strains may emerge and existing ones may adapt to changes in agricultural and societal practices.

To enhance our understanding further, Dr. Giri sir delivered a lecture on the diagnosis of human brucellosis. He highlighted that the clinical presentation can be misleading, with symptoms sometimes dominated by gastrointestinal, respiratory, skin, or neurological manifestations. Therefore, laboratory confirmation is essential, especially since atypical cases continue to occur. Although blood culture remains the standard diagnostic tool—most effective during the acute phase—the lysis concentration method provides the highest sensitivity. Automated incubation systems also assist in detection, but must account for the slow growth of the organism. Preliminary identification is based on morphological, cultural, and serological characteristics, while final confirmation requires advanced methods such as phage typing, oxidative metabolism studies, or genotyping techniques.

ACTIVITY LOG FOR THE FIFTH WEEK

Day & Date	Brief Description of the Daily Activity	Learning Outcome	Person In-Charge Signature
30-03-2023 (Day – 1)	Explained the result analysis of the samples	Gained knowledge on different result-comparison techniques	
31-03-2023 (Day – 2)	Studied disease findings and pathogen conclusions	Understood pathogen identification methods	
01-04-2023 (Day – 3)	Compared findings with other pathogens	Learned how to perform pathogen comparison and analysis	
03-04-2023 (Day – 4)	Demonstration of Brucella antigen preparation techniques	Learned antigen preparation, working mechanisms, and application guidelines	
04-04-2023 (Day – 5)	Observed packaging techniques of antigen kits	Understood export-quality packing and handling procedures	
05-04-2023 (Day – 6)	Information on marketing and manufacturing techniques	Gained live experience in drug marketing strategies and their practical use in rural animal healthcare	

Activity report on fifth week:

According to Dr. Giri sir, *Brucella* is a highly contagious pathogen, and for that reason we follow strict safety measures during every practical session. Research has shown that *Brucella* species can enter the human body through multiple routes, including the gastrointestinal and respiratory tracts, the conjunctiva, damaged skin, and even directly into the bloodstream through transfusion-related cases or transplacental transmission. Because of this high risk, our laboratory strictly enforces biosafety and biosecurity protocols. Before entering the lab, staff members carefully brief us on protective measures, handling procedures, and safety practices to prevent exposure.

After our in-charge explained each instrument and its operating principles, we worked together to analyse experimental data. For example, PCR using random or selected primers can produce positive results, but the process requires further standardization and confirmatory tests, especially for chronic infections. Antigen detection methods also provide useful indications, but their reliability still needs further validation. Advanced combinations like immuno-PCR show significant promise, although additional studies are required.

For serological diagnosis in humans and animals, enzyme immunoassays are widely used, with IgA and IgG antibodies serving as important indicators of active infection. In addition, Western blotting against specific cytoplasmic proteins can help differentiate between active, past, or subclinical infections, making it a valuable supportive test.

Throughout our training, we have practiced strict biosafety and biosecurity measures to minimize risk. Ultimately, the prevention of brucellosis in humans relies on controlling the disease in animal reservoirs, maintaining hygiene during high-risk occupational activities, and ensuring proper heating or pasteurization of dairy products and other potentially contaminated foods. Vaccination currently plays only a limited role in preventing human brucellosis.

Activity Log for Sixth Week

Day & Date	Brief Description of the Daily Activity	Learning Outcome	Person In-Charge Signature
06-04-2023 (Day – 1)	Introduction to scientific literature writing techniques.	Improved scientific writing and reading skills.	
07-04-2023 (Day – 2)	Collection of reference materials from the internet and veterinary textbooks.	Enhanced online searching and literature collection skills.	
08-04-2023 (Day – 3)	Searching and storing online scientific articles and web-based resources.	Learned efficient methods of saving and organizing scientific articles.	
10-04-2023 (Day – 4)	Downloading authenticated scientific materials for future project work.	Strengthened skills in authentic material identification and data collection.	
11-04-2023 (Day – 5)	Discussion on data writing techniques.	Gained practical experience in research script writing.	
12-04-2023 (Day – 6)	Explanation of data editing and manuscript preparation.	Learned data editing and scientific manuscript formatting.	

