

## DOW INSTITUTE FOR ADVANCED BIOLOGICAL & ANIMAL RESEARCH (DIABAR)

DOW UNIVERSITY OF HEALTH SCIENCE

# STRATEGIC PLAN (2024 - 2027)

**Pioneering Excellence | Inspiring Innovation** 



## To Heal | To Educate | To Discover



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### DIRECTOR'S MESSAGE



Dr. Talat Roome, *Ph.D., Post-doc (USA) Fulbright Scholar, USA; Charles Wallace Scholar, UK* Director

Dow Institute for Advanced Biological & Animal Research (DIABAR) Associate Professor (Molecular Medicine); Dept. of Pathology, DIMC Dow University of Health Sciences

I am honored to serve as a director "Dow Institute for Advanced Biological & Animal Research". DIABAR is a *state-of-the-art* facility meeting the international standards; it has four major sections ranging from a preclinical toxicology testing facility to a Research and Development (R&D) section extended to a central animal house and a Basic Biological Manufacturing Facility (BBMF) for the translation of R&D projects. The quality control section helps abide by the international standards and guidelines to produce biological products, whereas all logistics and working in DIABAR are strictly regulated by its QMS. We are unique in the country in maintaining a diverse group of experimental animals and a wonderful equine systemfor the manufacturing of biological products.

Our passion for research facilitates the scientific community from different domains of the health sector; it empowered us to have the thought leadership in addressing the health challenges being facedby the country during the worst economic crises. Establishment of the DIABAR is a great addition to the list of country's most accomplished research and development institutions to deliver results on health and health-related Sustainable Development Goals. Over the past 20 years, we have leveraged our expertise in providing high-quality research and services for research students, academic institutions and other stakeholders in Health and Pharmaceuticals.

DIABAR serves as a hub of scientific activities; our Advanced Research Laboratory facilitates interdisciplinary research from vast avenues of academia and industry. On the other hand, Pre- clinical Toxicological laboratory offers wide range of toxicity testing services using both in-vitro and in-vivo approaches, dedicated experimental animal models are also being used for precise results. We comply with FDA approved protocols and animal ethical guidelines for testing of drugs and natural extracts etc. The quality control section of DIABAR not only fulfills institutional needs but rather it outsources its testing facilities. Through our work, we have established strong ties with government and private sector across the country, bridges strong collaborations with renowned institutions around the globe.

DIABAR also focuses on academia; we strongly encourage youngsters across the country to join us for collaborative research work and training. We also provide an experimental 100-class facility for animal surgical procedures to researchers and faculty members. We also support postgraduate students to carry out their experimental work with the provision of full resources.

Our vision is to strengthen the health and economic sector of the country by indigenous production of biopharmaceutical products, including vaccines. Keeping in view the country needs our major projects to focuses on the production of anti-snake venom against big 4 of Pakistan and the manufacturing of inactivated rabies vaccine using local virus strains.

Being a director of the institute, I constantly encourage and support the DIABAR team to work day and night, I'm very delighted to follow our honorable Vice Chancellor, Prof. Dr. Muhammad Saeed Quraishy's Vision for the betterment of our health system and my self- commitment is to keep serving for the national cause. I'm quite hopeful to meet the strategic plans of Dow University of Health Sciences by bringing up the quality products at the national level as a Basic Biological Manufacturer. We want to bring up the facility as an International Accredited Laboratory with a license to work as a Pre-clinical & Toxicological research and screening service provider using animal models, etc., for all this upg r ad e and to meet milestone, DUHS has been continuously supporting us to build the infrastructure.

### EXECUTIVE SUMMARY

Dow Institute for Advanced Biological & Animal Research (DIABAR) is one of the reputable Institute of Dow University of Health Sciences with the vision of continuous upgradation and innovation in systems and infrastructures. DIABAR is a *state-of-the-art* facility having four major sections namely Research and Development (R&D), Pre-clinical Toxicology Testingfacility, Basic Biological Manufacturing Facility (BBMF) and Central Animal House. Quality control ensures the authenticity of experimental data and products quality, while Quality Assurance section ensures the implementation of proper SOPs and training of staff. DIABAR isa core facility to execute interdisciplinary research broadly from R&D level and its translation into Applied Science Projects.

Toxicity testing services help researchers from different domains. We receive samples of various types from academic Institutions and Industries across the country. Our well trained and highly qualified staff at each section make sure the good quality services and research of international standards as evident by the grant of US Patent and enormous publications. So far, we haveserved different pharmaceutical industries including Medics Pvt. Ltd., Mector Pvt. Ltd, Indus Pharma (Pvt.) Ltd. and Dalda Foods Ltd and Hamdard laboratories Pvt. Ltd.

We have developed strong National & International collaborations with Aga Khan University Hospital, International Center for Chemical and Biological Sciences (ICCBS), DESTO-RRC, Hamdard University, University of Karachi and Interdisciplinary Research Center in Biomedical Materials (IRCBM), COMSATS University Islamabad Lahore Campus as national collaborators in several research projects. Moreover, the DIABAR is coordinating with the international collaborators and service provider organizations at Chapman University, Irvine, California, USA; Virginia Commonwealth University (VCU) Virginia, USA; The American Type Culture Collection (ATCC; Cell line Bank), Manassas, Virginia, USA; Dept. of Materials Science & Engineering, University of Sheffield, UK; Biomedical Research Center, Qatar University etc. for exchange of knowledge and item provision and data analysis.

We are unique in the country in maintaining the diverse group of experimental animals and a wonderful equine system under continuous monitoring of veterinary doctors for the manufacturing of biological products. Our major project of Anti-snake venom (ASV) production against big 4 snakes is well known in Pakistan as a Basic manufacturer. We are honored to receive the HEC-World Bank funding under GCF-790 project of indigenous inactivated Rabies vaccine development, we have achieved several milestones and release of project's second installment by World Bank endorsed our efforts and satisfaction on our progress.

Dow Institute for Advanced Biological & Animal Research (DIABAR) envision that our facilities should be the best in basic biological manufacturing units and pre-clinical & toxicological contract laboratory in

Pakistan catering to local market and emerging markets while helping Pakistan to be self-sufficient in manufacturing biological(s) and vaccine(s) and its testing. In current COVID 19 pandemics, the facilities can cater for research and development and bulk manufacturing of COVID 19 vaccines that will significantly add another milestone including Anti-Rabies, Antitetanus and Monoclonal antibody production for the future of Pakistan and Sindh Pharmaceutical Industry.

### ABOUT THE INSTITUTE

DIABAR began its journey as a Laboratory Animal Sciences (LAS) in year 2008 comprising of total 4.07Acre area, later it was upgraded by the establishment of its extension laboratory as Advanced Research Laboratory (ARL) in January 2017. In continuation of innovation various sections are established; most importantly Basic Biological Manufacturing Facility (BBMF) designed as per DRAP approval, Quality Operation Sections established as per regulatory standards including Quality Control Laboratory (QC) & Quality Assurance (QA) and R&D Sections, all are now collectively working under the umbrella of DIABAR from 2021. A journey of transformation is going on with the hope of getting International Accreditation and Licensing to work as an exclusive pre-clinical & toxicological testing service provider and as a basic manufacturer of biologicals in the country and South Asia. Presently DIABAR has five major sections as per DUHS approved organogram shown below:

- 1. Research and Development (R&D) Section
- 2. Advanced Research Laboratory/Pre-Clinical & Toxicology Contract Laboratory
- 3. Basic Biological Manufacturing Facility (BBMF)
  - Plasma Collection and processing laboratory (PCPL)
  - Venom Collection and Processing Laboratory (VCPL)
  - Vaccine Manufacturing Facility (ready to fill commercial production)
  - Pathogen Free Facility (Vaccine & biological product testing facility)

#### 4. Quality Operations

#### 5. Central Animal House Facility

We are unique in the country as the producer of basic biological raw material under the designated facility BBMF. VCPL is a nested facility for the collection and processing of venom to serve as raw material provider and as biobank of big 4 which has been used for the immunization of horses to collect hyper immunized plasma. Two major projects are our prime targets to improve the health system of the country with the aim to decrease economic burden by indigenous production of biological using local strains.

- 1. Anti-snake venom (ASV) production against big 4 snakes of Pakistan
- 2. Inactivated Rabies Vaccine production under GCF-790 awarded by World Bank

The Dow Institute for Advanced Biological & amp; Animal Research (DIABAR), is continuously working on the concept of Venom Bank for biotherapeutics and cosmetics purposes. Due to our running Anti-Snake Venom Project, our prime target is Pakistan's Big-4 Venoms detailed Venomics, Biological & Toxicological profiles and Therapeutics Index in different animal disease and cell based models, these data is also beneficial for Anti-Snake Venom project indigenously in the country especially Next-Generation anti-snake venom and marketing of snake venom as a raw material, this is first time the Pakistani venom is explored on these aspects, we have completed our data on 4 batches of venom regarding general quality control tests as per our previously approved methods.

Under the entitlement of "<u>DUHS Venom Project BIG-4</u>" with the approval and Agreement of Vice Chancellor, Prof. Dr. Saeed Quraishy, we are designing a series of Projects for pilot studies and applied for different funding agency for conducting comprehensive R& D projects leading to commediation

### INTRODUCTION AND OVERVIEW

Dow Institute for Advanced Biological & Animal Research (DIABAR) is an emerging institute having integrated facilities of Research and Development, Pre-clinical Toxicology testing laboratory, Quality control and Basic Biological Manufacturing Facility (BBMF) supplemented with the institute's own animal house; a resource center of experimental animals and a fully established equine system for the manufacturing of biological products. All sections of our facility are fully equipped with latest instrumentations and highly qualified skilled full scientific staff.

Our Research and Development (R&D) section has been extensively involved in executing interdisciplinary research from various domains of the health sector. We use dedicated experimental animal models on wild type and genetically modified rodents and non-human primates (Rhesus Macaque) to carry out project based customized experiments with modified protocols; we have built strong collaborations both with national and international institutes/industries. We have recently acquired US Patent from one such study and several high impact international publications. We have established capacity to test Vaccines and Toxoids against challenge studies models targeting Rabies Vaccine, Covid-19 Vaccine and anti-tetanus. We welcomeequally both industry and academia for any collaboration of mutual benefit and of great national interest.

The Preclinical toxicological testing facility of DIABAR provides a vast range of toxicity testing services to academic, pharmaceutical, textile and other human consumables production industries. For animal surgical procedures: Toxicity Testing facility is also being available for scientists from other institutions. We also offer animals handling training programs for undergraduate and post graduate students and professional from health sector.

To translate R&D projects into commercialization we have a well-established Basic Biological Manufacturing Facility (BBMF) which ensures the transformation of ideas into applied projects. Venom Collection and Processing Laboratory (VCPL) is the subdivision of BBMF which is the unique in the country in collecting venom form big 4 snakes most prevalent in Pakistan, we have a well-established collection pipeline which assures the timely provision of snakes in enough quantities. We also have an in-house biorepository of processed Plasma as collected in our Plasma Collection and Processing Laboratory (PCPL) which is not only serving the institutional needs for immunization of horses to produce hyper-immunized plasma but also a good resource for the biological raw material for other industries.

