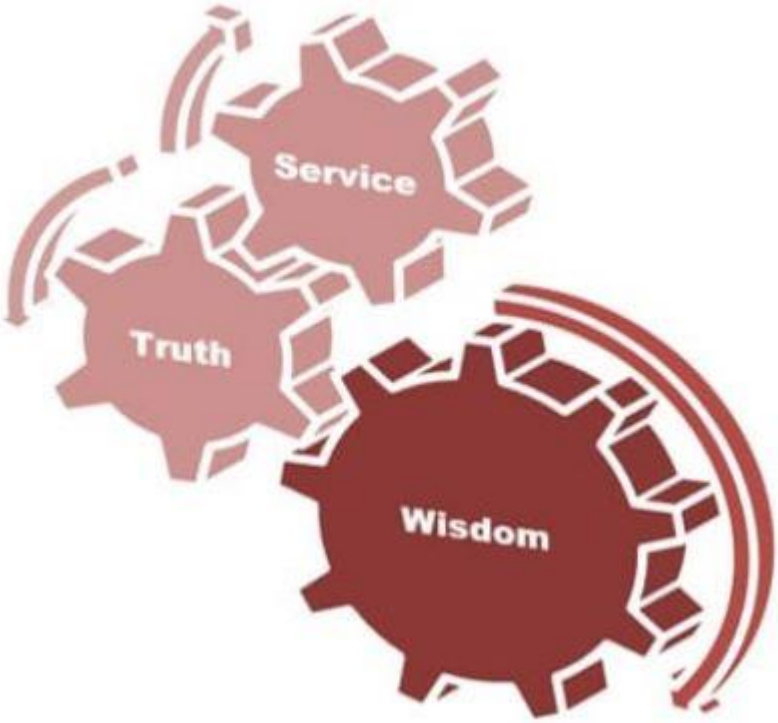
Rawalpindi Medical University

Curriculum

PhD in Health Sciences (Bio-Chemistry)

2023

Institution Mission Statement:



Institution Mission Statement:

Highly recognized and accredited center of excellence in medical education using evidence based training techniques for development of highly competent health professionals.

Institution Vision Statement:

- To impart evidence based research oriented medical education
- To provide best possible patient care
- To inculcate the values of mutual respect and ethical practice of medicine

OBJECTIVES PHD HEALTH SCIENCES (BIOCHEMISTRY)

Our goal is to train Post Graduates in the subject of Pharmacology, Biochemistry and Rehabilitation Sciences with excellent ability to teach undergraduate and post graduate medical, Biochemistry and Physiotherapy students, conduct research and effectively carryout administrative jobs in the medical institutions, Pharmaceutical industry and the drug regulatory authorities at National, International and Regional levels.

At the completion of the required period of training, the PG-trainee should be able to:

- Prove competency and clarity of concepts in all basic and allied disciplines of Pharmacology/Biochemistry/Rehabilitation Sciences (Physiotherapy).

- Teach, train and supervise post graduate students including M.Phil/MD/Ph.D.
- Develop Research proposals and conduct research in the field of Pharmacology, Biochemistry and Rehabilitation Sciences independently.

- Teach, train and evaluate medical undergraduates and other health and allied professionals in Pharmacology/Biochemistry and Rehabilitation Sciences.

- Develop, implement, manage and monitor programs of health care delivery systems.

- Pursue continuous and self-directed professional education to keep one's knowledge and skills updated and disseminate new knowledge.

- Discharge skills of leadership.

SCOPE/OUTCOUMES (MARKET, SOCIAL AND EMPLOYMENT (PROSPECTIVE)

- Senior Research Scientist, Biotechnology
- Research Scientist, Biotechnology.
- Research Scientist.
- Principal Scientist.
- Biochemist.
- Strategy Consultant.
- Staff Scientist.
- As a Biochemist in Hospital Labs and
- In Medical University

MINUTES OF 10th MEETING OF SYNDICATE, RMU / ALLIED HOSPITALS HELDIN THE SYNDICATE HALL, MAIN CAMPUS, TIPU ROAD, RAWALPINDI MEDICAL UNIVERSITY ON MONDAY, 31-05-2021

10th meeting of the Syndicate, RMU/Allied Hospitals, Rawalpindi was held on **Monday, 31-05-2021 at 10.00 am** in the Syndicate Hall, Main Campus Tipu Road, Rawalpindi Medical University, Rawalpindi under the chairmanship of **Prof. Dr. Yasmin Rashid**, Minister for Health, Punjab / Pro-Chancellor RMU, Rawalpindi.

Academic Council / Syndicate Approval Letter

Following members attended the meeting:-

1. ***Prof. Muhammad Umar,*** Vice Chancellor, Rawalpindi Medical University, Rawalpindi
2. ***Dr. Muhammad Asif Tufail ,***Additional Secretary(D&F), SHC&ME Department (Representative of Secretary SHC&ME Department, Punjab)
3. ***Mr. Abdul Rauf Sarohi,*** Deputy Director Local Fund Audit, Rawalpindi (Representative of Secretary Finance Department, Punjab)
4. ***Mr. Abdul Rauf,****Deputy Secretary Universities* (Representative of Secretary Higher Education Department, Punjab) – ***on video linkage***
5. ***Madam Farzana,*** *Deputy Secretary Regulations,* (Representative of Secretary Law and Parliamentary Affairs} - **on video linkage**
6. ***Prof. Tanveer Khaliq,***Vice Chancellor, Shaheed Zulfiqar Ali Bhutto Medical University / PIMS, Islamabad (Representative of Chairman HEC)
7. ***Dr. Muhammad SaqibAbbasi,*** Member Syndicate / Philanthropist.
8. ***Mr. Aezed Ata,*** Member Syndicate / Financial Expert,
9. ***Air Vice Marshal Asif Raza,*** Pro-Rector Academics, NUST (Representative of VC NUST)
10. ***Dr. Shazia Zeb,***Medical Superintendent, Holy Family Hospital, Rawalpindi
11. ***Mrs. Sundus Iqbal,*** Assistant Registrar, RMU, Rawalpindi (***On behalf of Registrar***)
12. ***Mrs. Naveela Kauser,*** Principal, College of Nursing, Holy Family Hospital, Rawalpindi ***(additional charge)***