Activity report on sixth week:

During the sixth week of training, our focus shifted toward developing strong literature-searching and scientific writing skills. Under the guidance of Dr. Vinay sir and the Genomix team, we spent considerable time in the computer laboratory learning how to effectively browse scientific websites, access veterinary and biotechnology resources, and download relevant articles. We were introduced to various online platforms, HTML article links, and e-library sources, which helped us understand how to distinguish authentic scientific information from general content. Along with online learning, we were also taught the basics of research writing—how to structure scientific paragraphs, convert data into meaningful text, and edit manuscripts for clarity. By the end of the week, our skills in data collection, scientific searching, and manuscript preparation improved significantly, and we gained confidence in digital literacy and communication required for research projects.

Activity Log for Seventh Week

Day & Date	Activity	Learning Outcome	Person In-Charge Signature
13-04-2023 (Day – 1)	Introduction to basic biostatistics and data classification.	Understood statistical tools and data grouping.	
14-04-2023 (Day – 2)	Hands-on practice with mean, median, mode calculations.	Learned basic descriptive statistical methods.	
15-04-2023 (Day – 3)	Graph plotting and data visualization training.	Gained skills in preparing scientific graphs and charts.	
17-04-2023 (Day – 4)	Explanation of standard deviation and errors in experiments.	Understood variation, accuracy, and error analysis.	
18-04-2023 (Day – 5)	Training in MS Excel for biological data handling.	Improved digital competence in data analysis.	
19-04-2023 (Day – 6)	Interpretation of statistical outputs using sample data.	Learned to interpret calculated values scientifically.	

Activity report on Seventh week:

The seventh week concentrated on enhancing our analytical and biostatistical understanding, which is essential for interpreting experimental results. We were introduced to the foundational concepts of biostatistics such as mean, median, mode, standard deviation, and types of data distribution. Under the instruction of our mentors, we learned to handle raw data, classify it, and convert it into meaningful visual formats such as graphs, charts, and tables. We practiced plotting experimental values and understanding variations and errors that commonly occur in biological experiments. Hands-on training with MS Excel further strengthened our ability to record, calculate, and interpret biological data. This week provided clarity on data reliability, accuracy, and scientific interpretation, which will greatly support our future work in disease detection and research documentation.

Activity Log for Eighth Week

Day & Date	Activity	Learning Outcome	Person In-Charge Signature
20-04-2023 (Day – 1)	Introduction to advanced cell culture techniques.	Understood aseptic handling and media requirements.	
21-04-2023 (Day – 2)	Observation of culture maintenance and contamination control.	Learned contamination sources and prevention.	
22-04-2023 (Day – 3)	Hands-on session on inoculation and sub-culturing.	Improved practical cell culture skills.	
24-04-2023 (Day – 4)	Explanation of CO_2 incubator functions.	Learned incubator operation and calibration.	
25-04-2023 (Day – 5)	Study of cryopreservation techniques.	Understood freezing, thawing, and storage of samples.	
26-04-2023 (Day – 6)	Discussion on cell viability assays.	Learned cell health evaluation methods.	

Activity report on Eighth week:

In the eighth week, our training moved deeper into cell culture and laboratory operations. The Genomix staff provided detailed demonstrations on advanced cell-culture systems, media preparation, contamination control, and aseptic techniques. We observed the functioning of different biological instruments such as CO_2 incubators, laminar airflow chambers, and cryopreservation units. Training sessions included inoculation procedures, sub-culturing steps, and maintenance of healthy cell lines. We understood the importance of sterile handling and the factors that influence cell growth, such as temperature, pH, nutrient supply, and contamination risks. We also learned about freezing and thawing methods used for long-term storage of biological materials. This week strengthened our technical skills and gave us real-time practical exposure to core biotechnological laboratory procedures.