Our major ongoing projects namely the Anti-Snake Venom (ASV) against big 4 snakes of Pakistan and Inactivated Rabies Vaccine production are unique projects in the country with the hope to provide significant support to the health sector. The quality control section ensures the stability and integrity of biology at each level of production. QC also offers a wide range of testing to the outsiders as well. The other major project GCF-790 awarded by World Bank has a great importance in improving the health system of the country by producing inactivated Rabies Vaccine using local viral strains. We are not limited to the above-mentioned projects; our collaborative work to produce recombinant COVID vaccine and others in pipeline to produce monoclonal antibodies.

The Quality Management System (QMS) of DIABAR manages all Standard Operating Procedures and has formed up to 300 SOPS as per international guidelines and approved by the director. Routine audits by QMS are the step towards accreditation and licensing.

DIABAR made several strong collaborations with world-renowned institutes for the exchange of technology and training of staff. We are known to be experts in the development of disease animal models with subsequent molecular analysis and cell signaling pathways to discover pathogenesis. These dedicated animal models have also been used to uncover drug action. We aim to strengthen university-industry networking and encourage young scientists across the country to pursue their academic training/carrier at DIABAR and welcome all collaborations from academia and industries.

### INSTITUTIONAL ORGANOGRAM



### **DIABAR TEAM & STAFF**

## DIABAR has qualified and technically skilled staff working in the sub-sections of the institute













Ph.D.; Post-doc (USA) Fulbright Scholar, USA Charles Wallace Scholar, UK*Director,* Dow Institute for Advanced Biological and Animal Research(DIABAR)

*Associate Professor,* Department of Pathology Dow International Medical College,Dow University of Health Sciences.

**Dr. Khurram Fareed** Sr. Veterinary Doctor Ph.D. in Microbiology, DVM (Rodents Specialist)

**Dr. Durr-e-shahwar** Production Manager In-charge Basic Biological Manufacturing Facility Ph.D. in Molecular Medicine

**Dr. Midhat Batool** Staff Scientist In-charge Advanced Research Lab Ph.D. in Molecular Medicine

**Dr. Salma Mirza** Staff Scientist Project Manager (In-charge Preclinical & Toxicological Contract Laboratory) Ph.D.; Postdoc. in Material Science

**Dr. Kashif Khan** Sr. Veterinary Doctor DVM (Equine Specialist)







**Dr. Sehrish Batool** QA Executive In-charge Quality Assurance Ph.D. Fellow, MPhil / Pharm D (Ph. Chemistry)

**Dr. Atia Gohar** Deputy Manager QC In-charge Quality Control Laboratory Ph.D. in Biochemistry

**Ms. Farah Aslam** Scientific Officer Venom Collection & Processing Lab (VCPL) Supervisor Ph.D. Fellow, M.Phil. in Pharmacology



**Ms. Nida Rehman** QC Officer M.Phil. in Microbiology



**Ms. Hafiza Ayesha** QC Analyst Ms. in Microbiology MPhil Fellow

Our team has qualified scientific staff, researchers of different fields comprise virologists, immunologists, microbiologists, molecular biologists, biotechnologists, pharmacists, material chemists and geneticists. Additionally, this institute has senior veterinary doctors, skilled workers, technologists, technicians, veterinary assistants, lab attendants and animal attendants.

### LIST OF DIABAR STAFF



#### DOW INSTITUTE FOR ADVANCED BIOLOGICAL AND ANIMAL RESEARCH QUALITY ASSURANCE DEPARTMENT LIST OF TECHNICAL STAFF

Dow Institute for Adv and Actival IN	Updated on: 10-02-2025						
S. No	Name	Qualification	Designation	Experience			
1	Dr. Talat Roome	Ph.D / Post Doc (Molecular Medicine); Toxicology and Immunology and Molecular Pathology	Director	16 years			
DEPARTM	ENT: CENTRAL ANIMAL HOU	JSE					
1	Dr. S. Khurram Fareed	Ph.D (Microbiology)/ DVM (Rodents Specialist)	Senior Veterinary Doctor / Incharge	16 years			
DEPARTM	ENT: QUALITY ASSURANCE						
1	Sehrish Batool	Ph.D Fellow (Ph. Chemistry) / Doctor of Pharmacy	Quality Assurance Executive / Incharge	13 years			
2	Hiba Arshad	Doctor of Pharmacy	Quality Assurance Representative	1 year			
DEPARTM	ENT: QUALITY CONTROL						
1	Dr. Atia Gohar	Ph.D (Genomics, Proteomics & Neuroscience)	Deputy Manager Quality Control / Incharge	12 years			
2	Nida Rehman	M.Phil (Microbiology & Immunology)	Quality Control Officer	9 years			
3	Hafiza Ayesha	M.Phil fellow (Microbiology)	Quality Control Analyst	4 years			
DEPARTM	ENT: ADVANCE RESEARCH L	ABORATORY					
1	Dr. Midhat Batool Zaidi	Ph.D. (Molecular Medicine); Stem cells and regenerative medicine/ MSc (Biotechnology)	Staff Scientist / Incharge	11 years			
2	Dr. Sobia Ekram	Ph. D (Molecular Medicine)	Scientific Officer	6 years			
3	Adeel Ahmed Farooqui	M.Phil fellow (Biotechnology)	On Project	5 years			
DEPARTME	NT: RESEARCH & DEVELOP	MENT (GCF 790)					
1	Naila Sheraz	MPhil (Medical Genetics)	GCF 790	15 years			
2	Dr. Faryal Ashraf	Ph.D (Molecular Medicine)	Research Associate	6 years			
3	Dr. Kinza Rafi	Ph.D fellow (Molecular Medicine)	Research Associate	6 years			
4	Dr. Saman Rashid	Ph.D fellow (Proteomics)	Research Associate	6 years			
5	Ms. Hina Shakeel	M.Phil (Molecular Medicine)	Research Assistant	6 years			
6	Rihaaf Abdul Qayyum Bilwani	M.Phil fellow (Pharmacology)	Research Assistant	4 years			
7	Syeda Kulsoom	M.Phil fellow (Pharmacology)	Research Assistant	4 years			
DEPARTME	NT: PRECLINICAL AND TOXI	COLOGICAL CONTRACTUAL LABORATORY					
1	Dr. Salma Mirza	Ph.D (Material Physics & Chemistry)	Staff Scientist/ Incharge	15 years			

DEPARTM	DEPARTMENT: BASIC BIOLOGICAL MANUFACTURING UNIT (PLASMA AND VENOM PROCESSING)							
1	Dr. Syeda Durr-e-Shahwar	Ph.D (Molecular Medicine, Molecular Biology & Biotechnology)	Production Manager / Incharge	15 years				
2	Dr. M. Kashif Khan	DVM (Equine Specialist) / Production Supervisor	Senior Veterinary Doctor	22 years				
3	Dr.Farah Aslam	Ph.D fellow (Pharmacology)/Doctor of Pharmacy	Scientific Officer	6 years				
4	Gulsher Umrani	Bachelor of Sciences	Lab Technician	24 years				
5	Rajab Ali	Intermediate, IT Diploma	Quality Assurance Assistant/ Phlebotomist	10 years				
6	Sarfarazuddin	Intermediate	Lab Technician / Phlebotomist	10 years				
7	Ghulam Asghar	Matric	Veterinary Assistant	16 years				
8	Abdul Jabbar	Intermediate	Veterinary Assistant	24 years				
9	Ghulam Hussain	Intermediate	Attendant	10 years				
10	Pervaiz	Matric	Attendant	11 years				
11	Basharat	Intermediate	Attendant	11 years				
12	Ali Raza	Matric	Stable Boy 9 years					
13	Qurban	Matric	Attendant	5 years				
14	Jamal	8th	Attendant	11 years				
15	Soofi	5th	Snake Charmer	9 years				
THIRD PAR	TY WORKERS							
1	Qurban		Attendant					
2	Irfan		Attendant					
3	Naib Ali		Attendant					
4	Lal Dino		Attendant					
5	Farrukh		Attendant					
6	Imtiaz Ali		Attendant					
7	Waqar		Attendant					
8	Mohsin		Sweeper					
9	Qurban		Sweeper					
10	Ibrar		Sweeper					
11	Jan Nisar		Attendant					

## SECTION I: OVERVIEW OF THE STRATEGIC PLANNING PROCESS

Given the fact that DUHS is the largest and most comprehensive health sciences institution in Pakistan, we share an unprecedented responsibility and enormous potential to continue to shape the future of health care in this region. Accordingly, Professor Muhammad Saeed Quraishy, ViceChancellor, DUHS mandate that all key stakeholders in the University and the community be involved in the development of this Strategic Plan. The Executive Strategic Planning Workgroup(see below) was therefore constituted with this mandate in sight and the process of development of this Plan was informed and influenced not only by their active participation but also the valuable feedback that was actively sought from the faculty, staff, students, and members of this community.

The following guiding principles were used in the development of this Strategic Plan, and it is anticipated that this will be incorporated within the planning process that will be subsequently employed by various academic and administrative units in the development of their own complementary strategic plans. It was envisioned that the Plan should:

- Be consistent with and contribute to the achievement of the DUHS's mission, vision, and values.
- Be developed in a participative and collaborative manner and shared with all keystakeholders.
- Reflect high but achievable and realistic aspirations as well as demonstrate creativity and innovation in setting forth goals and strategic thrusts for the University.
- Be based on measurable goals and strategies and include appropriate performancemetrics.
- Take into consideration available resources.
- Include a component on objective monitoring/evaluation.

A key component of the planning process was its genesis and review by a knowledgeable and appropriately constituted Executive Strategic Planning Workgroup. This review process ensured that all plans were conceptually and structurally sound, demonstrated high aspirations, creativity and innovative thinking, and contributed to the accomplishment of overall University goals. Recognizing both the time constraints of the planning schedule and the diversity of issues faced by a rapidly expanding University, the overall intent of this process was to keep it as simple as possible and provide appropriate flexibility inachieving the stated goals.