Following were also present:-

1. **Dr. Muhammad Nawaz Khokhar**, MS BBH, Rawalpindi (Additional charge). invited guest/co-opted member
2. **Dr. Farzana Zafar**, MS DHQ Hospital, Rawalpindi.(Additional charge) invited guest/co-opted member
3. **Dr. NosheenMehboob,** MS Institute of Urology & Transplantation, Rawalpindi / invited guest/co-opted member
4. **Dr. Shahzad Ahmed,** Consultant to VC RMU, Rawalpindi / invited guest/co-opted member
5. **Dr. Muhammad Khalid Mahmood Randhawa,**Consultant COVID-19, Institute of Urology & Transplantation / invited guest/co-opted member
6. **Mr. Muhammad Hafeez-ur-Rehman,** Treasurer, RMU& Allied Hospitals, Rawalpindi. / Invited guest/co-opted member
7. **Prof. Samia Sarwar,** Professor of Physiology / Dean Allied Health Sciences, RMU, Rawalpindi s/ Invited guest/co-opted member
8. **Mr. Kashif Zaheer,** B&A Officer, RMU, Rawalpindi / Invited guest/co-opted member

1. Meeting started with name of Allah and recitation from Holy Quran.

The following agenda points were discussed in the meeting and decisions taken accordingly.

Agenda Item No	Agenda item / Discussion	Decision	Responsible Officer
2.	**Implementation Status of the 9th meeting of Syndicate:** The implementation status of the 9th meeting of Syndicate meeting held on 3-10-2020 was presented.	Syndicate approved the minutes of 9th meeting with following discussion/direction: ➢ After detailed deliberation, Syndicate gave the approval of IAHS Agendas. However, further directed to conduct as External Audit of the Finances and Budget of all the previous years since the Institute was established by considering the observations raised by the representative of SHC & ME Department. Moreover, the Audit Report must be shared with the shared with the Syndicate. ➢ Agenda Item 18: Syndicate gave the approval of procurement of vehicle (coasters and vans) for student purpose only, which are exempted from Austerity inconformity. ➢ Agenda Item 25: Syndicate gave the approval of one year extension of non-gazetted staff and gazetted staff (BOM created seats) but for BS-17 and above seats created by Govt, the case may be referred to Health Department for extension as per Schedule III Sr. No.4 of Punjab Medical & Health Institutions Act 2003.	VC RMU Dean AHS Coordinator AHS Treasurer AO RMU VC RMU AR RMU
	Academic Matters		
3.	**Approval of Diplomas, Fellowship, MS/MD/MPhil/PhD University Residency Programs of Rawalpindi Medical University – RMU:** It is submitted that after the promulgation of Rawalpindi Medical University Act 2017 (XVI of 2017). The status of Rawalpindi Medical College is upgraded to the level of Rawalpindi Medical University. The curricula of training Programs i.e. Diploma, MD/MS/MPhil/PhD programs have been already approved by the Syndicate but as per requirements of HEC for No Objection Certificate of the said programs, the list of program placed below is presented to Syndicate for fresh approval.	Syndicate accorded the approval ofall diplomas, fellowship, MS/MD/MPhil/PhD University Residency Programs of Rawalpindi Medical University subject to the completion of all codal formalities.	VC RMU DIR ME RMU

Sr No.	Department	Program
1.	General Medicine	MD
2.	Paediatrics	MD
3.	Gynecology / Obstetrics	MS
4.	Ophthalmology	MS
5.	ENT	MS
6.	Gastroenterology	MD
7.	Radiology	MD
8.	General Surgery	MS
9.	Anatomy	MPhil
10.	Physiology	MPhil
11.	Biochemistry	MPhil
12.	Community Medicine	MPhil
13.	Pharmacology	MPhil

12.	Community Medicine	MPhil
13.	Pharmacology	MPhil
14.	Histopathology	MPhil
15.	Hematology	MPhil
16.	Chemical Pathology	MPhil
17.	Microbiology	MPhil
18.	Critical Care	MD
19.	Nephrology	MD
20.	Infectious Diseases	MD
21.	Plastic surgery	MS
22.	Emergency Medicine	MD
23.	Dermatology	MD
24.	Pulmonology	MD
25.	Anesthesiology	DA,MS
26.	Cardiology	MD, Diploma
27.	Orthopedic Surgery	MS
28.	Pediatric Surgery	MS
29.	Microbiology and Molecular Biology	PhD
30.	Urology	MS
31.	Psychiatry	MD
32.	Medical Education	MHPE
33.	Neurosurgery	MS
34.	Psychiatry	Mental Health Diploma

New Programs

Sr No.	Department	Program
1.	Endoscopy in Nursing	Diploma
2.	Interventional Pain Management	Fellowship
3.	Family Medicine	Diploma, MD, Masters
4.	Research	MSc
5.	Orthopedics	MSc
6.	Forensic Medicine	MPhil
7.	Medical Education	MPhil
8.	Clinical Toxicology	MPhil
9.	Forensic Sciences	MPhil
10.	Health Sciences (Pharmacology)	PhD
11.	Health Sciences (Biochemistry)	PhD
12.	Health Sciences (Biochemistry, Pharmacology, Rehabilitation Sciences)	PhD
13.	Medical Radio Diagnosis (DMRD)	Diploma
14.	Gynaecology& Obstetrics (DGO)	Diploma
15.	Diploma in laryngeal optometery (DLO)	Diploma
16.	DOMS	Diploma

ELIGIBILITY CRITERIA

M.Phil/MS/MD/MDS/FCPS-II or its equivalent degree, 18 year of education, as per HEC admission criteria for PhD in one of the following basic disciplines of health sciences; Pharmacology, Biochemistry or Physiotherapy.

- The minimum GPA should be 3.00 or 70% in M.Phil or FCPS or equivalent degree
- If applicant is a government servant, he/she needs to produce N.O.C., from the concerned department along with the study leave, where required.
- The candidates must get 70% in the subject of Pharmacology/ Biochemistry/ Physiotherapy in the university-based test for admission in PhD.
- An interview will be held of the short-listed students for assessment of aptitude.
- Candidates having teaching/research experience in relevant fields shall be preferred.
- The Maximum number of PhD students under the supervision of one PhD supervisor will be as per HEC criteria.

ADMISSION TEST

i. The candidates must get 70% in subject Health Sciences (Biochemistry) University-based test for admission in PhD.

SEMESTER-WISE BREAK-UP OF CREDIT HOURS

CREDIT HOURS

48-credit Hours (18 credit hours course work + 30 credit hours research work).