Activity Log for Ninth Week

Day & Date	Activity	Learning Outcome	Person In-Charge Signature
27-04-2023 (Day – 1)	Overview of DNA isolation techniques.	Understood principles of DNA extraction.	
28-04-2023 (Day – 2)	Demonstration of gel electrophoresis.	Learned sample loading and band interpretation.	
29-04-2023 (Day – 3)	PCR primer design basics.	Understood primer function and selection criteria.	
01-05-2023 (Day – 4)	PCR reaction setup and thermal cycling conditions.	Gained practical experience in PCR preparation.	
02-05-2023 (Day – 5)	Post-PCR analysis and result reading.	Learned band interpretation and troubleshooting.	
03-05-2023 (Day – 6)	Differences between conventional PCR and Real-Time PCR.	Understood advanced molecular detection concepts.	

Activity report on Ninth week:

Week nine focused on molecular biology techniques, especially DNA extraction and PCR. Our mentors explained the theoretical basis of DNA isolation, and we observed demonstrations of gel electrophoresis to understand how DNA fragments are separated and visualized. We were taught the importance of primer design and how specific binding sites influence the success of PCR amplification. The staff demonstrated how PCR reactions are prepared, optimized, and processed in a thermal cycler. Later, we learned how to read gel bands, interpret results, and identify potential sources of error in molecular experiments. The week concluded with a discussion on the differences between conventional PCR and Real-Time PCR, giving us a clear understanding of quantitative molecular diagnostics.

Activity Log for Tenth Week

Day & Date	Activity	Learning Outcome	Person In-Charge Signature
04-05-2023 (Day – 1)	Introduction to immunodiagnostic assays.	Understood antigen–antibody principles.	
05-05-2023 (Day – 2)	ELISA plate handling demonstration.	Learned pipetting accuracy and plate reading.	
06-05-2023 (Day – 3)	Hands-on ELISA experiment observation.	Understood absorbance values and cut-off analysis.	
08-05-2023 (Day – 4)	Introduction to rapid diagnostic kit technology.	Learned fundamentals of lateral-flow assays.	
09-05-2023 (Day – 5)	Difference between qualitative and quantitative assays.	Improved analytical interpretation ability.	
10-05-2023 (Day – 6)	Cross-reactivity and false-positive/negative concepts.	Understood quality assurance in immunoassays.	

Activity report on Tenth week:

In the tenth week, our training emphasized immunological methods used in disease detection. We were introduced to antigen–antibody interactions, the working principles of immunoassays, and the importance of sensitivity and specificity in diagnostics. Using ELISA plates, the staff demonstrated pipetting accuracy, incubation procedures, and plate reading using absorbance values. We also learned about rapid diagnostic kits, particularly lateral-flow systems used for field diagnosis in animals. Discussions included the differences between qualitative and quantitative tests, causes of false-positive or false-negative results, and quality-control measures needed to ensure accuracy. This week improved our practical understanding of immunodiagnostic applications and their importance in veterinary and biomedical fields.

Activity Log for Eleventh Week

Day & Date	Activity	Learning Outcome	Person In-Charge Signature
11-05-2023 (Day – 1)	Introduction to common livestock diseases.	Understood disease categories and symptoms.	
12-05-2023 (Day – 2)	Sample collection from animals (milk, blood, swabs).	Learned safe sample-collection procedures.	
13-05-2023 (Day – 3)	Handling and storage of veterinary samples.	Understood cold-chain and biosafety levels.	
15-05-2023 (Day – 4)	Demonstration of serological tests for livestock.	Learned diagnostic applications in field conditions.	
16-05-2023 (Day – 5)	Practical observation of antigen detection kits.	Gained real-time diagnostic experience.	
17-05-2023 (Day – 6)	Comparison of human & animal diagnostic workflows.	Understood similarities and differences in pathology.	

Activity report on 11th week:

During the eleventh week, we were trained in disease identification in livestock species such as cattle, buffaloes, goats, and sheep. Our mentors explained common infections, pathological symptoms, and real-world examples of disease outbreaks. Hands-on sessions included demonstrations of milk, blood, and swab sample collection, highlighting safe handling protocols, storage methods, and cold-chain maintenance. We compared diagnostic procedures used in humans and animals and observed how antigen detection kits are used in veterinary hospitals and field centres. This week broadened our understanding of zoonotic disease management and practical diagnostic procedures used in rural livestock healthcare.