## Membership of the Executive Strategic Planning Workgroup:

Professor Muhammad Saeed Quraishy	
Vice Chancellor, DUHS	
	Chairman
Professor Sohail Rao	Member
Senior Advisor to the Vice Chancellor, DUHS	
Professor Saba Sohail	Member
Chairperson, Department of Postgraduate Studies	
Professor Sumbul Shamim	Member
Principal, Dow College of Pharmacy Dean, Faculty of Pharmaceutical Sciences	
Professor Jahan Ara Hasan	Member
Professor Sajida Qureshi	
Head, Surgical Unit - V, Dow Medical College Dr. Ruth K. M.Pfau	Member
Civil Hospital, Karachi	
Professor Asima Faisal	Member
Director Academics & Professor	
Institute of Business and Health Management (IBHM)	
Professor Kashif Shafiq	Member
Director of the Office of Research, Innovation, and	
Commercialization (ORIC) at DUHS	
Professor Nazli Hossain	Member
Professor Sonia Siddiqui	Member
Professor Yahya Noori	Member
Pathology and Digital Learning	
Ms. Sanam Soomro	Member
Director, Quality Enhance Cell, DUHS	
Mr. Hamid Ali	Member
Mr. Farhan Mahmood	Member
Mr. Muhammad Babar	Member

The DIABAR has also formed an internal committee for the Strategic Planning and Development of the Institute. Dr. Talat Roome (Director, DIABAR) is the chairperson of the committee and other members include:

S.No	Name & Designation	Key role
1.	<b>Dr. Talat Roome,</b> Director DIABAR	Team leader Articulate and communicate DIABAR key objectives under DUHS strategic goals directly to SPIW-DUHS member Prof. Kashif Shafiq ( <i>Ref No: DUHS/Reg./2024/01-04</i> )
2.	Dr. Sehrish Batool, Quality Assurance Executive/ In- charge QMS, DIABAR	Focal person Workforce development through imparting internal & external training programs, conducting audits, monitoring compliances for accreditation of biological product manufacturing and pre-clinical lab facilities.
3.	<b>Dr. Midhat Batool</b> Staff Scientist, In-charge Advance Research Laboratory, DIABAR	Member Assisting in designing and execution of innovative R&D projects with development of Pathogen-Free Facility (PFF) to achieve fiscal sustainability and meet SDG goals. Additionally performing the role of IFBA- International Federation of Biosafety Associations certified Biosafety Officer to monitor and check compliances of our laboratory biosafety contaminants specifically designated for animal research (ABSL).
4.	Dr. Syed Khurram Fareed Senior Veterinary Doctor/ In- charge of Central Animal House, DIABAR	<b>Member</b> Management of central animal houses for the provision of healthy laboratory animals.

5.	<b>Dr. Dur-e-shahwar</b> Production Manager, In-charge of Basic Biological Manufacturing Facility, DIABAR	Member Monitoring & Regularization of BSLIII & cGMP facilities for continuous, quality production of biopharmaceuticals from R&D level to mass scale production.
6	Dr. Atia Gobar	Mombor
0.	Deputy Manager Quality Control, Incharge QC, DIABAR	Managing and utilizing quality procedures to test biological products following international standards to meet customer needs via providing quality products.
7.	<b>Dr. Salma Mirza</b> Staff Scientist Project Manager (In-charge Preclinical & Toxicological Contract Laboratory), DIABAR	<b>Member</b> Provide robust pre-clinical and toxicological testing services With alignment to international standards.
8.	<b>Dr. Farah Aslam,</b> Scientific Officer, DIABAR	Secretary Establishment of Venom Collection & Processing Lab for commercialization of venom- based products. Additionally, as secretary of committee provides general administrative support to achieve objectives of strategic goals



#### OFFICE OF THE DIRECTOR DOW INSTITUTE FOR ADVANCED BIOLOGICAL & ANIMAL RESEARCH (DIABAR)

Dow University of Health Sciences, Karachi

DIRECTOR Dr. Talat Roome Mob# 0301-2215546 Dated<sup>\*</sup> 1<sup>st</sup> October 2024

KDA Scheme 33, Gulzar-e-Hijri Suparco Road Ojha Campus Karachi – 75270 Pakistan Tel: 021-38771111 Ext – 4435, 4446, 2897

#### Ref No: DUHS/DIABAR/Reg./2024/04

#### Internal Memo

✓ URGENT

O INFO ONLY

O ROUTINE

It is to inform that a **committee** has been formed for the **Strategic Planning & Development** of the Institute. The committee will be chaired by the **Dr. Talat Roome** (**Director, DIABAR**). This committee includes the following team members:

S.NO	TEAM MEMBERS	DESIGNATION
1.	Dr. Talat Roome	Chairperson of the Committee, Director, DIABAR
2.	Dr. Syed Khurram Fareed	Senior veterinary Doctor/In-Charge, CAH, DIABAR
3.	Dr. Syeda Durr-e-Shahwar	Production Manager, In-charge of BBMF, DIABAR
4.	Dr. Midhat Batool	Staff Scientist, In-charge, Advanced Research Lab, DIABAR
5.	Ms. Schrish Batool	In-charge, Quality Assurance, DIABAR.
6.	Dr. Salma Mirza	Staff Scientist, Project Manager, Pre-Clinical Contract Lab
7.	Dr. Atia Gohar	Deputy Manager, QC, In-charge, Quality Control Laboratory
8.	Ms. Farah Aslam	Scientific Officer, Committee Secretary, DIABAR

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Dr. Talat Roome Director, Dow Institute for Advanced Biological & Animal Research (DIABAR), Ojha Campus, DUHS, Karachi.

### SECTION II: VISION, MISSION & VALUES

#### VISION

To be a pre-eminent academic institution committed to changing and saving lives.

#### MISSION

Providing outstanding patient-centered education, training, and clinical care informed by cutting-edge research and innovation generating and disseminating new knowledge.



- VALUES
- Customer Service
  - o Put students first
- Empathy & Compassion
  - o Understand before you judge
  - o Be concerned for the sufferings and misfortunes of others

- Excellence
  - Be the best and commit to exceptional quality and service
- Innovation
  - Encourage curiosity, imagine, create, and share
- Teamwork
  - Engage and collaborate
- Integrity & Leadership
  - $\circ~$  Be a role model and influence others to achieve their best
  - Have the courage to do the right thing
  - Hold yourself and others accountable
- Respect & Collegiality
  - $\circ$  Be kind
  - Listen to understand
  - Value different opinions

#### STATEMENT OF PURPOSE

DIABAR is one of the state-of-the-art and well-equipped facilities that deals with the broad aspects of Biological, Biomedical & Pharmaceutical Basic Applied Sciences. Target Research & Our aim is to Drug Designing/Exploration of novel entities with the mechanistic evaluation at biochemical, cellular, and molecular levels, pre-clinical studies targeting various disease models designed on genetically modified/transgenic/wild type rodents, non-human primates (Rhesus Macague) to address Global Quest of different fields of modern Science, Toxicological Studies (acutechronic toxicity, Genotoxicity, mutagenicity, teratogenicity & Reproductive toxicity, etc.) of drugs are carried out incorporating a wide array of testing methods as per FDA-approved guidelines and the Development of Biologicals i.e. Anti-sera & Vaccines at R& D to Mass-Scale Production taking the path towards the advancement in the translational research.

DIABAR is a core part of DUHS vision, which emphasizes upgradation of quality education and research by Enhancing Science and Technology as well as Research & Development Facilities to extend the research towards production and commercialization to meet the challenges of Sustainable Development Goals (SDGs-3, 4 and 9). To establish firm linkages amongst national and international Academia, R & D Institutions and Industries for exchange of knowledge and technology.

DIABAR is continuously engaged in facilitating Researchers, Scientists, M.Phil. and Ph.D. students for conducting Clinicians and many multidimensional advance research projects & providing lab facilities to assist in their efforts of quality research with respect to the use of laboratory animals and act as a resource center for the researchers. Our institute has established the DOW Animal Care & Use Guidelines (Dow-ACUG) following international Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) and Animal Care and Use Committee (IACUC) guidelines in accordance with Institutional Review Board (IRB) for Animal Research and Ethics. The Dow-ACUG ensures the animal welfare standards are maintained along with the conduct of accurate, valid scientific research under the umbrella of QMS in compliance with international GLP and GMP standards followed by DRAP, WHO and FDA guidelines.

Dow Institute for Advanced Biological & Animal Research (DIABAR) envision that this facility should be the best in class for Basic Biological Manufacturing & Preclinical services that will cater the community by indigenous production of multiple biological(s) and vaccine(s) that will significantly add another milestone including Anti-Rabies, Anti-tetanus and Monoclonal antibody production for the future of Pakistan and Sindh Pharmaceutical Industry. Venom Bank and DUHS-Venom Project BIG-4 are unique contributions to introduce biologicals for thebenefit in the health care sector and to generate revenue.

### SECTION III: ASPIRATIONAL INSTITUTIONS

Defining aspirational institutions in innovative research offers the Institute an opportunity not only to assess its performance but also to clearly outline the direction it aims to take and its ultimate goals/ objectives. This process equips both internal and external stakeholders with the means to continuously evaluate the institution's progress in achieving its objectives using measurable parameters. This acknowledgment was further reinforced by the DIABAR commitment to enhancing research and committing to providing open and transparent information about all-relevant research activities, including animal breeding, scientific testing, experimentation, laboratory animal-related products and their standards animal care. Pertaining to facilitate research institutions, DIABAR completely supports and follows the international guidelines including the ARRIVE (Animal Research: Reporting of In Vivo Experiments) guidelines, developed as part of an NC3Rs initiative to improve the design, analysis and reporting of animal research. DIABAR has pride in collaborating with following esteem organizations who share our vision, mission and values:

- 1. International Center for Chemical and Biological Sciences (ICCBS), University of Karachi.
- 2. Chapman University, Irvine, California, USA.
- 3. Virginia Commonwealth University (VCU), Virginia, USA.
- **4.** The American Type Culture Collection (ATCC; Cell line Bank), Manassas, Virginia, USA
- 5. Dept. of Materials Science & Engineering, University of Sheffield, UK
- 6. Biomedical Research Center, Qatar University
- 7. Defense Science and Technology Organization (DESTO)-BIOLOGICAL RESEARCH CENTER - Karachi, Pakistan
- 8. Commission on Science and Technology for Sustainable Development in the South (COMSATS) Islamabad, Pakistan
- 9. University of Veterinary and Animal Sciences (UVAS), Lahore, Pakistan
- 10. Research Department, Cleveland Clinic Lerner research Institute, USA
- 11. Research Department, Harvard Medical School. USA. DIABAR fully recognizes the fact that it will take consistent and longterm effort to match the international credibility that our aspirational peer institutions have acquired over the course of decades of their existence. DIABAR is enthusiastic about working towards continual improvement to enhance the quality of the product and our services.

### SECTION IV: STRATEGIC GOALS

#### Goal 1: Enhance Research & Production Capacity and Infrastructure.

Objective 1: Expand Research and Biological's Manufacturing Facilities.
Objective 2: Enhance Technological Capabilities.
Objective 3: Develop Staff Expertise through Training.

#### Goal 2: Expand Collaborative Research and Commercialization.

Objective 1: Strengthen National and International Collaborations.
Objective 2:Commercialize Research Outputs.
Objective 3: Secure Long-Term Funding.
Objective 4: Training & Utilization of Cloud based platforms

#### Goal 3: Enhance Education and Training Programs.

**Objective 1:** Introduce Specialized Training Programs. **Objective 2:** Foster Industry-Academia Linkages.

#### Goal 4: Achieve International Accreditation and Compliance.

**Objective 1:** Obtain ISO Certification and Accreditation (PNAC). **Objective 2:** Enhance Regulatory Compliance (DRAP, WHO).