FIRST SEMESTER

S. No	Course Title	Credits	Semester
1	Health Education	2	First Semester
	Synopsis Writing, Literature Search and Computer Skills- Mandatory workshops	1	
2	Advanced Biostatistics	3	First Semester
3	Advance Research Methodology	2	First Semester
	Research Methodology, Reference citation (End Note, Medley)	1	
SECOND SEMESTER			

5	Statistical Analysis/ Medical education/ bioethics/medical Ethics	3	Second
PhD in Molecular Biology /BIOCHEMISTRY			
1	Molecular Biology /Biochemistry I	2+1	Second
2	Molecular Biology /Biochemistry II	2+1	Second
3	Statistical Analysis/ Medical education/ bioethics/medical Ethics	3	Second

LIST OF MANDATORY WORKSHOPS

SEMESTER 1	**Credit hours**
Medical Synopsis writing=3 days workshop (Hands on)	01 Cr. Hour
Literature search and selection of research topic =1day workshop	01 Cr. Hour
Computer Skills=1 day	
Reference citation (End Note, Medley)=1 Days	
	Total Cr. Hour=02
SEMESTER 2	
Medical Education: Leadership, Communication skills, Interactive lectures & Small group discussion (SGD)=day 1	Cr.Hour=1

How to attempt postgraduate SAQs=3 hours=day2 **Assessment tools(Objectively structured practical examination OSPE, Multiple choice questions MCQs)=3 hours= day 3**	
Basic and Advance Statistical analysis=3 Days	Cr.Hour=1
Article writing=4 hours	Cr.Hour=1
Thesis writing=4 hours	
	Total Cr. Hour=3
Total Cr. Hour=05	

TEACHING METHODOLOGIES

The objectives of the training may be achieved through different modes, some of which are listed below:

- Assigning responsibilities of teaching the undergraduates, MBBS and M. Phil.
- Seeking information through Journal clubs, library and Internet.
- Attending workshops, Seminars, conferences, lectures and small group discussions, etc.
- Arranging regular quiz sessions for students
- Completion of assignments
- Patient/case-based learning
- Flip classroom technique
- Assisting/Supervising Research projects of undergraduates of MBBS and M. Phil students.
- Practical laboratory work in Pharmacology/ Biochemistry/ Physiotherapy at RMU and allied hospitals.

COURSES DISTRIBUTION & COURSES CONTENTS

COURSES DETAIL:

Course Title	Course Code	Credit Hours
Biochemistry-I	BCH-I 801	02 + 01 = 03
Biochemistry-II	BCH-II802	02 + 01 = 03
Molecular Biology	MB 803	02 + 01 = 03
General (Minor) Courses		
Analytical Techniques and Instruments-I	ATI 813	02 + 01 = 03
Analytical Techniques and Instruments-II	ATI 814	02 + 01 = 03
Molecular Biology of Mitochondrial Diseases	BMBD 804	02
Mandatory Courses		
1. Advance Biostatistics	AB 002	01
2. Advance Research Methodology	ARM 003	01
3. Bioethics	BE 001	01
4. Computer Skills	CS 004	01
5. Health Education	HE 005	01
6. Medical Education	ME 006	01
7. Medical Writing	MW 007	01

CURRICULUM COMMITTEE MEMBERS:

1. Dr. Asma Nafisa
2. Dr. Amna Noor
3. Dr. Muhammad Abdul Rab Faisal Sultan
4. Dr. Kashif Rauf

Program Detail

For Semester 1 & 2 (1st Year of Residency)

Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
08-10am	08-10am	08-10am	08-10am	08am-12pm	08am-12pm
Lecture	Lecture	Lecture	Lecture	Lab work	Lab work
			Journal Club		Presentation

For Semester 3 & 4 (2nd Year of Residency)

Comprehensive Examination

Synopsis topic selection – Synopsis writing

Evaluation by department and

Approval from ERB & BASR

Visit to the Research Stations

For Semester 5 & 6 (3rd Year)

Research work

For Semester 7 & 8 (4th Year)

Thesis write up

Evaluation by reviewers

Article write up, submission and publication

Thesis defense

CORSE CONTENT DETAIL:

YEAR 1
Semester 1
Duration: 16 weeks

Credit hours: 9

SUBJECTS

Health Education

Advance Biostatistics

Advance Research Methodologies

Synopsis Writing / Computer Skills

HE-01 HEALTH EDUCATION
PART I: BUILDING THE FOUNDATION OF A SKILLS-BASED APPROACH

Developing health literate individuals:

Components of health literacy

Continuum of health literacy

Developing health literacy as an asset

Establishing health literacy for life

Understanding a skills-based approach:

Components of skills-based health education

Skills-based health education in practice

Support for Skills-based health education

Examining student motivation:

Theories of motivation

Developmental levals and motivation

General considerations across age levels

PART II: TEACHING TO THE NATIONAL HEALTH EDUCTION STANDARDS

Accessing valid and reliable information, products and services

Skill introduction

Presenting the steps of the skill
Modeling the skill

Practice

Feedback and reinforcement

Analyzing influences:

Skill introduction

Presenting the steps of the skill

Modeling the skill

Practice

Feedback and reinforcement

Interpersonal communication:

Skill introduction

Presenting the steps of the skill

Modeling the skill

Practice

Feedback and reinforcement

Decision Making

Skill introduction

Presenting the steps of the skill

Modeling the skill

Practice

Feedback and reinforcement

Goal Setting

Skill introduction

Presenting the steps of the skill

Modeling the skill

Practice

Feedback and reinforcement

SELF MANAGEMENT

Skill introduction

Presenting the steps of the skill

Modeling the skill

Practice

Feedback and reinforcement

Advocacy

Skill introduction

Presenting the steps of the skill

Modeling the skill

Practice

Feedback and reinforcement

PART III: DEVELOPING CURRICULA AND ASSESSMENTS Using data to inform curriculum planning