Activity Log for 12th Week

Day & Date	Activity	Learning Outcome	Person In-Charge Signature
18-05-2023 (Day – 1)	Introduction to GLP (Good Laboratory Practices).	Understood laboratory standards and compliance.	
19-05-2023 (Day – 2)	SOP preparation and importance in industry.	Learned to follow and prepare SOPs.	
20-05-2023 (Day – 3)	Quality control checkpoints in antigen manufacturing.	Understood QC protocols and product validation.	
22-05-2023 (Day – 4)	Batch preparation and labeling process.	Learned systematic batch handling.	
23-05-2023 (Day – 5)	Storage and stability testing of products.	Understood shelf-life and temperature effects.	
24-05-2023 (Day – 6)	Regulatory requirements for veterinary products.	Gained knowledge of certification processes.	

Activity report on 12th week:

The twelfth week focused on quality management and industrial processing of diagnostic products. We were introduced to GLP (Good Laboratory Practices) and the importance of Standard Operating Procedures (SOPs) in ensuring consistent laboratory performance. The Genomix staff demonstrated each stage of product development, including batch preparation, labeling, stability testing, and quality control checkpoints. We learned about documentation, regulatory requirements, and certification processes necessary before a diagnostic product can be released into the market. This week helped us understand how laboratory research transitions into commercial-scale manufacturing while maintaining safety and product reliability.

ACTIVITY LOG FOR THE 13th WEEK

Day & Date	Brief Description of the Daily Activity	Learning Outcome	Person In-Charge
06-04-2023 (Day – 1)	Explained writing techniques of literature	Improved writing and reading skills	
07-04-2023 (Day – 2)	Collection and referencing of various materials from the internet and veterinary books	Improved search skills using internet and library resources	
08-04-2023 (Day – 3)	Searching for online articles and HTML links	Learned how to search and save online articles efficiently	
10-04-2023 (Day – 4)	Searching and downloading online materials	Enhanced skills in collecting digital materials	
11-04-2023 (Day – 5)	Explained data-writing techniques	Gained practical experience in script and data writing	
12-04-2023 (Day – 6)	Explained data editing and script-writing techniques	Learned manuscript editing and data-refining skills	

Activity report on Thirteenth week:

During this week of the internship, we received valuable hands-on training from our mentor and from Dr. Vinay sir. We regularly visited the computer rooms at Genomix Company, where we learned how to search for scientific materials, access online resources, and use digital tools effectively. By the end of the sixth week, this consistent practice helped us develop strong technical abilities and improve our communication skills.

Through our experience, we understood that technology should serve as a powerful tool to enhance subject knowledge and support innovative teaching and learning practices. It is not the final goal, but a medium through which scientific understanding, research skills, and professional competence can be strengthened in fields such as biotechnology, science education, research, and marketing.

We also learned the importance of three core components of modern scientific learning:

1. Content Knowledge: This includes understanding current technologies—hardware, software, internet tools, and both online and offline computer-based systems—that support scientific learning and laboratory instruction.

2. Pedagogical Knowledge: This refers to understanding how to design effective instruction, apply modern theories of cognition and learning, and use research-based methods that allow technology to be integrated meaningfully into education and scientific practice.

3. Professional Disposition: This involves developing qualities such as intellectual risk-taking, problem-solving in real time, envisioning how technology can be applied in scientific fields, and using data-driven decision-making for improvement. These skills are essential for implementing technology, collecting and analysing data, and adapting to new scientific challenges.

Overall, this week greatly enhanced our ability to use technology thoughtfully and effectively, strengthening both our scientific knowledge and our confidence as budding researchers.

Chapter -4
Description of Internship Programme

AAbstract

This internship was carried out in Genomix company in the period of two months from 1st October 2022 to 18th November 2022.

The main objective was to link the theoretical and practical's of onsite learning knowledge learnt in class with the practical on the field that enable the participant to contribute technically to get the real time experience of students progressions Research development, Pharmaceuticals in Genomix company.