#### Goal 5: Drive Innovation through Research Excellence.

Objective 1: Develop a Cloud-based collaboration portal. Objective 2: Encourage Innovative Research. Objective 3: Increase Patents and Publications.

#### Goal 6: Support Community Health and Economic Development.

**Objective 1:** Increase Production of Cost-Effective indigenous Biologicals (ASV, ARV, etc.) **Objective 2:** Promote Public Health Initiatives.

### DIABAR OBJECTIVE SETTING UNDER DUHS GOALS:

#### DUHS Strategic Goal 1: Enhance Research Capacity and Infrastructure

#### **DIABAR Statement:**

Strengthen DIABAR's research capabilities by expanding infrastructure, upgrading facilities, and enhancing the skills of the workforce to support cutting-edge research and innovation in biomedical and pharmaceutical sciences.

## Objective 1.1: Expand and Upgrade Research and Biological's Manufacturing Facilities.

#### **Objective Statement:**

Secure funding and partnerships to expand DIABAR's laboratory space, particularly in developing a Pathogen-Free Facility (PFF) and enhancing the Basic Biological Manufacturing Facility (BBMF), to support advanced research and production of ready to fill products for human consumption and meet international standards.

#### Sub-Objective 1.1.1: Develop Pathogen-Free Facility (PFF)

Establish a state-of-the-art Pathogen-Free Facility to strengthen preclinical and toxicological research, ensuring compliance with international guidelines.

## Sub-Objective 1.1.2: Upgrade Basic Biological Manufacturing Facility (BBMF)

Upgrade the BBMF to include a Biosafety Level III (BSL-III) laboratory for the production of vaccines and monoclonal antibodies at a commercial level, reducing reliance on international suppliers.

#### Objective 1.2: Enhance Technological Capabilities Objective Statement:

Invest in advanced research equipment and technology, such as individually ventilated cages (IVCs) and RABS systems, to improve research accuracy and ensure compliance with international standards.

## Objective 1.3: Develop Staff Expertise through Training Objective Statement:

Implement regular training and certification programs to update DIABAR staff on the latest research techniques and international regulatory standards, ensuring a skilled workforce capable of supporting innovative research.

## DUHS Strategic Goal 2: Expand Collaborative Research and Commercialization

#### DIABAR Goal statement:

Foster national and international collaborations to enhance DIABAR's research output, commercialize innovative products, and secure financial sustainability through diversified revenue streams.

#### Objective 2.1: Strengthen National and International Collaborations Objective Statement:

Leverage existing partnerships and establish new collaborations with leading academic institutions and industries to enhance research opportunities and expand DIABAR's global reach.

#### Sub-Objective 2.1.1: Establish New Research Partnerships

Identify and collaborate with additional national and international research institutions to explore new research avenues and share technological resources.

#### **Objective 2.2: Commercialize Research Outputs**

#### Objective Statement:

Establish a Regulatory Affairs and Commercialization Office to manage market strategies, industry partnerships, intellectual property (IP) management, and product distribution and to ensure compliance with national (DRAP, PNAC) and international (WHO, FDA, EMA) regulations, including ISO certifications. This office will work in coordination with the concerned DUHS departments including departments of marketing, finance, legal and OSDI.

Sub-Objective 2.2.1: Establish Venom Collection & Processing Lab (VCPL) Set up a fully functional Venom Collection & Processing Laboratory for the commercialization of venom-based biological products, including Anti-Snake Venom (ASV).

## Objective 2.3: Secure Long-Term Funding Objective Statement:

Design and submit innovative research and development (R&D) projects annually to secure funding from national and international agencies, ensuring long-term financial stability.

#### Objective 2.4: Training & Utilization of Cloud based platforms

Training & Utilization of cloud-based platforms & Big analytics to secure long-term funding and research partnerships. Use VR/AR for training researchers and lab technicians in complex experimental techniques, equipment usage, and safety protocols.

#### DUHS Strategic Goal 3: Enhance Education and Training Programs

#### DIABAR Goal statement:

Develop and implement high-quality education and training programs that empower students and researchers with the skills needed to excel in biomedical and pharmaceutical sciences.

#### Objective 3.1: Introduce Specialized Training Programs Objective Statement:

Develop and offer credit hour certificate training courses annually, focusing on key areas such as Veterinary Sciences, Biomedical Research, and Molecular Biology to enhance research skills and knowledge.

#### Sub-Objective 3.1.1: Expand Academic Assistance

Provide advanced training and research opportunities for undergraduate and postgraduate students, facilitating the development of specialized skills in veterinary and biomedical sciences.

#### Objective 3.2: Foster Industry-Academia Linkages Objective Statement:

Promote stronger ties between DIABAR and industry to ensure that educational programs align with industry needs, providing students with relevant skills and enhancing employability.

## DUHS Strategic Goal 4: Achieve International Accreditation and Compliance

#### **DIABAR Goal statement:**

Obtain international accreditation and ensure compliance with global standards to position DIABAR as a leading research institution in biomedical and pharmaceutical sciences.

## Objective 4.1: Obtain ISO Certification and Accreditations Objective Statement:

Pursue ISO certification and other relevant international accreditations for DIABAR's pre-clinical and toxicological laboratories, ensuring adherence to global quality standards.

#### Sub-Objective 4.1.1: Implement Quality Management System (QMS)

Expand and rigorously implement the Quality Management System (QMS) to meet ISO 9001:2015 standards, ensuring consistent production of validated results.

## Objective 4.2: Enhance Regulatory Compliance Objective Statement:

Ensure that all research activities and manufacturing processes comply with international guidelines such as DRAP, WHO, and FDA, thereby maintaining DIABAR's credibility and competitive edge.

#### Sub-Objective 4.2.1: Regularize cGMP Facility

Achieve full compliance with cGMP guidelines for the production of Hyper-Immunized Plasma and other biological products, ensuring safety and efficacy in line with international standards.

#### DUHS Strategic Goal 5: Drive Innovation through Research Excellence

#### DIABAR Goal statement:

Promote a culture of innovation and research excellence at DIABAR by encouraging the development of new therapeutics, securing patents, and publishing high-impact research.

#### Objective 5.1: Encourage Innovative Research Objective Statement:

Support the development of novel research projects focused on drug discovery, therapeutic formulations, and disease modeling, contributing to advancements in biomedical sciences.

#### Sub-Objective 5.1.1: Develop Disease Models

Establish and refine animal-based disease models to facilitate research on infectious diseases, cancer, and inflammatory conditions, providing platforms for drug testing and therapeutic interventions.

## Objective 5.2: Increase Patents and Publications Objective Statement:

Encourage and support DIABAR researchers in securing patents for innovative discoveries and publishing in high-impact journals, enhancing the institute's global reputation.

#### Sub-Objective 5.2.1: Promote Participation in Conferences

Support researchers in presenting their work at national and international conferences, furthering DIABAR's recognition and fostering academic exchange.

## DUHS Strategic Goal 6: Support Community Health and Economic Development

#### **DIABAR Goal statement:**

Contribute to the health and economic development of the local community by producing cost-effective biological products and enhancing public health initiatives.

## Objective 6.1: Increase Production of Cost-Effective indigenous Biologicals (ASV, ARV, etc.)

#### Objective Statement:

To significantly scale up the cost-effective production of indigenous biologicals—including Anti-Snake Venom vaccine (ASV), Anti-rabies vaccine (ARV) to address critical public health needs such as snakebites and Dog bites management, infectious diseases, and health emergencies in local and regional communities.

#### Sub-Objective 6.1.1: Expand Equine Management System

Expand the equine management system to increase the production capacity of Hyper-Immunized Plasma, ensuring a consistent supply of highquality biologicals.

#### Objective 6.2: Promote Public Health Initiatives Objective Statement:

Collaborate with local health authorities to support public health initiatives, including the development and distribution of vaccines and antitoxins, contributing to the overall health and well-being of the community.

**Sub-Objective 6.2.1: Develop and Distribute Vaccines** Focus on the development and bulk production of vaccines, such as rabies and tetanus, ensuring accessibility and affordability for the local population.

## **OBJECTIVES, OKRs & KPIs**

#### Strategic Goal 1: Enhance Research & Production Capacity and Infrastructure

Goal Statement: Strengthen DIABAR's research capabilities by expanding infrastructure, upgrading facilities, and enhancing the skills of the workforce to support cutting-edge research and innovation in biomedical and pharmaceutical sciences.										
	OKR (Objective and Key Results)									
Objective 1: Expand Research and Biological Manufacturing Facilities.										
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline			
Secure funding and partnerships to expand DIABAR's laboratory space, particularly in developing a Pathogen- Free Facility (PFF) and enhancing the Basic Biological Manufacturing Facility (BBMF), to support advanced research and meet international standards.	KR 1.1: Secure funding for infrastructure expansion by Q4 2025.	KPI 1.1: Amount of funding secured.		Secure 100% of required funding by Q4 2025.		Infrastructure expansion	Q1-Q4 2025			
	KR 1.2: Complete construction of the PFF by Q4 2027	KPI 1.2: Percentage of PFF construction completed.	Track funding milestones, construction progress, and certification status through monthly reports.	100% completion of PFF constructio n by Q4 2027	DIABAR Team, in coordination with the respective	Budget allocation for the PFF construction	Q1 2025- Q4 2027			
	KR 1.3: Upgrade the BBMF with BSL-III capabilities by Q4 2027.	KPI 1.3: BSL-III certification obtained.		Achieve BSL-III certification by Q4 2027.	DUHS Team	Advanced setup required for the certification	Q1 2025- Q4 2027			
		Objective	2: Enhance Techno	ological Capabi	lities					
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline			
Invest in advanced research equipment and technology to improve research accuracy and ensure compliance with	KR 2.1: Training and use of Al- powered Laboratory Management System (LMS) blockchain- based Inventory Management System (IMS) in DIABAR facilities	KPI 2.1: Training & execution of AI-powered LMS & IMS by Q4 2026	Monthly tracking of system implementation progress.	100% acquisition of targeted systems by Q4 2026	DIABAR Team in coordination with the respective DUHS Team	Budget allocation and Al-powered system introduction, training & executions	Q4 2026			
with international standards.	KR 2.2: Acquire 10 new pieces of advanced research equipment by Q3 2025.	KPI 2.2: Number of new equipment acquired.				Budget allocation up to the new and modified version of the equipment purchasing	Q4 2024-Q3 2025			

	KR 2.3: Implement an advanced data management system by Q4 2025.	KPI 2.3: Data management system operational.				Upgradation of the data management software	Q1 2024- Q4 2025
		Objective 3:	Develop Staff Expe	ertise through T	raining		
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
Implement regular training and certification programs to update DIABAR staff on the latest research techniques and international regulatory standards, ensuring a skilled workforce capable of supporting innovative research.	KR 3.1: Conduct 6 training sessions per year starting in 2024.	KPI 3.1: Number of training sessions conducted.	Track training attendance and certification status quarterly.	100% of staff participate in training sessions each year.	DIABAR Team in coordination with the respective DUHS Team	Budget allocation up to 6 training and certification programs annually.	Q4 2024
	KR 3.2: Achieve 100% staff certification in relevant areas by Q4 2025.	KPI 3.2: Percentage of staff certified.		100% staff certification by Q4 2025.			Q4 2025