Compiling functional infiormation

Gathering and understanding data

Interpreting data to make decisions on curriculum

Using data to bulid support for health education

Eight steps for curriculum development

Get to know the students and the community

Formulate goals

Develop benchmark assessments

Determine health topics, functional information and skills

Create a scope and sequence

Develop unit plans

Develop unit assessments

Create lesson plans

Designing meaningful assessments

Purpose of assessment

Types of assessment

Authentic assessment

Rubrics and grading

Constructive feedback

PART IV: STRATEGIES FOR EFFECTIVE INSTRUCTION

Creating a positive learning environment

Know yourself

Have a plan

Know your students

Establish class room norms

Consequences and reward systems

Foster student leadership and involvement

Be a positive role model

Implementing a skills-based approach

Facilitate learning experiences

Format lessons to support skill development and knowledge acquisition

Provide engaging, relevant experiences

Foster participation and active learning

Provide opportunities for self-reflection, internalization and personalization

Provide opportunities for skill development

Meeting the unique needs of teaching elementary health education

Making time for health education

Considerations for the elementary level

Using children's literature to support health education

Engaging families and the community

PART V: BEYONG THE CLASS ROOM

Professional development and advocacy

Staying current and relevant

Engaging in professional development opportunities

Developing a personalized professional development plan

Using what you learn

Advocating for health education

Making cross-curricular connections

A coordinated approach to student success

Shaping local wellness policies

Making interdisciplinary connections for school improvement

AB-01 ADVANCE BIOSTATISTICS

LEARNING OBJECTIVES

To provide the students with the necessary concepts of statistics to enable them to realize a research project.

Selection of appropriate statistical techniques to address questions of medical relevance;

select and apply appropriate statistical techniques for managing common types of medical data;

use various software packages for statistical analysis and data management;

interpret the results of statistical analyses and critically evaluate the use of statistics in the medical literature;

communicate effectively with statisticians and the wider medical community, in writing and orally through presentation of results of statistical analyses;

explore current and anticipated developments in medical statistics.

DATA ANALYSIS

DESCRIPTIVE STATISTICS

Frequency Distributions

Measures of Central Tendency

Measures of Variability

The Normal Distribution

STATISTICAL INFERENCE

Probability

Sampling Error

Confidence Intervals

Hypothesis Testing

Type I Error: Level of Significance

Type II Error: Statistical Power

Concepts of Statistical Testing

Parametric versus Nonparametric Statistics

Commentary: Statistical Significance versus Clinical Significance

Comparing Two Means: The t-Test

The Conceptual Basis for Comparing Group Means

The t-Test for Independent Samples

The Correlation Matrix

Pearson Product-Moment Correlation Coefficient

Correlation of Ranks: Spearman Rank Correlation Coefficient

Correlation of Dichotomies

Interpreting Correlation Coefficients

REGRESSION

Linear Regression

Assumptions for Regression Analysis

Outliers

Accuracy of Prediction

Analysis of Variance of Regression

Restrictions on the Interpretation of Linear Regression Analysis

Nonlinear Regression

Analysis of Covariance

MEASURES OF ASSOCIATION FOR CATEGORICAL VARIABLES: CHI-SQUARE

The Chi-Square Statistic

Goodness of Fit

Interpreting Significant Effects: Standardized Residuals

Tests of Independence

McNemar Test for Correlated Samples

Coefficients of Association

STATISTICAL MEASURES OF RELIABILITY

Reliability Theory and Measurement Error

Intra class Correlation Coefficient {ICC)

Agreement

Internal Consistency

Response Stability

Alternate Forms: Limits of Agreement

STATISTICAL MEASURES OF VALIDITY

Validity of Diagnostic Tests

Receiver Operating Characteristic (ROC) Curves

Clinical Prediction Rules

Measuring Change

EPIDEMIOLOGY: MEASURING RISK

The Scope of Epidemiology

Descriptive Epidemiology: Measures of Disease Frequency

Analytic Epidemiology: Measures of Association and Risk

Analytic Epidemiology: Measures of Risk Based on Treatment Effect

MULTIVARIATE ANALYSIS

Partial Correlation

Multiple Regression

Logistic Regression

Discriminant Analysis

Factor Analysis

Cluster Analysis

Multivariate Analysis of Variance

Survival Analysis

DATA MANAGEMENT

Confidentiality and Security of Data

Monitoring Subject Participation

Statistical Programs

Data Collection Forms

Data Coding

Data Entry

Data Cleaning

Data Modification

Data Analysis

ARM-01 ADVANCE RESEARCH METHODOLOGY

Learning Objectives

The primary objective of this course is to develop a research orientation among the scholars and to acquaint them with fundamentals of research methods. Specifically, the course aims at introducing them to the basic concepts used in research and to scientific social research methods and their approach. It includes discussions on sampling techniques, research designs and techniques of analysis. Some other objectives of the course are:

Identify the basic and advance concepts of research and scientific inquiry and its methodologies

To develop understanding of the basic framework of research process

Define appropriate research problem and parameters

Construct a project proposal to undertake a research project.

Discuss scientific Inquiry, its principle and application in medical research.

Describe Search techniques for literature review

To develop an understanding of the ethical dimensions of conducting applied research

Differentiate between different levels of evidence, appraisal and different studies with respect to their effectiveness in literature.

Appreciate the components of scholarly writing and evaluate its quality.

To develop an understanding of various research designs and techniques

To identify various sources of information for literature review and data collection

CONCEPT OF CLINICAL RESEARCH

Defining Clinical Research

Measurement of Outcomes

Models of Health and Disability

Evidence-Based Practice

Sources of Know ledge

Types of Research

The Research Process

Understanding Method, Content and Philosophy

THE ROLE OF THEORY IN CLINICAL RESEARCH

Purposes of Theories

Components of Theories

Development of Theories

Characteristics of Theories

Theory and Research

Theory and Law

ETHICAL ISSUES IN CLINICAL RESEARCH

Integrity of the Researcher

The Protection of Human Rights in Clinical Research

The Institutional Review Board

Elements of Informed Consent

PART II- CONCEPTS OF MEASUREMENT

PRINCIPLES OF MEASUREMENT

Quantification and Measurement

The Indirect Nature of Measurement

Rules of Measurement

RELIABILITY OF MEASUREMENTS

Measurement Error

Reliability Coefficients

Types of Reliability

Generalizability

Pilot Testing

VALIDITY OF MEASUREMENTS

Validity and Reliability

Validity of Inferences

Face Validity

Content Validity

Criterion-Related Validity

Construct Validity

Measuring Change

Criterion Referencing and Norm Referencing

Cross-Validation

The Ongoing Pursuit of Validity

Compulsory Courses for All Specialties

SEMESTER 1 & 2

CS-01 COMPUTER SKILLS

Learning Objectives

Upon completion of the course the students should be able to:

Comprehend the basic concepts of the computational skills.

