Proposal

Fellowship in Chronomedicine

King George's Medical University, UP, Lucknow

Prepared by

CHRONOMEDICINE UNIT
Department of Physiology
King George's Medical University, UP, Lucknow

The Training Programme

1. Duration of the Course – 01 year

2. Eligibility:-

   Any one of the following qualification:-

   - MD Physiology from an MCI recognized medical college
   - DNB in Physiology from recognized medical college
   - M.Sc PhD in Medical Physiology from a recognized University
   - MD/DNB in General Physiology from a recognized medical college
   - MD/DNB in any discipline of medical stream from a recognized medical college/institute

3. ROTATION OF POSTING

The candidate would be posted in **Chronobiology, sleep and neurophysiology lab (Department of Physiology)** apart from their scheduled peripheral related postings.

The **peripheral related postings** for the fellow will be in the related departments for the training of history taking and evaluation of patients such as;

- Department of Psychiatry (child, adolescent and adult) for affective and neuro-behavioural disorders
- Department of Geriatric Mental Health for affective and neuro-behavioural disorders
- Department of Neurology for sleep and neurological disorders
- Department of Respiratory Medicine for sleep, asthma, bronchitis etc
- Department of ENT for allergic rhinitis, vasomotor rhinitis
- Department of Endocrinology for pancreatic, thyroid and other metabolic disorders
- Department of Cardiology for hypertension and cardiovascular disorders
- Department of Dermatology and Venereal disease for skin related allergic disease

4. CURRICULUM TO BE COVERED

Being a higher specialty training course, the emphasis will be on self-learning with lecture, seminars and journal clubs organized to cover the spectrum of disorders in Chronomedicine.

The specific areas of training would be divided into the following modules, each to be covered in equal period intervals.

I. Introduction and historical outline of chronobiology. (Introduction about chronophysiology, chronopathology, chropharmacology, chronopharmacokinetics)

II. Physiology:-

(a).Types of biological and other rhythms

-Circadian rhythm

-Circadian rhythms in prokaryotes

-Properties of circadian rhythm

-Influence of light on circadian rhythm

-Influence of non-photic stimuli on circadian rhythm (temperature, meal feeding schedule, arousals, presence or absence of mother, social activity etc.)

(b).Organization of circadian system:

-central and peripheral clock

-anatomy of biological clock

-role of hypothalamus, pineal gland and melatonin

-molecular components of circadian clock

(c).Regulation of sleep-wake cycle

(c).The chronobiology of pharmacotherapeutic responses.

III. Pathophysiology and consequences of biological rhythm disruption:-

(1).Circadian genotypes that cause circadian disturbance and leads to neurobehavioral, metabolic, and cardiopulmonary disorders.

(2).Environmental factors that cause circadian disturbance and leads to neurobehavioral, metabolic, and cardiopulmonary disorders.

(3).Elucidate the role of circadian disturbances in the pathophysiology of immune and inflammatory disorders, neurological autoimmune attacks and fatigue.

Professor
Department of Physiology
K.G's Medical University
Lucknow

HEAD
Department of Physiology
K.G. Medical University
Lucknow

(4).Elucidate neurobiological mechanisms coupling chronic circadian disruption with the etiology of mental, attention, anxiety, stress, pain, and depressive disorders.

(5).Elucidate molecular pathophysiological mechanisms and windows of vulnerability to circadian disruption with respect to impaired neurological development and function, maintenance of synaptic function across the lifespan, and disorders of aging.

(6).Circadian disruption of sleep-wake cycle during childhood and adolescence and their impact on brain development or circuitry and predispose to affective, attention and impulse control disorders.

(7). Circadian disruption of sleep-wake cycle during childhood and adolescence their impact on development of autonomic nervous system regulation.

(8). Circadian disruption of sleep-wake cycle during childhood and adolescence their impact on energy metabolism.

(9).Elucidate neurobiological and other pathways coupling disrupted circadian rhythms to abnormal secretion of insulin by the pancreas.

(10).How resetting the phase, alter the period of the circadian clock at the organismal, tissue or cellular levels.

(11).How resetting the phase (circadian clock) could lead to new treatment approaches for diseases that involve or are affected by circadian disruption.

(12)Identify the relationship between circadian timing mechanisms and outcomes of medical procedures, such as organ transplantation, gastric bypass surgery, cancer chemotherapy and immunotherapy.

(13). Identify the relationship between circadian timing mechanisms and outcomes of medical management with prescription drugs.

Prof. A.B. Bhatnagar
Department of Physiology
K.G. Medical University
Lucknow

HEAD
Department of Physiology
K.G. Medical University
Lucknow

(14).How treatment of sleep and circadian disturbances alter progression of co-morbidity (such as cardiovascular, renal, metabolic, mental, or neoplastic disorders).

(15).Compare the impact of existing therapeutic strategies for sleep and circadian disorders on adherence, health outcomes and cost effectiveness.