Strategic Goal 2: Expand Collaborative Research and Commercialization										
Goal Statement: Fos	Goal Statement: Foster national and international collaborations to enhance DIABAR's research output, commercialize innovative products, and secure financial sustainability through diversified revenue streams.									
	OKR (Objective and Key Results)									
	Obje	ective 1: Strengthe	en National and Ir	nternational C	ollaborations					
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline			
Leverage existing partnerships and establish new collaborations with leading academic institutions and industries to enhance research opportunities and expand DIABAR's global reach.	KR1.1: Establish 5 new international research collaborations by Q4 2027.	KPI 1.1: Number of new collaborations established.	Quarterly tracking of	5 new collaborati ons establishe d by Q4 2027.	- DIABAR R & D Team	Global linkage with the research institutes associated with the DUHS	Q4 2024-Q4 2027			
	KR1.2: Secure 3 joint research grants with partners by Q3 2026.	KPI 1.2: Number of joint grants secured.	agreements and grant applications.	3 joint grants secured by Q3 2026.			Q4 2024-Q3 2026			
	<u>,</u>	Objective 2:	Commercialize R	esearch Outp	uts	ļ				
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline			
	KR2.1: Establishment of Regulatory affairs & commercializa tion office by						Q1 2025 -			
Establishment of commercialization office to facilitate technology transfer, intellectual property management, and product licensing. facilitate regulatory affairs, intellectual property management, and product licensing.	d4 2026 -Expert personnel skills utilize Al-driven market analytics tools	KP2.1: Commercializ ation office establishment	Management & Regularization of commercial office	Q2 2027	DIABAR/ commercial Regulatory Officers	Office allocation and qualified expert personnel	Q2 2027			
	to identify potential markets and forecast demand for biological products by Q2 2027						Q2 2027			
	KR2.2: Launch 2 new commercial products by	KPI 2.2: Number of commercial products	Quarterly sales and revenue	Launch 2 new products by Q3	DIABAR BBMF Team in coordination with	Establishment of Venom Collection & Processing	Q4 2024-Q3 2026			

	KR2.3: Generate revenue from commercializa tion by Q4 2026.	KPI 2.3: Revenue generated from commercializa tion.		Achieve revenue by Q4 2026.		venom-based products and their commercializat ion.	Q4 2024-Q4 2026
		Objective	3: Secure Long-	Term Funding			
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
Design and submit innovative research and development (R&D) projects annually to secure funding from	KR3.1: Submit 10 R&D project proposals per year starting in 2024.	KPI 3.1: Number of R&D proposals submitted.	Track proposal submissions and funding secured on a quarterly basis.	10 proposals submitted annually.	DIABAR R &	Access to licensed journals/ databases/soft	Q4 2024-Q4
national and international agencies, ensuring long-term financial stability.	KR3.2: Secure funding by Q4 2027.	KPI 3.2: Total funding secured.		funding secured by Q4 2027.	2 roum	ware and pharmacopeias	2027
	0	bjective 4: Trainin	<mark>ng &amp; Utilization of</mark>	Cloud based	platforms		
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
Training & Utilization of cloud-based platforms & Big analytics to secure long-term funding and research partnerships.	KR4.1: Use Virtual & augmented reality VR/AR approach for training researchers and lab technicians in complex experimental techniques	KPI 4.1: VR/AR training programs to launch by Q4 2026	Track and assess training programs on quarterly	Q4 2026	DIABAR Management	Trainings management and budget allocation	Q4 2026

	Strategic Goal 3: Enhance Education and Training Programs									
Goal Statem	Goal Statement: Develop and implement high-quality education and training programs that empower students and researchers with the skills needed to excel in biomedical and pharmaceutical sciences.									
	OKR (Objective and Key Results)									
		Objectiv	e 1: Introduce Specia	lized Training Pro	grams					
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline			
Develop and offer credit certificate training courses annually, focusing on key areas such as Veterinary Sciences, Biomedical Research, and Molecular Biology to enhance research skills and knowledge	KR 1.1: Launch 3 new training programs via implementing Virtual & augmented reality (VR/AR) for training by Q1 2026.	KPI 1.1: Number of training programs launched.	Track program development and student enrollment	Launch 3 training programs by Q1 2026.	DIABAR Team	Budget allocation up to the 03 training programs	Q1-Q4 2026			
	KR 1.2: Enroll 50 students annually in the training programs by Q4 2026.	KPI 1.2: Number of students enrolled.	quarterly.	Enroll 100 students annually by Q4 2026.		annually.				
		Objec	tive 2: Foster Industr	y-Academia Linka	ges					
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline			
Promote stronger ties between DIABAR and industry to ensure that educationa l programs align with industry needs, providing students with relevant skills and enhancing employabil ity.	KR 2.1: Establish 4 industry partnerships for training and internships by Q2 2025.	KPI 2.1: Number of industry partnerships established.	Quarterly reviews of partnership agreements and graduate employment data.	Establish 5 industry partnerships by Q2 2025.	DIABAR Team	Linkage with the industries associated with the DUHS	Q4 2024-Q2 2025			
	KR 2.2: Achieve a 90% job placement rate for program graduates by Q4 2026.	KPI 2.2: Job placement rate for graduates.		Achieve a 90% job placement rate by Q4 2026.			Q1 2025- Q4 2026			

Strategic Goal 4: Achieve International Accreditation and Compliance											
Goal Statement: Obtain international accreditation and ensure compliance with global standards to position DIABAR as a leading research institution in biomedical and pharmaceutical sciences.											
	OKR (Objective and Key Results)										
	(	Objective 1: Obta	in ISO Certifica	tion and Accred	litation (PNAC	;).	-				
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline				
Pursuing ISO certification and for DIABAR's pre-clinical and toxicological laboratories, ensuring adherence to global quality standards via Incorporating latest technology such as IoT- enabled	KR 1.1: Obtain ISO 17025:2017 certification by Q4 2025.	KPI 1.1: ISO certification status.	Track certification and accreditation progress through bi- monthly reports.	Obtain ISO 17025:2017 by Q4 2025.	DIABAR Team	External trainings required for the documentation purpose for the ISO certification and other relevant	Q4 2024- Q4 2025				
sensors in clean rooms and critical areas to monitor environmental conditions (e.g., air quality, humidity),	KR 1.2: Achieve accreditation from 2 additional international bodies by Q4 2026.	KPI 1.2: Number of international accreditations achieved.		Secure 2 additional accreditations by Q4 2026.		international accreditations	Q3 2025-Q4 2026				
		Objective 2: Enh	nance Regulato	ry Compliance (	DRAP, WHO).						
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline				
Enhance Regulatory Compliance & Regularize cGMP Facility	KR2.1: Achieve 100% compliance with DRAP, WHO, and FDA guidelines by Q4 2025.	KPI 2.1: Compliance audit results.	Quarterly audit reports and compliance	Achieve 100% compliance by Q4 2025.	DIABAR QMS Team	Construction of the Pathogen Free Facility and obtaining	Q1 2024-Q4 2025				
	KR2.2: Conduct 2 internal audits annually to ensure ongoing compliance. KPI 2.2: Number of non- compliance issues identified and resolved. compliance		reviews.	Conduct 2 audits annually, with zero major non- compliance issues.		license for the GLP and GMP	Q3 2025 onwards				

Strategic Goal 5: Drive Innovation through Research Excellence											
Goal Statement: Promote a culture of innovation and research excellence at DIABAR by encouraging the development of new therapeutics, securing patents, and publishing high-impact research.											
OKR (Objective and Key Results)											
Objective 1: Develop Cloud-based collaboration portal											
Objective	Key Results	Resource Requirement	Timeline								
A centralized cloud-based collaboration portal will improve transparency, facilitate resource sharing, and enhance communicati on among collaborators	KR1.1: Use big data analytics to identify trends in research funding by Q2 2027	KPI 1.1: Use and train staff on cloud-based collaboratio n portal	KPI 1.1: Use and train staff on cloud-based collaboratio n portal Quarterly checking and assessment of cloud portal implementation on portal Cloud portal cloud portal collaboratio cloud portal collaboratio n portal		PI 1.1: Use and train staff on oud-based cloud portal implementation n portal				Q2 2027		
Objective 2: Encourage Innovative Research											
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline				
Encourage innovative research projects focusing on therapeutic formulations and the development of animal	KR 2.1: - Initiate 3 new innovative research projects by Q4 2025 Training & Development of a cloud- based collaboration portal by Q1 2027	KPI 2.1: Number of new research projects initiated.	Track project initiation and model development through quarterly progress reports Implementation of cloud-based collaboration	-Initiate 3 new projects by Q4 2025.	DIABAR R&D Team	Space constraints Pathogen Free Facility with advanced laboratory setup for the isolation of diseased	Q4 2024-Q4 2025 - Q1 2027				
disease models.	KR 2.2: Develop 5 new animal disease models by Q1 2026.	KPI 2.2: Number of animal disease models developed.		Develop 5 new models by Q1 2026.		animal models.	Q1 2025- Q1 2026				
		Objec	tive 3: Increase Patents	and Publication	าร						
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline				
Increase Patents and Publications, Promote Participation in national and international Conferences	KR3.1: File 3 patents by Q3 2027.	KPI 3.1: Number of patents filed.		File 3 patents by Q3 2027.		Budget	Q1 2025- Q3 2027				
	KR3.2: Publish 10 research papers in high-impact journals by Q4 2027.	KPI 3.2: Number of research papers published.	Track patent filings and publication records quarterly.	Publish 10 papers by Q4 2027.	DIABAR Team	to the filing 03 patents and 10 publications in a peer reviewed journal.	Q1 2025- Q4 2027				

Strategic Goal 6: Support Community Health and Economic Development											
Goal Statement: Contribute to the health and economic development of the local community by producing cost-effective biological products and enhancing public health initiatives.											
OKR (Objective and Key Results)											
Objective 1: Increase Production of Cost-Effective indigenous Biologicals (ASV, ARV, etc.)											
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline				
Scale up the production of Hyper-	KR1.1: Increase production capacity of Hyper- Immunized Plasma by 50% by Q2 2026.	KPI 1.1: Production capacity of Hyper- Immunized Plasma.		Achieve 50% increase in production by Q2 2026.		Horse purchasing is required to increase the production	Q1 2025- Q2 2026				
Plasma and other essential biologicals to manage snakebite cases and other health emergencies in the local community.	KR1.2: Manufactured & delivered 4000L of Hyperimmuni zed plasma (from 300 equines) to downstream facility to produce 10,000 units of ASV (biological product) annually by Q4 2026.	KPI 1.2: Number of units distributed.	Track production and distribution volumes quarterly.	Delivered 4000L of Hyperimmun ized plasma (from 300 equines) to the downstream facility annually by Q4 2026.	DIABAR BBMF Team, in coordination with the respective DUHS Team	of Hyper- Immunized Plasm. A Vaccine Facility is required for the large- scale production of other biologicals.	Q1 2025- Q4 2026				
		Objective	2: Promote Public	Health Initiative	s						
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline				
Promote Public Health Initiatives, Develop Indigenous Vaccines	KR2.1: Partner with 2 local health organizations by Q4 2026.KPI 2.1: Number of partnerships with health organizations.KR2.2: Registration of indigenous vaccine by Q4 2027.KPI 2.2: Product registration achieved.		Track partnership agreements and vaccine	Establish 2 partnerships by Q4 2026.	DIABAR BBMF & QMS	Linkage with the local health organization s associated with DUHS. Vaccine Facility	Q4 2024-Q4 2026				
			distribution quarterly.	Registration of indigenous vaccine by Q4 2027.	Team	required for the bulk production leading to commercializ ation.	Q2 2025-Q4 2027				

# SECTION V: RESOURCE PLANNING FOR ACHIEVING STRATGIC GOALS

The resource planning focuses on enhancing research capacity and infrastructure, expanding collaborative research, and supporting community health and economic development. Key initiatives include expansion of Basic Biological Manufacturing Facility (BBMF) to Phase II includes 9500 sq. ft. comprising the following.