Learn the use of computer in sampling techniques and the data collection and analysis.

Understand the application of computerized instruments for the practical work.

Course Contents

Basic Concepts of Computer

History of Computer

Concept of Computer hardware

Concept of Computer languages

Concept of Computer Software e.g. SPSS,Microsoft Excel or similar.

Computer applications in Biology Spreadsheet tools: Introduction to spreadsheet applications; Data storing, Statistical analysis of data, Generating charts/ graph and other features.

Presentation tools: Introduction, features and functions, Presentation of Power Point Presentation, customizing presentation, Showing presentation, Tools – Microsoft Power Point or Similar

Web Search: Introduction to Internet, Use of Internet and WWW, Use of search engines, Biological data basis.

SA-01 STATISTICAL ANALYSIS

Course Objectives

Identify and define the basic concepts and procedures required for data analysis and interpretation.

Analyze and interpret the data collected for the research project and draw conclusions related to the objectives of your study.

Write a clear and concise research report (paper for a peer reviewed journal) and a summary of the major findings and recommendations for each of the different parties interested in the results.

Present the major findings and the recommendations of your study to policy-makers managers and to the subjects of your research together with them to finalize the recommendations.

Prepare a plan of action for the dissemination, communication and utilization of the findings and (if required) make recommendations for additional research.

Course Content

Introduction to SPSS

Data Description and Simple Inference for Continuous Data

Simple Inference for Categorical Data

Multiple Linear Regression

Analysis of Variance I: One-Way Designs

Analysis of Variance II: Factorial Designs

Analysis of Repeated Measures I: Analysis of Variance

Type Models; Field Dependence and a Reverse Stroop Task

Analysis of Repeated Measures II: Linear Mixed Effects Model

Logistic Regression

Survival Analysis

Principal Component Analysis and Factor Analysis

Classification: Cluster Analysis and Discriminant

Function Analysis

MW-01 MEDICAL WRITING

Introduction to medical writing

Accumulation of scientific Knowledge

Guiding Principles for Scientific Inquiry

Features of Education and Education Research

Designs for the Conduct of Scientific research in Education

Design Principles for Fostering Science in a Federal Education Research Agency

BE-01. BIOETHICS

Course Objectives

The ***ethics curriculum*** is designed to provide students with the conceptual tools that they will need to navigate the ***ethical*** issues that are commonly encountered in clinical practice. Program helps students to develop skills in critical reasoning and in using the basic concepts of medical ethics it also fosters the habits of critical reflection and discussion about the ethical issues. Thorough exploration of ethics is critical to developing exemplary scholars and teachers. Focusing on discussion, curriculum considers central ethical and legal principles, and research ethics.

Course Content:

Professional Responsibilities

Student Responsibilities/ Professionalism

Qualities of a Physician/Codes of Ethics

Should Patients Be Learning Tools?

Central Ethical & Legal Principles

Duty to Provide Care (Trust & Fiduciary Responsibility)

Truth Telling and Informed Consent for Treatment

Confidentiality and The Duty to Warn

Research Ethics [Epidemiology]

Ethical Dangers of Human Subject Research

The Importance of Research and The Development of New Therapies

The Common Rule: Requirements for The Ethical Conduct of Research

Justice and Medicine

Justice in Clinical Practice

The Right to Health Care

Allocation of Transplant Organs

The Nature and Value of Autonomy

Concepts of Autonomy

Concept of beneficence

Concept of Non- maleficence

Standards for Surrogate Decision Making

Refusal of Treatment and Justified Paternalism

Advance Directives and Proxies

Clinical Moral Reasoning: A Systematic Approach to Clinical Ethics Dilemma

Critical Care -Family Meeting

Emergency Medicine - Confidentiality and Legal Responsibility o Family Practice -Adherence and Compliance

o Geriatrics -Giving Bad News

o Medicine -Responding to Families o Neurology -Disclosing a Diagnosis o Ob/Gyn-Reproductive Choice

o Pediatrics -Parental Discretion

o Psychiatry -Treatment over Objection and Confidentiality o Surgery - Identifying Ethical Issues

ME-01 Medical Education

Rationale:

Due to the advancement & development of innovative educational strategies with implementation of E. Learning environment, technology zenith and advance scientific research in medical & allied health, the health professionals (Basic sciences & clinical teachers) require to be acquaint with all these innovations and demonstrate essential skills & competencies as a physician, teacher, scholar, researcher and leader. This means that training of health professionals requires high standards of education at par with the realities of the practical world. Along with the expansion of health professionals as a need, a reform in health professions education is taking place world over e.g. Curriculum integration, implementation of PBL/CBL, use of simulator in teaching, virtual patients, OSCE/OSPE as an assessment tools etc. Therefore, this course is designed keeping in mind the basic requirements for a medical teacher (Basic sciences) in Health Profession Education to demonstrate the competencies of an effective medical teacher.

Course Goal:

The course is endeavors to train post graduate students (basic medical sciences) in basics of health profession education to produce competent health profession teacher.

Outcomes of Course:

By the end of the course the students will be able to:

Adept in basic knowledge and its application in the core areas of medical education i.e. educational environment & students, teaching and learning, curriculum development including educational strategies & curriculum themes, Students assessment and Program evaluation.

Acquire knowledge, skills and attitude requires for a competent health profession educator by understanding & applying the theoretical and empirical literature in medical education

Critically examine the preparation requires for their role as educators of their profession through enhancing students understanding and implementation of principles of adult learning and teaching in relation to their target group.

Apply the educational theories and cognitive psychology in support of their role as an educator in practice.

Use knowledge and skills require for Designing & developing an integrated curriculum/Module at an undergraduate level.

Understand and apply the fundamentals of educational methodologies (Learning and Teaching) while “Teaching to learn and learning to teach”.

Understand and apply the fundamental principles in ‘Assessment’ while designing an assessment plan and assessment tools.

Design a plan with tools for evaluating a teaching program.

Demonstrate effective communication skills (active participation, Pro-activeness, professionalism, group dynamics, team building, conflict resolution, negotiation skills, leadership skills etc) while working in the group/team tasks.