This can only be achieved if there is knowledge about of proper techniques for animal production, vaccines, antibiotics, improvement practices, the diagnosis of the diseases on the field and use of drugs according to the diseases and animal's ages, how to conduct an anamnesis, different behavior of animals and try to choose the best animal according to your benefits and about some prophylactic measures of diseases and about some techniques and operations that can be used to solve non disease complications that can impair with livestock animal's life and cause production decline.

To ensure food security, good quality and large quantity of products from livestock animals, animal must be healthy and physically fit.

I had used many drugs during my internship to treat some diseases like infectious diseases, parasitic diseases, protozoa diseases and other measures or techniques and operations had been used to correct and prevent some other cases which may be disease related or not like dehorning, deworming. This report has three major parts namely general introduction and description of the internship area as part one, internship activities.

General introduction:

Genomix Carl Private Limited is a firm established under Public Private Partnership with Government of Andhra Pradesh, incorporated on 26th November, 2015 as Non-Government Company and is registered with Registrar of Companies, Hyderabad based at Pulivendula, Kadapa district of Andhra Pradesh with an authorized share capital of ₹100,000 and its paid up capital of ₹100,000.

Genomix company has complete production based sector, its manufactures broad range of Rapid diagnostic kits, ELISA and Isothermal PCR based molecular diagnostic assays and

handheld instrumentation to detect pathogens affecting human including HIV, Hb(S) Ag, HCV, Dengue, Chikungunya and canine, poultry and veterinary health care including Brucellosis, Wild animal and

bovine TB, Leptospira, New Castle Viral Disease, IBD, Foot and Mouth disease, Blue tongue disease, PPRV, Listeria etc. One of our focuses is also to develop assays and kits to help people at resource limited areas and economically challenged populations in the world. Our R&D team includes large number of young scientists working towards their Ph.D., degree registered at different universities.

The Genomix CARL is equipped with modern state of art R & D facilities in the field of live stock research. The main focus of Genomix CARL R&D is to identify the crucial needs of commonman, neglected/under-served rural communities, economically challenged populations, resource limited areas and explore the problems through fundamental research and develop best quality compounds or biopharmaceuticals for therapeutic intervention of disease processes and diagnostics and vaccines and instrumentation with state of the art technologies.

OBJECTIVES OF INTERNSHIP

MAIN OBJECTIVES:

To link the theoretical knowledge learnt in class with the practical on the field in different domains such as Zoonotic diseases and technical activities, immunological and pathological, Antigen kits preparation, vaccines and research development.

MY SPECIFIC OBJECTIVES WAS:

- To familiarize with the field activities by realization of different activities in the laboratory;
- To know well the different techniques of working methods in lab and try to choose the best method according to my benefits;
- To focus on the diagnosis of the diseases on the field and use of drugs according to the diseases and animal's live weight and ages;
- To improve skills about how to conduct an anamnesis towards an accurate diagnosis.
- To know the different challenges on the work place and to know how to solve them as technicians.
- To improve the skills about animal disease treatment and control.
- To improve my interpersonal communication.
- To improve my self confidence related to my option of animal production.

MISSION OF GENOMIX :

Genomix has the following mission:

- To impart reaserch in various branches of animal biotechnology, veterinary medicine, pharmaceuticals and animal husbandry to a sufficient number of technicians , Scientists and provide them with adequate skills to meet the requirements of their duties.
- To contribute to the ongoing poverty reduction, economic development and Biosecurity programs, animal vaccination programs in the country through increased antigen, antibodies production as a result of vaccine, ant-drugs research and transfer of technology.

The following are prioritized for this mission to be achieved

- Genomix ensures that its staff is highly qualified and promotes research in the fields of animal biotechnology, animal husbandry, rural economy and animal sciences;
- Genomix spreads diseases awereness programmes in rural throughout YSR-Kadapa district by providing training and refresher courses to the farmers by coordinating and sensitizing them within the framework of enhancing their skills and technical knowhow;
- Genomix supports activities carried out by farmers throughout the country by disseminating research findings and educating them through seminars, technical support, conferences, publications or any other communication tools available.
- Genomix promotes veterinary development and animal husbandry through existing linkages and cooperation between Genomix and other institutions of higher learning, scientific research institutions inside Rwanda and in foreign countries.