### i. Venom Collection & Processing Lab (VCPL)- Ground level

VCPL is the spine of ASV production, as we need to maintain safe and secure storage of venoms and venom-based products. VCPL with latest regulatory requirements is dire needed to comply with International Standards such as WHO regulations for manufacturing of Hyperimmune plasma and nextgeneration ASV. VCPL comprising 'Venom Bank' needs to be constructed as a separate entity for Venom handling and processing in a control manner.

DIABAR continuously striving to study Pakistan's Big-4 Venomics, Biological & Toxicological profiles and Therapeutics Index in different animal disease and cell-based models. These studies are also beneficial for the Anti-Snake Venom project especially Next-Generation anti-snake venom and marketing of snake venom as a raw material, this is the first time that Pakistani snakes' venom is explored on these aspects, we have already completed our data on 4 batches of venom regarding general quality control tests as per our previously approved methods.

Under the entitlement of "DUHS Venom Project BIG-4" with the approval and Agreement of Vice Chancellor, Prof. Dr. Saeed Quraishy, we are designing a series of Projects for pilot studies and applied for different funding agency. DUHS is interested in extending our collaboration to further explore venoms and its fractions/ peptides for other avenues with the mutual interests of our scientific team. Additionally, we are collaborating with DESTO, ICCBS, COMSTECH- UNIVERSITY and CHAPMAN University, USA for the broader national interest and to meet the challenges of SDGs 3, 4, 9 & 12. Under the umbrella of "**DUHS Venom Project BIG-4**", we have submitted following projects for the review and approval of IRB entitled as:

- a)Rapid Development of Next-generation Anti-venom in Pakistan: Recombinant Human m-Absagainst Cobra species.
- b) Snake Venom: An innovative ingredient for Marketing as Raw Material
- c)Hydrogel Encapsulating Snake venom derived molecules for Infectious wound healing in-vivo
- d) Snake Venom derived Nano-conjugates: A new era of Nano-biomaterial-based Cancertherapeutics



Venom Collection and Processing Laboratory (Ground Floor)

#### ii. Vaccine Manufacturing Facility (Ready to fill commercial production) -LEVEL I

DIABAR aims to become a leading entity in fundamental biological manufacturing, progressing towards the establishment of a Vaccine Manufacturing (VMF) for Facility large-scale production and commercialization of vaccines. The initiative is focused on achieving selfsufficiency in biological and vaccine production within Pakistan, reducing dependence on international sources. Currently, DIABAR is engaged in the research and development of Anti-sera and Vaccines, including Anti-Rabies, Anti-Tetanus, and Monoclonal Antibody production. These efforts will be scaled up to mass production under this facility, paving the way for technological advancement and efficient technology transfer.



## Vaccine Manufacturing Facility (1<sup>st</sup> Floor)

### iii. Pathogen-Free Facility (PFF) -LEVEL II

The development of a Pathogen-Free Facility (PFF) to advance pre-clinical and toxicological research, adhering to international guidelines such as AAALAC, ARRIVE, WHO, IACUC, and FDA. The facility will feature advanced laboratories, stringent animal housing, and decontamination measures to support safe and humane animal-based research. The plan for new lab setup and preclinical lab license has been submitted to DUHS and DRAP, respectively for support and approval.

The establishment of such Contract Laboratory Services is a momentous step, offering a range of capabilities and a proven process to ensure on-site accountability and data integrity. These services and laboratory setups in Pakistan will help the DIABAR staff to learn the latest technology and methodologies for validating results in bio/pharmaceutical and biomedical research and development. The trained staff will uphold the highest standards and possess in- depth knowledge in their respective fields.

These efforts align with broader goals of advancing scientific understanding, fostering economic sustainability, and addressing global health challenges.



## Pathogen Free Facility (2<sup>nd</sup> Floor)

### KEY CHALLENGES IN ACHIEVING STRATEGIC GOALS:

Advanced bioprocessing equipment plays a crucial role in scaling up vaccine production while maintaining GMP compliance. DIABAR is committed to scaling up operations from lab-scale to commercial production ensures efficiency, quality, and regulatory adherence.

#### ESSENTIAL EQUIPMENT FOR VACCINE PRODUCTION:

Following essential equipment are dire needed to enhance indigenous vaccine and biological production. DIABAR must overcome critical challenges in scaling up manufacturing capacity, ensuring quality control, and meeting regulatory requirements. For the establishment of a robust, self-sufficient vaccine production facility and to overcoming these challenges and, following equipment are our basic requirements,

- 1. Bioreactor,
- 2. Inverted fluorescence microscope,
- 3. Fixed Tommy Suprema 25 (Fixed Bucket Highspeed Centrifuge), and
- 4. ÄKTA flux system

These tools will enable efficient, high-quality bulk vaccine production, streamline workflows in our GMP-compliant facility, and strengthen our ability to monitor and control critical production parameters. Below is a detailed justification for each equipment, highlighting the current production bottlenecks and support our long-term objectives.

#### 1. Bioreactor Procurement

**Challenge:** Scaling up vaccine production from R7D level to pilot scale commercial production while maintaining consistency, yield, and safety.

**Importance:** The bioreactor is indispensable for **cultivating viral cultures under controlled conditions**, ensuring optimal growth and high-quality vaccine bulk production. Key advantages include:

• <u>Scalability (up to 25L capacity)</u>: Facilitates seamless transition from small-scale R&D to pilot-scale manufacturing, crucial for rabies vaccine bulk production.

- <u>Real-time monitoring & automation</u>: Precise control over pH, temperature, and oxygen levels minimizes human error and ensures batch consistency.
- <u>Enhanced productivity:</u> Microcarrier-based mixing and automated gas exchange maximize **cell growth and viral yield**, directly supporting large-scale inactivated vaccine production.
- <u>Operational safety:</u> Reduces contamination risks and deviations, aligning with **GMP compliance** and reducing reliance on imported biological materials.
- 2. Inverted Fluorescence Microscope Procurement

**Challenge:** Ensuring accurate viral titer calculation and quality assessment during vaccine development.

**Importance:** This microscope is critical for **quantifying viral concentration (MOI)** and assessing production quality through fluorescence imaging. Essential features include:

- <u>Automated fluorescence detection (FITC, DAPI, Texas Red</u> <u>filters):</u> Enables precise analysis of viral cultures.
- <u>High-resolution imaging (2x-40x magnification)</u>: Supports detailed examination of cell cultures and viral propagation.
- <u>Automated stage & digital imaging:</u> Facilitates efficient data capture and analysis, improving workflow consistency.
- 3. ÄKTA Flux S System Procurement

**Challenge:** Efficient purification and concentration of viral protein for high-yield vaccine production.

**Importance:** This semi-automated crossflow filtration system is essential for **purifying viral bulk with minimal product loss**. Key benefits:

- <u>High-efficiency filtration (1–50 mL/min adjustable flow</u> <u>rate):</u> Optimizes viral concentration for downstream processing.
- Uniform mixing (magnetic stirbar system): Prevents aggregation and ensures consistent purification.

- <u>Regulatory compliance</u>: Compatible materials (PTFE, PVDF) and compact design meet **GMP and biosafety standards**.
- 4. Tommy Suprema 25 (Bucket High-Speed Centrifuge)

**Challenge:** Efficient separation and purification of viral cultures for highyield vaccine production.

Importance: To meet the demands of large-scale inactivated vaccine manufacturing, the Fixed Tommy Suprema 25 Bucket High-Speed Centrifuge is essential for rapid and precise separation of biological materials, ensuring optimal recovery of final product while maintaining product integrity.

Key Advantages of the Tommy Suprema 25 Centrifuge:

- 1. High-Speed Separation for Scalable Production
- Max speed of 25,000 RPM with a high RCF (Relative Centrifugal Force), enabling efficient pelleting of viral particles and cell debris.
  - Large-capacity buckets (4 x 750 mL or 6 x 250 mL) allow processing of multiple samples simultaneously, significantly improving throughput for bulk vaccine production.
  - 2. Precision and Reproducibility in Vaccine Manufacturing
    - Programmable speed and brake control ensures gentle yet effective separation, minimizing damage to sensitive viral cultures.
    - **Temperature-controlled rotor (4°C to 40°C)** maintains sample stability, critical for preserving vaccine efficacy.
  - 3. Enhanced Safety and Compliance with GMP Standards
    - Advanced imbalance detection and auto-locking lid prevent operational hazards, ensuring operator safety.
    - Stainless steel rotor and biocontainment-compatible design meet GMP and biosafety requirements for vaccine production facilities.
  - 4. Reduction in Processing Time and Dependency on External Labs
    - Faster separation compared to standard centrifuges reduces batch processing time, accelerating vaccine development.

 Eliminates the need for outsourcing centrifugation steps, reducing costs and supply chain risks.

### Impact on Vaccine Production:

Without this centrifuge, viral harvest purification would be slower, less efficient, and more prone to inconsistencies, delaying production timelines and increasing reliance on imported intermediates. Tommy Suprema 25 is a critical component in achieving:

- High-purity viral concentrates for inactivated vaccines.
- Faster scale-up from lab to industrial production.
- Self-sufficient vaccine manufacturing, reducing foreign dependency

The integration of this equipment is essential for increasing production yield without compromising quality. As DIABAR advances through the licensing phase, the ability to demonstrate validated, scalable, and reproducible manufacturing processes is critical. Scaling up vaccine production requires robust process development, advanced monitoring systems, and equipment capable of handling increased batch sizes while ensuring product consistency

## SECTION VI: IMPLEMENTATION & MONITORING STRATEGIC PLAN

The effectiveness of a strategic plan hinges on its execution; DIABAR-DUHS is committed to robust oversight and transparency in monitoring implementation efforts outlined in the plans. Results will be diligently reported, and corrective actions will be taken as needed to ensure the success of this plan. A crucial aspect of this endeavor involves collaborating with various in-house and outsources units to devise pertinent and meaningful indicators of progress toward the University's strategic goals. It is imperative that these indicators undergo periodic evaluation throughout the execution of the Strategic Plan.