Course Overview and description

The whole course is based on principles of constructive cognitive philosophy and follows the FAIR criteria to improve learning. According to constructive philosophy the teacher is more than a transmitter of information and has responsibility for managing the student’s learning. The reflective teacher understands the principles of learning. Hence, this course has four key features identified for effective learning – the FAIR criteria:

Feedback to the learner as to progress
Active rather than passive learning
Interest or motivation of the learner
Relevance to the perceived and real needs of the learner

This course is designed for the post gradates medical students to develop them as an effective team member and effective teacher in an Integrated Curriculum development, its implementation and evaluation. The students will understand and apply the basic core concepts in medical education while working as Task Force member, conducting an integrated session for instance ‘**Problem Based Learning Sessions’ etc.** and assessing the students**.** The essential Core area and themes in medical education in which students will be trained are 1) educational environment & students, 2) teaching and learning strategies, 3) curriculum development including educational strategies & curriculum themes, 4) Students assessment and 5) Program evaluation. The course curriculum is structurally organized in these

five Themes.

Instruction strategies:

Interactive lectures by the teacher followed by the group

discussions/activity weekly 1 hrs.

Self-study and literature search- for assignment.

Assignments (Students are expected to submit 02 evidence-based written assignment-01 major & 01 minor)

Assessment strategy:

Formative assessment- there will be continuous assessment on the ongoing small group activities and attitude of each student and that will be recorded through an evaluation performas (checklists, rating scales) used during the sessions. Constructive Feedback will be provided on it by the teachers. Students, who will score satisfactory and achieve the minimum required standard, will be allowed to sit in end of course/semester assessment.

Summative assessment:

Assessment modalities:

For Knowledge:

Students are expected to submit 02 evidence-based written assignments (01 major & 01 minor related to major themes).

Final end of Semester Exam: At the end of the course there will be a Theory Exam comprises of MEQ (Modified Essay Questions).

For Skill and attitude:

It will be assessed through ongoing continuous assessment in small group activities, presentations and mini projects assigned during the classes and that will be recorded through an evaluation performas (checklists, rating scales).

Learning Resources:

A practical Guide for Medical Teacher by John A. Dent & Ronald M. Harden. (4^{th} edition, A Book)

Journal Articles will be provided from the latest medical education journals.

Other reading materials from the renowned author's books and research work, some good websites.

Logistics / Training Resources for the course:

Photostat facility for handouts and readings.

Room for classes with multimedia.

Course Sequencing, Time Planning and TOS

Total 18 hours of teaching: Each session will be of 01 hour

Sr. #	Theme #1	Theme #2	Theme #3	Theme #4	Theme #5	Total
Topic	Introduction to HPE& Educational Environment	Teaching And Learning	Curriculum: structural concepts and development	Assessment	Program Evaluation	
Duration	4hrs	4hrs	4hrs	4hrs	2hrs	18hrs
Marks	20	25	25	20	10	100

Course Content and Learning Objectives (Course Evaluation Procedure)

THEME # 1:

Introduction to HPE& Educational Environment

Number of Lectures: 04 Content:

Introduction to HPE and competencies required in HPE

Educational environment which effect the students learning- factors that enhance or inhibit the learning the learning.

Various learning styles and merits and demerits- superficial and deep learning.

Introduce with the themes of HPE, trend, Issues & Challenges IN HPE& Competencies required in HPE.

Discuss the competencies of a Medical Teacher.

Identify the factors which constitute the educational environment and effect the students learning i.e. the factors that enhance or inhibit the learning.

Identify various learning styles, its merits and demerits- superficial and deep learning.

THEME # 2:

Teaching & Learning

Number of Lectures: 04

Content:

The characteristics of adult learners- the principles of adult learning.

Different instructional methodology or modes of information transfer.

Teaching and Learning in large group: Interactive lecturing.

Teaching and Learning in small groups teaching and learning: PBL, CBL

why? How? Its principles, process – tutors and students role.

Learning Objectives:

Identify the characteristics of adult learners, and the principles of adult learning.

Link principles of adult learning with characteristics of modern curriculum.

Identify different modes of instruction and its strength and weakness.

Use the process of planning while designing & conducting large group teaching (Interactive lectures) session.

Use the process of planning while designing & conducting small group discussion session.

Discuss the principles process, role of tutors and students, student's assessment in a PBL& CBL session.

Demonstrate effective communication skills (active participation, Proactiveness, professionalism, group dynamics, team building, conflict

resolution, negotiation skills, leadership skills etc) while working in the group/team tasks.

THEME # 3:

Curriculums: structural concepts and development

Number of Lectures: 04

Content:

The curriculum and its components.

Various curricular philosophies & Perspectives- curricula past, present, future.

Innovative trends in curriculum, educational strategies and curriculum themes with emphasis on integration.

The Hardens 10 questions for curricular planning.

Differentiation between the aims, goals, outcomes, objectives

Writing Learning objectives and Levels in Bloom's taxonomy of objectives for a course.

The selection of core content while integrated curriculum development.

Steps of Integrated Modules planning & development.

Define curriculum.

Differentiate between the different components of a curriculum.

`Enlist Harden's 10 questions for curricular planning &WFME standards

Discuss various curricular philosophies & Perspectives - curricula past, present, future.

Identify the trends in curriculum development, educational strategies and curriculum themes.

Discuss integrated curriculum and broad categories of integration in curriculum

Differentiate between the aims, goals, outcomes, objectives

Differentiate between the different levels in Bloom's taxonomy of objectives.

Write learning objectives of 3 different domains for an integrated module and match it with the teaching and learning strategies.

Steps of Integrated Modules planning & development

Select core content while designing an integrated curriculum development.

THEME # 4:

Assessments

Number of Lectures: 04

Content:

Definition of assessment and evaluation.

Differentiation between the formative &summative assessment, Criterion referenced and norm referenced.

Characteristics of a good examination and definitions of validity and reliability of exams.

Matching of learning objectives with the assessment tools

Design various assessment tools for knowledge, skill & attitude-MCQs, SEQs, & OSCE/OSPE

Importance and Contents of a table of specification.

Differentiate between assessment and evaluation

Differentiation between the formative &summative assessment, Criterion referenced and norm referenced.

Discuss the characteristics of a good examination.

Match learning objectives with the assessment tools (Miller's Pyramid).

Construct various assessment tools e.g. M.C.Qs, SEQ, OSCE/OSE

Match the objectives with the assessment tools.

Develop a table of specification for a module.

THEME # 5: Program

Evaluations Number of

Lectures: 02 Learning

Objectives:

Discuss the importance of evaluating a teaching session/ course/ program.