VISION

By the year 2022, Geniomix is committed to becoming a centre of high standards and influence in research, technology transfer in animal husbandry, veterinary medicine, vaccines and drugs development and processing and to becoming a major player in rural economic transformation.

This vision is based on the following values:

- Science and Conscience,
- Patriotism,
- Efficiency,
- Integrity, and
- Equity.

These moral and professional values insure the institution’s success.

Description:

About Brucellosis:

The widespread and prevalent zoonotic illness brucellosis can affect both domestic and wild animals. Brucella spp. are Gram-negative coccobacilli that range in size from 0.6 to 1.5 lm, are non-spore- forming, and are not migratory. Different types of wild and domestic animal species are infected by Brucella spp. The three pathogenic species that are most significant to humans are B. melitensis, B. suis, and B. abortus. From hosts, two novel Brucella species have been identified.

Pathogenesis of Brucella spp. and involved immune mechanisms

Potentially, Brucella species can grow inside of the macrophages and bypass the host's defences. Through ingestion, inhalation, puncture wounds like needle sticks, and mucosal contact, it can infect a human host. There are no plasmids linked to the pathogenicity of this bacterium's genome. While causing very minimal endotoxicity, or the ability to pass through the blood stream unharmed, it has demonstrated exceptional resistance to antibiotics.

Economic losses due to brucellosis

Numerous financial losses are caused by cattle brucellosis worldwide, including those to animal health, production, and public health (cost of treatment and productivity loss in man). For instance, surveys carried out in India revealed an estimated median economic loss of US $3.4 billion as a result of laborious rucellosis. Two decades ago, Nigeria's small ruminant industry suffered annual economic losses from brucellosis of $3.2 million USD. In farms where the disease has spread, a 20–30% decline in milk production has been predicted. In underdeveloped nations, eradication programmes for brucellosis could be quite expensive.

Brucella spp. shedding in milk

According to the examined nation and region, the prevalence of Brucella species contamination of dairy products varied. For instance, because of many concerned livestock species, variable management techniques, and particular national or regional veterinary and medical programmes, brucellosis prevalence is significant in middle and low income countries. Although bacterial isolation is still regarded as the "gold standard" for brucellosis diagnosis, many indirect and direct approaches have been used to detect Brucella species in dairy products with varying sensitivity and specificity. Considering that B. melitensis and B. abortus typically infect people through the intake of infected milk products from cattle, camels, goats, and sheep, the prevalence of Brucella spp. in contaminated milk appears to be

of significant relevance for risk evaluation in high risk groups. However, the incidence of brucellosis in different hosts and countries is directly associated with eradication and control programs in livestock that should be implemented by national veterinary services such as vaccination and "test and slaughter" policy.

Brucellosis control strategies

According to the World Health Organization (WHO) - One of the seven zoonotic diseases that have received little attention but are responsible for a significant part of poverty in underdeveloped nations is brucellosis. You can utilise all or more of the following control strategies, including cleanliness, test-and-removal methods, and/or vaccine, to combat brucellosis. The use of the Brucella melitensis REV-1 vaccine is the most efficient method for eliminating and controlling brucellosis in young and adult small ruminant animals. The most effective method for extensive or nomadic husbandry is considered to be this method. Numerous factors need to be assessed as part of the planned control programme, including knowledge of regional and local variations in animal epidemiological patterns of the brucellosis, cross-sectoral epidemiological coordination and surveillance, husbandry practises, the level of infrastructure support, community awareness, and social customs.

Risk factors of Brucella spp. infection in dairy cattle farms

The main risk factors for brucellosis infection in herds located in the suburbs of Asmara, Eritrea, have been discovered through a research of 99 dairy cattle herds (1294 female cattle sampled) in Eritrea. Numerous possible risk variables, including farm size, herd size, stocking density, and herd type, have been identified. According to a study, mixed farming and bigger herd sizes are the primary risk factors for increasing Brucella infections in cattle. The authors came to the conclusion that Brucelia spp. prevalence was independently correlated with animal density and herd type. Additionally, the presence of horses or other animals on the farm (such as a dog, sheep, cat, chicken, or monkey) was taken into account.