DIABAR staff have competent expertise in multiple scientific domains including pharmacists, virologists, immunologists, microbiologists, molecular biologists, biotechnologists, material chemists and geneticists. Additionally, we have senior veterinary doctors, technologists, technicians, veterinary assistants, lab attendants and animal attendants.

DIABAR-DUHS, as the largest animal care system, prioritizes active participation in fostering healthy and sustainable communities as a kev strategic goal. While striving for excellence across all aspects of animal healthcare, the institute aims to attain national and international recognition for unparalleled expertise in specific "niche" areas, providing world class animal care coupled with pioneering research & its translation to commercialization objective as a sustainable goal of the institute. Moreover, the DIABAR Quality Management system was established in 2021 and was based on international guidelines. All these management systems need to be implemented through Standard operating procedures (SOPs). SOPs outline roles & responsibilities of Head of DIABAR / Director, QA & QC Personnel with respect to various quality systems. The ISO certification entitled "ISO/IEC 17025:2005: General requirements for the competence of testing and calibration laboratories" is shortlisted as it specifies the general requirements for the competence to carry out tests and/or calibrations according to standard methods, non-standard methods, and laboratorydeveloped methods and it is also the basis for accreditation from an accreditation body. This will implement a quality system following DRAP, WHO, ICH and FDA guidelines aimed at improving the ability of different research laboratories in DIABAR to consistently produce validated results. It is essential to acknowledge that these indicators will undergo periodic evaluation throughout the execution of the Strategic Plan. These evaluations will not only provide valuable insights but also shape the implementation of the Plan and ensure the timely achievement of milestones. To uphold fairness and transparency in this process, DIABAR-DUHS has formulated an internal team (Ref No: DUHS/DIABAR/Reg./2024/01) headed by the Director-DIABAR to report directly to allocated members of SPIW-DUHS, Prof. Kashif Shafiq (Ref No: DUHS/Reg./2024/01-04) for the implementation of DIABAR strategic plan. The establishedteam comprising QMS system incharge as a focal person from institute along with other highly experienced individuals including SVD, Production manager, Scientific Officer & Staff scientist to undertake this important and vital role in the Institute and to achieve ultimate goals of theUniversity.

No.	DESCRIPTION							
A	List Of Existing Research Projects							
В	List Of Publications							
С	SWOT Analysis							
D	TOWS Matrix							
E	DIABAR Facility Map							

### APPENDIX A: LIST OF EXISTING RESEARCH PROJECTS



List of Existing Research Projects in DIABAR are entitled as follows:

- 1. "Rabies Vaccine: Development of Inactivated Human Rabies Vaccine against Wild-Type Strain in Pakistan" (supported by GCF-790).
- 2. "Mass Production of Anti-Snake Venom to End International Reliance" (supported by PC-1).
- 3. "2- Deoxy Ribose Sugar Dressing for Chronic Wounds."
- 4. "Microneedle against various Wounds."
- 5. "Pre-clinical profile of DNA -COVID Vaccine."
- 6. "Nanofiber Dressing for accelerated Healing."
- 7. "Curcumin based serum-MOFs for Chronic wound Healing."
- 8. DUHS Venom Projects BIG-4.

### APPENDIX B: LIST OF PUBLICATIONS:



DOW INSTITUTE FOR ADVANCED BIOLOGICAL & ANIMAL RESEARCH

**RESEARCH & DEVELOPMENT LABORATORY** 

LIST OF PUBLICATIONS (2018-2023) Impact Factor: 82.357

- Kawish, M., Ullah, S., Roome, T., Razzak, A., Aslam, S., & Raza Shah, M. (2024). Thermoresponsive Lipids Engineered Magnetic Nanoparticles for Spatiotemporal Delivery of Hesperidin to Inflammatory Sites in Animal Model. Pharmaceutical Development and Technology,1-14. The impact factor is 2.6 and HEC category "X"
- Hasnain, M., Kanwal, T., Rehman, K., Rehman, S. R. U., Aslam, S., Roome, T., & Shah, M. R. Microarray needles comprised of arginine-modified chitosan/PVA hydrogel for enhanced antibacterial and wound healing potential of curcumin. International Journal of Biological Macromolecules.2023;253(1)126697.doi:10.1016/j.ijbiomac.2023.126697. The impact factor is 8.2 and HEC category "W"
- Ullah, A., Mamun, A. A., Zaidi, M. B., Roome, T., & Hasan, A. Calcium peroxide incorporated oxygen releasing chitosan-PVA patch for Diabetic wound healing. *Biomedicine & pharmacotherapy*. 2023, *165*, 115156. <u>doi:10.1016/j.biopha.2023.115156</u> The impact factor is 7.5 and HEC category "W"
- 4. Hasan A, Roome T, Wahid M, Ansari SA, Khan JA, Kiyani A, Jilani SN. A novel experimental model to investigate fungal involvement shows expression of Dectin-1 in periapical lesion pathogenesis. Journal of Oral Rehabilitation. 2023 June 1;50 (8). doi:10.1111/joor.13528. The impact factor is 3.558 and HEC category "W"
- 5. Hasan A, Roome T, Wahid M, Ansari SA, Akhtar H, Jilani SN, Kiyani A. Gene expression analysis of toll like receptor 2 and 4, Dectin-1, Osteopontin and inflammatory cytokines in human dental pulp ex-vivo. BMC Oral Health. 2022 Dec;22(1):1-5. doi: 10.1186/s12903-022-02621-4. The impact factor is 3.747 and HEC category "W"
- 6. Majeed MM, Ahmed I, Roome T, Alali Y, Al-Aali KA, Ahmed N, Saleem Z, Alhumaidan AA, Farooqui WA, Ahmed S, Vohra F. Association of the unstimulated whole salivary cytokine il-1β levels with initial, moderate and severe periodontitis. A case control study. International Journal of Environmental Research and Public Health. 2022 Mar 2;19(5):2889. doi: 10.3390/ijerph19052889 The impact factor is 4.614 and HEC category "W"
- **7.** Jabri T, Roome T, Razzak A, Aziz S, Imran M, Sikandar B, Elhissi A, Aslam SM, RazaShah M. Fabrication of hesperidin hybrid lecithin-folic acid silver nanoparticles and its evaluation as anti-arthritis formulation in autoimmune

arthritic rat model. Journal of Molecular Structure. 2023 Mar 15;1276:134722. doi:10.1016/j.molstruc.2022.134722. The impact factor is 3.841 and HEC category "W"

- Hasan A, Roome T, Wahid M, Ansari SA, Khan JA, Jilani SN, Jawed A, Kiyani A. Expression of Toll-like receptor 2, Dectin-1, and Osteopontin in murine model of pulpitis. Clinical Oral Investigations. 2023 Mar;27(3):1177-92. doi: 10.1007/s00784-022-04732-2. The impact factor is 3.606 and HEC category "W"
- 9. Aslam Z, Roome T, Razzak A, Aslam SM, Zaidi MB, Kanwal T, Sikandar B, Bertino MF, Rehman K, Shah MR. Investigation of wound healing potential of photo-active curcumin-ZnO-nanoconjugates in excisional wound model. Photodiagnosis and Photodynamic Therapy. 2022 Sep 1;39:102956. doi: 10.1016/j.pdpdt.2022.102956 The impact factor is 3.577 and HEC category "X"
- 10. Roome T, Qasim M, Farooq AD, Ilyas Q, Aziz S, Ali SF. Antispasmodic activity and mechanism of action of polyherbal formulation DCD-684 on rabbit jejunum. Pakistan Journal of Pharmaceutical Sciences. 2021 Mar 2;34. PMID: 34275806 The impact factor is 0.863 and HEC category "Y"
- Roome T, Qasim M, Aziz S, Farooq AD, Razzaq A, Ali SF. Assessment of acute, sub-acute, chronic and genotoxicity of polyherbal formulation DCD-684 in mice. Pak. J. Pharm. Sci. 2021 Jul 1;34(4):1485-98. PMID: 34799324 The impact factor is 0.863 and HEC category "Y"
- 12. Majeed MM, Ahmed I, Roome T, Fatima T, Amin R. Association between interleukin-1β gene polymorphism and chronic periodontitis. European Journal of Dentistry. 2021 Jul 24;15(04):702-6. doi: 10.1055/s-0041-1730041 The impact factor is 0.622 and HEC category "X"
- 13. Qadir A, Wahid M, Asif M, Roome T. Synergistic effect of bevacizumab and celecoxib on angiogenesis in vitro using human umbilical vein endothelial cells. International Journal of Clinical Pharmacology and Therapeutics. 2020 Dec 1;58(12):696. doi: 10.5414/CP203757 The impact factor is 0.976and HEC category "Y"
- 14. Sindhia Kumari, Arslan Ali, Talat Roome, Anam Razzak, Ayesha Iqbal, Amna Jabbar Siddiqui, Syed Muhammad Zahid Azam, Hafeezullah Shaikh, Hesham R. Al-Seedi, Syed Ghulam Musharraf. Metabolomics approach to understand the hepatitis C virus induced hepatocellular carcinoma using LC-ESI-MS/MS. Arabian Journal of Chemistry. 2020 Nov 17; 14(1): 10297. doi: 10.1016/j.arabjc.2020.11.013.