Identify the ways of assessing the effectiveness of an educational program.

SEMESTER 2
Duration:16 weeks

Credit hours:9

PHD BIOCHEMISTRY:

COURSES IN YEAR-1, SEMESTER 2

Course Outline

Molecular Biology / BIOCHEMISTRY I

Molecular Biology / BIOCHEMISTRY II

BCH-201:Biochemistry

Course Objectives:

Upon completion of course the students will be able to:

Comprehend the structure and function of carbohydrates, proteins and lipids

- Comprehend the chemical structure and metabolism of nucleotides and nucleic acids, purine/pyrimidine and related abnormalities in their metabolism

Comprehend the buffer system of the body, role of kidney and lungs in regulation of the pH and related abnormalities of acid base balance

Comprehend the basic concepts of energy with regard to diet and nutritional aspects of various dietary components

Cell structure and organization

DNA replication, transcription, protein synthesis and enzymology

Molecular genetics like DNA recombination, gene structure, function and regulation as well as cell signaling pathways and cancer

Molecular cloning and molecular tools for studying genes and gene activity

Course Contents :

The course contents of this subject include ;

Chemistry of carbohydrate,

protein and lipids,

Chemical structure of Nucleotides/Nucleic Acid,

metabolism of Purine/Pyrimidine and

related abnormalities in their metabolism,

Acid Base Balance and maintenance

pH of the body fluids,

Diet and Nutrition

Concepts of energy,

caloric requirements

nutritional aspects of various dietary components,

malnutrition in pregnancy and lactation. Cell biology,

the chemical basis of life,

- techniques in cell and molecular biology,
- enzymes and metabolism,

mitochondrion and aerobic respiration,

- the structure and function of the plasma membrane

cytoplasmic membrane systems,

interactions between cells and their environment,

the nature of the gene and genome,

expression of genetic information,

cytoskeleton and cell motility,

cellular reproduction,

cell signaling

cancer.

MB-202: Biochemistry II

Course Objectives:

Upon completion of course the students will be able to:

Comprehend the basic knowledge of biological oxidation and oxidative phosphorylation

2. Comprehend knowledge about the processes of metabolism of proteins, carbohydrates, lipids, minerals and trace elements

Comprehend understandings of various internal or inherited defects in metabolic pathways

Course Contents:

The course contents of this subject include ;

Principals of biological oxidation,

various process of oxidation and enzymes involved in it ,

election transport chain.,

study of its components

various heories of oxidative phosphorylation ,

digestion and absorption of proteins,

bio synthesis of various amino acids,

catabolism of proteins and amino acid nitrogen,

urea synthesis,

catabolism of carbon skeleton of amino acids,

 synthesis of special ized products from amino acids,

internal defects in metabolism of amino acids,

digestion and absorption of carbohydrates,

synthesis of glycogen,

the process of glycogenolysis,

gluconeogenesis,

aerobic and anaerobic glycolysis,

 the reaction and importance of hexode monophosphate pathway

inter-conversion of various monosaccharide

synthesis of amino sugars,

glycosaminoglycanes and glucuronic acid

various inheriteddefects in the metabolic pathways of carbohydrates

digestion and absorption of lipids,

transport of plasma lipids,
their storage in adipose tissue,
oxidation of fatty acids,
synthesis of fatty acids,
synthesis of ketone bodies
cholesterol and their disposal,
 plasma lipoproteins and their metabolism, Internal
disorders of lipid metabolism,
details about minerals,
trace elements,
their dietary sources,
their biochemical role,
mechanism of action
effect of their deficiency
role in metabolism.

TOTAL CREDIT HOURS

48-credit Hours (18 credit hours course work + 30 credit hours research work).

Duration of Program

Duration of program is supposed to be minimum 03 years while maximum 06 years, as per HEC policy

Assessment Procedure

1. Assignments/tests/log book/portfolio 10 percent marks
2. Semester Exam:

If subject has practical:

Viva/practical OSPE 45 percent

Written Examination 45 percent

If subject has no practical then:

Written Examination 90 percent

Calculate GPA as per University rules.

Marks Distribution

- Total marks per semester 500 marks

First Semester:

- MCQs 45 marks (each subject)
- SEQs 45 marks (each subject)

- Viva (Advance Biostatistics) 100 marks
- Viva (Advance Research Methodology) 100 marks
- Mandatory Workshops 100 marks

2nd Semester:

- MCQs 45 marks (each subject)
- SEQs 45 marks (each subject)
- Viva+ Practical 100 marks (each subject)
- Mandatory Workshops 100 marks

Semester	Course Title	MCQ Marks	SCQ Marks	VIVA/Practical Marks	Internal Assessment
First	Medical Writing & Health Education	45	45	N/A	10
	Advanced Biostatistics	45	45	90	20
	Advance Research Methodologies	45	45	90	20
PhD Biochemistry					
	BIOCHEMISTRY I	45	45	90	20
	BIOCHEMISTRY II	45	45	N/A	10

Second	Differential Diagnosis in Rehabilitation Sciences	45	45	90	10

STANDARD OF PASSING

Cleared the semester exams

Cleared the comprehensive exam If yes, then the evidence of clearing the comprehensive exam

The dissertation examined or to be examined by at least two foreign examiners and one national examiner. If the scholar has completed his/ her dissertation then the dissertation has to be examined by minimum of two foreigner examiners preferably from technologically advanced countries and one national examiner.

Has the dissertation been defended If yes, then provide the details including date of defense, whether it was an open defense, notification of the defense etc.

Submitted paper for publication in HEC approved journals. The scholar has to publish at least 2 research papers in HEC approved journal for the purpose to attain Ph.D. Degree. For this purpose, if the paper is published then the evidence of publication is to be submitted; if the paper is accepted for publication, then the documentary proof of acceptance from the journal will be submitted.

RECOMMENDED READINGS
COMPULSORY COURSES FOR ALL SPECIALTIES

BOOKS

BIOETHICS AND MEDICAL ETHICS

John Arras and Bonnie Steinbock. Ethical Issues in Modern Medicine, Mayfield, Latest Ed.

Françoise Baylis, Jocelyn Downie, Benjamin Freedman, Barry Hoffmaster, and Susan Sherwin. Health Care Ethics in Canada. Harcourt Brace, Latest Ed.

Tom L. Beauchamp and James F. Childress. Principles of Biomedical Ethics. Latest Ed. Oxford University Press.