Detection methods and identification of Brucella spp. in the milk of infected cattle, sheep, goats and camels

The prevalence of Brucella spp. in dairy herds and milk is extremely important for both public health and the economy. Brucella contaminations might come from the udder's interior or exterior. The efficient role of macrophages in moving B. abortus from the systemic circulation into the mammary glands and milk was shown by an intriguing investigation. Brucellosis can be brought on by contact with organisms that react with one another, such as Yersinia enterocolitica O:9, Vibrio cholerae, Francisella tularensis, and Escherichia coli O:157.

Serology tests like the SAT, RBT, CFT, and iELISA are used in the majority of brucellosis diagnostic methods. Complementary non-agglutination tests, which are more expensive and use techniques like ELISA and PCR, are strongly advised.

Brucella-associated public health concern in the milk supply chains

This disease may also be spread by the eating of contaminated raw milk, cheese, and butter. The likelihood of contracting bovine Brucellosis and the availability of financial resources are significantly correlated. In several parts of the world, Brucella contamination of milk products continues to be a significant public health concern because it is still impossible to determine how common it is. The prevalence of human brucellosis can be decreased by the introduction of sensible control strategies and surveillance systems. In Oman, Kuwait, and Iran, consumption of tainted raw milk products was to blame for 63%, 69%, and 57% of human brucellosis infections, respectively. In Turkey, 63% of people reported having consumed raw milk or other raw dairy products in the past. According to other Turkish studies, 62–94% of human brucecserosis cases are attributed to the intake of milk products that are contaminated. Avoiding the mingling of small ruminants and cattle, reducing the rate of abortion, and culling contaminated animals after testing could all help achieve this.

Failure of control of Brucella spp. infection in a dairy herd

To fully understand the Brucella species that are circulating among livestock, a prevalence research on immunised herds is necessary. A field strain of B. abortus biovar 1 that was isolated from dairy calves that had received the RB51 vaccine indicated that the vaccination had failed, which could have resulted in the resurgence of brucellosis. A bacteriological test and a PCR technique were used to confirm the presence of Brucella spp. in milk samples from seronegative dairy animals (reported by RBPT). These days, it is believed that animals like birds, cats, and dogs could contaminate the environment and infect people, livestock, and humans. A higher risk of the disease exists on dairy farms that use artificial insemination or natural breeding with non-certified bulls for brucellosis. Control of bovine Brucellosis remains a significant concern in many areas due to the lack of highly effective vaccinations and the challenges associated with implementing a segregation and slaughter policy.

Conclusions:

The most significant and pervasive zoonotic diseases in the world are thought to be brucellosis. As a result of rising milk consumption and population growth, milk production is steadily expanding. The objective of this review was to explain how brucellosis prevention initiatives might enhance dairy output. Considering the potential public health implication and

important economic losses associated with these widespread zoonotic diseases, strict preventive programs should be performed to protect the cattle population from Brucella infections. According to our investigations, multiple factors influence the epidemiology of brucellosis among dairy herds, including management and trade systems, climatic conditions, and agro-ecological zones. All potential risk factors need to be carefully identified and their individual and combined impacts on milk production evaluated in order to design adequate preventive strategies and control programs to improve milk production process in endemic regions. The control of brucellosis on dairy farms has been made possible by a "One Health" plan that includes the growth of health education and the improvement of veterinary capabilities and services. In endemic areas, vaccination-based control efforts, such as calf, sheep, and goat vaccination, proved to be essential.