The impact factor is 6.212 and HEC category "W"

15. Kanwal T, Saifullah S, ur Rehman J, Kawish M, Razzak A, Maharjan R, Imran M, Ali I, Roome T, Simjee SU, Shah MR. Design of absorption enhancer containing self-nanoemulsifying drug delivery system (SNEDDS) for curcumin improved anti-cancer activity and oral bioavailability. Journal of molecular liquids. 2021 Feb 15; 324:114774. doi: 10.1016/j.molliq.2020.114774 The impact factor is 6.633 and HEC category "W"

- 16. Rozi S, Zahid N, Roome T, Lakhdir MP, Sawani S, Razzak A, Butt ZA. Effectiveness of a school based smokeless tobacco intervention: a cluster randomized trial. Journal of Community Health. 2019 Dec; 44:1098-110. doi: 10.1007/s10900-019-00689-8. The impact factor is 4.371 and HEC category "W"
- 17. Rozi S, Lancaster G, Mahmud S, Butt ZA, Roome T, Zahid N. A systematic review
- of observational studies, demonstrating smoking among school going adolescents. Open Journal of Epidemiology. 2019;9:173. doi: <u>10.4236/ojepi.2019.92015</u> The impact factor is 3.809 and HEC category.
- 18. Roome T, Rashid Y, Aurongzeb M, Razzak A. Structural investigation of human dectin-1 receptor; A novel gateway in drug discovery. Pakistan Journal of Pharmaceutical Sciences. 2019 Jul 1;32(4). PMID: 31608869 The impact factor is 0.863 and HEC category "Y"
- 19. Roome T, Aziz S, Razzak A, Aslam Z, Jamali KS, Sikandar B, Fatima T, Abidi L, Imran M, Faizi S, Shah MR. Opuntioside, opuntiol and its metallic nanoparticles attenuate adjuvant-induced arthritis: novel suppressors of toll-like receptors-2 and-4. Biomedicine & Pharmacotherapy. 2019 Apr 1;112:108624. doi: 10.1016/j.biopha.2019.108624 The impact factor is 7.419 and HEC category "Y"
- 20. Imran M, Hameed A, Shafiullah, Hafizur RM, Ali I, Roome T, Shah MR. Fabrication of Xanthan stabilized green gold nanoparticles based tolbutamide delivery system for enhanced insulin secretion in mice pancreatic islets. Journal of Macromolecular Science, Part A. 2018 Dec 2;55(11-12):729-35. doi: 10.1080/10601325.2018.1510290 The impact factor is 2.216 and HEC category "Y"
- **21.** Rao K, Roome T, Aziz S, Razzak A, Abbas G, Imran M, Jabri T, Gul J, Hussain M, Sikandar B, Sharafat S. Bergenin loaded gum xanthan stabilized silver nanoparticles suppress synovial inflammation through modulation of the immune response and oxidative stress in adjuvant induced arthritic rats. Journal of Materials Chemistry B. 2018;6(27):4486-501. doi: 10.1039/c8tb00672e The impact factor is 7.0 and HEC category "W"
- 22. Rao K, Aziz S, Roome T, Razzak A, Sikandar B, Jamali KS, Imran M, Jabri T, Shah MR. Gum acacia stabilized silver nanoparticles-based nano-cargo for enhanced anti-arthritic potentials of hesperidin in adjuvant induced arthritic rats. Artificial cells, nanomedicine, and biotechnology. 2018 Oct 31;46(sup1):597-607. doi: 10.1080/21691401.2018.1431653

The impact factor is 6.355 and HEC category "W"

## APPENDIX C: SWOT ANALYSIS

STRENGTHS	WEAKNESSES
<ol> <li>Established Quality Management System: DIABAR established a robust Quality Management System (QMS) in 2021, aligned with international standards, ensuring technically valid results and system-wide Standard Operating Procedures (SOPs).</li> <li>Highly Qualified Staff: The institute employs a team of highly skilled and qualified staff capable of executing tasks across all facilities and laboratories.</li> <li>Well-Organized Experimental Setups: The institute has well- organized in-vitro and in-vivo experimental setups, with established animal-based disease models and advanced molecular biological techniques.</li> <li>National and International Grants: DIABAR has secured multiple national and international grants, including a significant award under the Grand Challenge Fund (GCF-790) and the World Bank.</li> <li>Research and Development: The institute has developed strong national and international collaborations, contributing to significant research outputs, including patents and publications.</li> <li>Advanced Facilities: DIABAR boasts advanced research laboratories with state-of-the-art equipment, contributing to its capability for groundbreaking research.</li> </ol>	<ol> <li>Space Constraints: The quality labs are limited in space, potentially restricting the expansion of research activities.</li> <li>Need for Extra Resources: Additional cages and equipment are required to enhance research capabilities, particularly in animal-based studies.</li> <li>Limited Infrastructure: The current infrastructure may limit the scalability and efficiency of activities, especially in achieving international recognition and accreditation.</li> <li>Competition and Funding: Intense competition for research funding poses a challenge, along with the need for continuous technological upgrades.</li> </ol>

OPPORTUNITIES	THREATS
<ol> <li>Training and Certification: Opportunities for staff training and certification in specialized modules related to ISO and QMS standards are available.</li> <li>National and International Collaborations: The institute has opportunities for business collaborations with industries and institutions nationally and internationally, enhancing its research scope and impact.</li> <li>Commercialization: There are opportunities to commercialize research outputs, primarily in biologicals, vaccines, venom- based products and anti-sera, contributing to financial sustainability.</li> <li>Expansion of Services: The institute can expand its pre- clinical and toxicological testing services to a broader range of industries and national / international organizations, potentially increasing revenue and research opportunities</li> </ol>	<ol> <li>Disease Outbreaks: The risk of outbreaks of infectious or contagious diseases could disrupt research activities and animal models.</li> <li>Market Competition: DIABAR faces competition from other national organizations working on similar products, which could impact on its market share and funding opportunities.</li> <li>Regulatory Compliance: Meeting the stringent requirements for licensing and international accreditation, such as transforming into a "Pathogen-Free Facility," poses a significant challenge.</li> </ol>

## APPENDIX D: TOWS MATRIX

OF	PORTUNITIES	TH	IREATS
OF         1.         2.         3.         4.         5.         6.	PORTUNITIES Established Quality Management System: DIABAR established a robust Quality Management System (QMS) in 2021, aligned with international standards, ensuring technically valid results and system-wide Standard Operating Procedures (SOPs). Highly Qualified Staff: The institute employs a team of highly skilled and qualified staff capable of executing tasks across all facilities and laboratories. Well-Organized Experimental Setups: The institute has well-organized in-vitro and in-vivo experimental setups, with established animal-based disease models and advanced molecular biological techniques. National and International Grants: DIABAR has secured multiple national and international grants, including a significant award under the Grand Challenge Fund (GCF-790) and the World Bank. Research and Development: The institute has developed strong national and international collaborations, contributing to significant research outputs, including patents and publications. Advanced Facilities: DIABAR boasts advanced research laboratories with	TH         1.         2.         3.	IREATS Disease Outbreaks: The risk of outbreaks of infectious or contagious diseases could disrupt research activities and animal models. Market Competition: DIABAR faces competition from other national organizations working on similar products, which could impact on its market share and funding opportunities. Regulatory Compliance: Meeting the stringent requirements for licensing and international accreditation, such as transforming into a "Pathogen-Free Facility," poses a significant challenge

STRENGTHS			SO	ST		
1.	Established Quality	1.	Leverage QMS and SOPs to	1.	Use Robust QMS to	
	Management		Expand Collaborations: Use		Mitigate Risks from	
	System: DIABAR		the established Quality		Disease Outbreaks:	
	established a		Management System and		Strengthen the Quality	
	robust Quality		standardized SOPs to		Management System to	
	Management		attract more national and		include rigorous	
	System (QMS) In		International collaborations		biosecurity protocols	
	2021, aligned with		with industries and		that minimize the risk of	
	standards onsuring		thereby expanding the		authropics thereby	
	technically valid		research scope and		protecting research	
	results and system-		securing more funding		activities and animal	
	wide Standard	2	Capitalize on Skilled Staff to		models	
	Operating		Commercialize Research	2.	Employ Advanced	
	Procedures (SOPs).		Outputs: Utilize the highly		Research Facilities to	
2.	Highly Qualified		qualified and technically		Outpace Competitors:	
	Staff: The institute		skilled staff to focus on the		Utilize DIABAR's	
	employs a team of		commercialization of		advanced research	
	highly skilled and		research, primarily in		capabilities and strong	
	qualified staff		biologicals, vaccines,		collaborations to stay	
	capable of		venom-based products and		ahead of national	
	across all facilities		contributing to financial		continuously innovating	
	and laboratories		sustainability and revenue		and offering unique	
3	Well-Organized		generation		research services and	
0.	Experimental	3.	Enhance Research Outputs		products.	
	Setups: The		through Advanced	3.	Leverage Strong	
	institute has well-		Facilities: Use the advanced		National and	
	organized in-vitro		research laboratories and		International	
	and in-vivo		facilities to increase the		Collaborations to	
	experimental		institute's contributions to		Secure Funding: Use	
	setups, with		high-impact research and		existing partnerships	
	established animal-		publications, securing more		with prestigious	
	based disease		onbanging DIARAP's global		against the competitive	
	advanced		reputation		research funding	
	molecular	4	Expand Training and		environment ensuring a	
	biological		Certification Programs:		steady flow of financial	
	techniques.		Develop and offer		and technological	
4.	National and		specialized training and		resources.	
	International		certification programs	4.	Enhance Regulatory	
	Grants: DIABAR has		leveraging existing staff		Compliance to Address	
	secured multiple		expertise, potentially		Market Threats:	
	national and		increasing revenue and		Implement and maintain	
	international grants,		improving the institute's		Strict compliance with	
	significant award		excellence in biomedical		auidelines using the	
	under the Grand		and pharmaceutical		QMS ensuring that	
	Challenge Fund		research.		DIABAR meets all	
	(GCF-790) and the				regulatory requirements	
	World Bank.				and mitigates the risk of	
5.	Research and				losing market share to	
1	Development <sup>.</sup> The				competitors.	

6.	institute has developed strong national and international collaborations, contributing to significant research outputs, including patents and publications. Advanced Facilities: DIABAR boasts advanced research laboratories with state-of-the-art equipment, contributing to its capability for groundbreaking research.				
W	EAKNESSES		WO		WT
W 1. 2. 3.	EAKNESSES Space Constraints: The quality labs are limited in space, potentially restricting the expansion of research activities. Need for Extra Resources: Additional cages and equipment are required to enhance research capabilities, particularly in animal-based studies. Limited Infrastructure: The current infrastructure may limit the scalability and efficiency of activities, especially in achieving	1. 2. 3.	WO Address Space Constraints by Securing Funding for Infrastructure Expansion: Utilize national and international grant opportunities to secure funding for expanding lab space and facilities, thereby overcoming current space limitations, and supporting further research and development. Expand Infrastructure to Increase Scalability: Invest in infrastructure improvements that will allow DIABAR to scale up its research activities and improve efficiency, making the institute more competitive on an international level. Develop Staff Skills Through Training Programs: Address the need for more skilled	1.	WT Mitigate Space Constraints and Outbreak Risks: Prioritize the expansion of laboratory space and the enhancement of biosecurity measures to reduce the risks associated with space constraints and potential infectious disease outbreaks. Secure Stable Funding to Offset Competitive Pressures: Focus on securing stable and long-term funding through diversification of grant applications and exploring new revenue streams, such as commercialization of research outputs, to protect against intense competition and
4.	international recognition and accreditation. Competition and Funding: Intense competition for research funding poses a challenge,		technical staff by developing and implementing comprehensive training programs in collaboration with international partners, thereby enhancing the	3.	funding challenges. Strengthen Regulatory Compliance to Avoid Market Losses: Invest in upgrading the infrastructure and equipment to meet international regulatory

along with the need for continuous technological upgrades.	4.	institute's capacity to meet research demands. Utilize Collaborations for Infrastructure Upgrades: Partner with international collaborators who can provide technological assistance or funding to upgrade facilities, particularly in establishing a Pathogen-Free Facility, thereby enhancing DIABAR's research capabilities.	4.	standards, ensuring that DIABAR's products and services remain competitive and compliant with global expectations. Develop Contingency Plans for Resource Shortfalls: Establish contingency plans to manage potential shortfalls in resources, including alternative funding strategies and partnerships, to ensure that the institute remains operational and competitive even in challenging circumstances.
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## APPENDIX E: DIABAR FACILITY MAP