Jonathan Glover, Causing Death and Saving Lives. Penguin Books, Latest Ed.

Glenn C. Graber and David C. Thomasma. Theory and Practice in Medical Ethics. Continuum, Latest Ed.

Thomas A. Mappes and David Degrazia. Biomedical Ethics, 4th ed. McGraw-Hill, Latest Ed.

Gregory E. Pence. Classic Cases in Medical Ethics.2nd ed., McGraw-Hill, 1990.

BIOSTATISTICS

Gordis, L. Epidemiology. Pennsylvania: W.B. Saunders Company. Latest Ed.

Rothman KJ. Modern Epidemiology. Boston: Little, Brown and Company, Latest Ed.

Kelsey JL, Thompson WD, Evans AS. Methods in Observational Epidemiology. New York: Oxford University Press, Latest Ed.

Kleinbaum DG, Kupper LL, Morgenstern H. Epidemiologic Research: Principles and Quantitative Methods. Belmont, CA: Lifetime Learning Publications, Latest Ed.

Lilienfeld DE, Stolley PD. Foundations of Epidemiology. New York: Oxford, Latest Ed.

Daniel WW. Biostatistics: A Foundation for Analysis in the Health Sciences. Latest Ed. John Wiley & Sons. Inc. New York.

Larson R and Farber B. Elementary Statistics: Picturing the World. Latest Ed, Prentice Hall Publications. New Jersey USA.

AR-01 ADVANCE RESEARCH

Essentials of clinical research By Stephan P. Glasser.

Rehabilitation Research (Principles and Applications) 3rd Edition By Elizabeth Domholdt.

Dowrick C. Medicine in society: behavioral sciences for medical students. CRC Press; 2001

Billingham KA, Feldman HS & Lopez MA. Developmental psychology for health care prefession. Michigan: westviewpress ;1982.

Purtilo RB & Doherty RF. Ethical dimensions: in the health professions. 6th ed. St. Louis: Elsevier; 2016

Veatch RM. Medical ethics. 2nd ed. USA: Jones & Bartlett. 1997

COMPUTER SKILLS

Hochreiter, Sepp; Wagner, Roland. Bioinformatics Research and Development. Series Lecture notes in Computer Science, Springer, Latest Ed.

Mandoiu, Ion; Narasimhan, Giri; Zhang, Yanqing. Bioinformatics Research and Applications Series: Lecture Notes in Computer Science. Springer, Latest Ed.

JOURNALS:

COMPUTER SKILLS

Journal of Bioinformatics and Computational Biology (JBCB)

BMC Bioinformatics

BIOETHICS

Cambridge Quarterly of Healthcare Ethics

Hastings Center Report

Journal of Clinical Ethics

Journal of Medical Ethics

Journal of Medicine and Philosophy

Kennedy Institute of Ethics Journal

Nursing Ethics

BIOSTATISTICS

Cancer Epidemiology

Epidemiologic Reviews

Annals of Epidemiology

American Journal of Epidemiology

International Journal of Epidemiology

RECOMMENDED READINGS MOLECULAR BIOLOGY / BIOCHEMISTRY:

BCH-201: MOLECULAR BIOLOGY / BIOCHEMISTRY I

Robert. K. Murray Harpers Illustrated Biochemistry Latest Ed.

MN. Chatterjea Rana Shinde. Text Book of Medical Biochemistry Latest Ed.

Pamedla.L. Champe Richard. A.Harvey. Dooli R.F. Reconstructing history with amino acid sequences. Protein SC Latest Ed.

Collins PM: carbohydrates Chapman and Hall Latest Ed.

A.S.Saini Text Book of Biochemistry Latest Ed.

Adams R.I.P. KnolerJT.leader DP The Biochemistry of Nucleic Acids Latest Ed. Chapman and Hall.

Blackburn G.M. Gait MJ. Nucleic Acids in Chemistry and Biology IRL Latest Ed.

D M Vasudeva n and. Sreekumaris Text Book of Biochemistry Latest Ed.

Harris M.D. Siegel LB. Alowey J.A Gout and Hyperurieemia. Arm Family Physicians Latest Ed.

Burton David Rose Clinical physiology of acid-base and electrolyte disorders Latest Ed.

D.S.A Talha Raza Basis of Fluid ad Electrolytes Latest Ed.

Davidson and Passmore Human Nutrition and Dietetics Latest Ed.

M.Swaminathan Principles of nutrition and dietetics Latest Ed.

Bender DA. Bender AE Nutrition, A Reference Handbook Oxford University Press Latest Ed.

Carrow JS James WPT. Ralph A Human Nutrition and dietetics Latest Ed. Churchill Livingston

Journals:

Analytical Biochemistry

Essays in Biochemistry

Journal of Biochemistry

Nature Chemical Biology

The Journal of Biochemistry

Biology of the Cell

Nature Cell Biology

Cell & Tissue Research

Journal of Cellular Physiology

Journal of Cellular Biochemistry

Journal of Molecular Cell Biology

Molecular and Cellular Endocrinology

Cellular Physiology and Biochemistry

Nature Reviews Molecular Cell Biology

International Journal of Biochemistry and Cell Biology

BCH-202: MOLECULAR BIOLOGY / BIOCHEMISTRY II

Harpers illustrated biochemistry Latest Ed.

DM. Vasudevan,Streekumaris. Text book of biochemistry Latest Ed.

Donald Voet and Judith G voet Latest Ed.

Pamela. 1. Champe. Richard. A.Hariuz biochemistry Latest Ed.

Lehninger, Nelson and Cox. Principals of Biochemistry Latest Ed.

Montgomery, Convey, Spector Biochemistry a case oriented approach Latest Ed.

Seriver CR et-al The metabolic and molecular bases of inherited diseases. Latest Ed. McGraw Hill.

M.N Chaterjea, Rana shinde. Text book of medical Biochemistry Latest Ed.

Mehews. Van Holde. Biochemistry Latest Ed.

Styere Biochemistry Latest Ed.

Waite. M Biochemistry of lipids, lipoproteins and membrance. Elsevier Latest Ed.

Davidson

Garrow. J- rchill Livingstone.

Bender D/ ess Latest Ed.

Journals :

Analytical Biochemistry

Essays in Biochemistry

Journal of Biochemistry

Nature Chemical Biology

The Journal of Biochemistry

International Journal of Biochemistry and Cell Biology

Journal of Cellular Biochemistry