Student Self Evaluation of the Short-Term Internship

Student Name: **Registration No:**

Term of Internship: **From:** **To :**

Date of Evaluation:

Organization Name & Address:

Please rate your performance in the following areas:

Rating Scale: **Letter grade of CGPA calculation to be provided**

1	Oral communication	1	2	3	4	5
2	Written communication	1	2	3	4	5
3	Proactiveness	1	2	3	4	5
4	Interaction ability with community	1	2	3	4	5
5	Positive Attitude	1	2	3	4	5
6	Self-confidence	1	2	3	4	5
7	Ability to learn	1	2	3	4	5
8	Work Plan and organization	1	2	3	4	5
9	Professionalism	1	2	3	4	5
10	Creativity	1	2	3	4	5
11	Quality of work done	1	2	3	4	5
12	Time Management	1	2	3	4	5
13	Understanding the Community	1	2	3	4	5
14	Achievement of Desired Outcomes	1	2	3	4	5
15	**OVERALL PERFORMANCE**	**1**	**2**	**3**	**4**	**5**

Date: **Signature of the Student**

Evaluation by the Supervisor of the Intern Organization

Student Name: **Registration No:**

Term of Internship: **From:** **To :**

Date of Evaluation:

Please rate the student's performance in the following areas:

Please note that your evaluation shall be done independent of the Student's self- evaluation

Rating Scale: 1 is lowest and 5 is highest rank

1	Oral communication	1	2	3	4	5
2	Written communication	1	2	3	4	5
3	Proactiveness	1	2	3	4	5
4	Interaction ability with community	1	2	3	4	5
5	Positive Attitude	1	2	3	4	5
6	Self-confidence	1	2	3	4	5
7	Ability to learn	1	2	3	4	5
8	Work Plan and organization	1	2	3	4	5
9	Professionalism	1	2	3	4	5
10	Creativity	1	2	3	4	5
11	Quality of work done	1	2	3	4	5
12	Time Management	1	2	3	4	5
13	Understanding the Community	1	2	3	4	5
14	Achievement of Desired Outcomes	1	2	3	4	5
15	**OVERALL PERFORMANCE**	**1**	**2**	**3**	**4**	**5**

Date: **Signature of the Supervisor**

Photos

Diwali celebrations in Genomic Company

Orientation programmes in Genomics Company

INTERNAL ASSESSMENT STATEMENT

Name of the Student	:	**S.SUBHAHAN**
Program Of Study	:	**A study on clinical symptoms and Diagnosis as well as potential therapeutic implications for of Brucellosis**
Year Of Study	:	**2024**
Group	:	**B.SC, B.ZC**
Register No/H.T. No	:	**206036049028**
Name Of the College	:	**Loyola Degree College**
University	:	**Yogi Vemana University**

Sl.No	*Evaluation Criterion*	*Maximum Marks*	*Marks Awarded*
1.	Activity Log	10	
2.	Internship Evaluation	30	
3.	Oral Presentation	10	
	GRAND TOTAL	**50**	

Date: Signature of the Faculty Guide

EXTERNAL ASSESSMENT STATEMENT

Name of the Student : **S.SUBHAHAN**

Program of Study : **A Study on clinical symptoms and Diagnosis as well as potential therapeutic implications for Brucellosis**

Year of Study **2024**

Group : **B.SC, BZC**

Register No/ H.T.No : **206036049028**

Name of the college : **Loyola Degree College**

University : **Yogi Vemana University**

Sl.No	*Evaluation Criterion*	*Maximum Marks*	*Marks Awarded*
1.	Internship Evaluation	80	
2.	For the grading giving by the Supervisor ofthe Intern Organization	20	
3.	Viva-Voce	50	
	TOTAL	150	
GRAND TOTAL (EXT. 50 M + INT. 100M)		200	

Signature of the Faculty Guide

Signature of the Internal Expert

Signature of the External Expert

Signature of the Principal with Seal

Interns Final Grading Sheet For their semester internship

As per our observance and for their punctuality at their work, Discipline and for communication in our organization we are assigning thesemarks to these interns.

Sl. No	Student Name	Group	Hallticket No.	Total Marks	Assigned marks
1.	S. SUBHAHAN	B.SC, BZC	206036049028	20	
2.	B. BASHROON	B.SC, CZCA	206036628005	20	
3.	V.JOYSHNA	B.SC, CZCA	206036628030	20	
4.	R. SRUTHI	B.SC, CZCA	206036628022	20	
5.	T. POOJITHA	B.SC, CZCA	206036628027	20	
6					
7					
8					
9					
10					