(16).Biomarkers of sleep and circadian disorders that will facilitate personalized treatments.

(17).Efficacy of circadian-coupled interventions (chronomedicine) on the outcome of medical procedures (e.g. organ transplantation, gastric bypass surgery, cancer chemotherapy, immunotherapy).

(18).Efficacy of circadian-coupled interventions (chronomedicine) on the outcome of the medical management of chronic conditions (e.g. hypertension, diabetes, hyperlipidemia, vascular disease, and thrombosis).

(19).Circadian disorders of the sleep-wake cycle.

(a).Delayed sleep-wake phase disorders

(b).Advanced sleep-wake phase disorders

(c).Shift work sleep disorder

(d).Jet lag disorder

IV. Instrumentation:

-theory and practical knowledge of Actigraphy

-theory and practical knowledge of Ambulatory blood pressure monitoring

-theory and practical knowledge of Polysomnogrphy

-theory and practical knowledge of continuous glucose monitoring

-theory and practical knowledge of Autonomic nervous system testing

-theory and practical knowledge of various molecular lab techniques

Professor
Department of Physiology
K.G's Medical University
Lucknow

HEAD
Department of Ph
K.G. Medical

(a).PCR

(b).ELISA

V. Role of Choronotherapy in human diseases

1. What is chronopharmacokinetic?
2. Role of Choronotherapy Cancer.
3. Role of Choronotherapy Allergy.
4. Role of Choronotherapy Asthma.
5. Role of Choronotherapy Heart disease.
6. Role of Choronotherapy Seasonal affective disorders.
7. Role of Choronotherapy Metabolic disorders (diabetes, thyroid disorders).

VI. Different treatment modalities

1. Cognitive behavior therapy
2. Bright light therapy
3. Chronopharmacotherapy

5. PRACTICAL SKILLS TO BE GAINED

4.1. CLINICAL SKILLS

It is envisaged that at the end of the period of training the candidate would have acquired the following clinical skills.

Professor
Department of Physiology
K.G's Medical University
Lucknow

Department of Physiology
K.G. Medical University
Lucknow

To diagnose, evaluate and effectively plan treatment of following conditions:

(a).Allergy

(b).Asthma

(c). Seasonal affective disorders (attention, anxiety, stress and depression)

(d). Heart disease

(e). Metabolic disorders (diabetes, thyroid disorders)

(f).Circadian disorders of sleep-wake cycle:

-Delayed sleep-wake phase disorders

-Advanced sleep-wake phase disorders

-Shift work sleep disorder

-Jet lag disorder

6. RESEARCH SKILLS TO BE GAINED

The candidate would be actively involved in the on-going research activities of the unit. The candidate would be expected to complete at least one project during fellowship and prepare 02 papers on the work for publication in a peer-reviewed journal.

The candidate would also be expected to present two papers at the annual conference of the Indian Society of Chronomedicine/ Association of Physiologists of India.

It is hoped that the candidate would gain some insight into the methodology of basic and clinical research including the design and planning, analysis of data, simple statistical methods and finally the nuances of logical presentation of the data in a scientific communication.

7. AFFECTIVE SKILLS

-How to communicate with patients and their attendants

-How to explain prognosis of disease

-How to explain the procedure

-How to take informed consent

-How to break the bad news

8. ATTITUDE INSTRUMENTS

HEAD
Department of Physiology
K.G. Medical University
Lucknow

-Portfolios
-Structured Essay type questios
-OSCEs
-Checklists
-Rating scales
-Patient management problems

EVALUATION

1. INTERNAL EVALUATION (FORMATIVE ASSESSMENT)

Periodic internal assessment would be carried out to assess the progress of the candidate during the training. The format of the assessment is appended. It is emphasized that the assessment is not only on acquisition of theoretical knowledge but an overall assessment of the candidate's performance as a physician.

Curriculum	**Tools of learning**	**Tools of Assessment**
• Introduction and historical outline of chronobiology	Lecture/Seminar	MCQ

Professor
Department of Physiology
K.G's Medical University
Lucknow

• Types of biological and other rhythms	Lecture/Seminar	MCQ
• Properties of circadian rhythm	Lecture/Seminar	MCQ
• Influence of light on circadian rhythm	Lecture/Seminar	MCQ
• Influence of non-photic stimuli on circadian rhythm	Lecture/Seminar	MCQ
• Central and peripheral clock	Lecture/Seminar	MCQ
• Molecular components of circadian clock	Lecture/Seminar	MCQ
• Regulation of sleep-wake cycle	Lecture/Seminar	MCQ
• The chronobiology of pharmacotherapeutic responses.	Lecture/Seminar	MCQ
• Circadian genotypes that cause circadian disturbance and leads to neurobehavioral disorders.	Lecture/Seminar	MCQ
• Circadian genotypes that cause circadian disturbance and leads to metabolic disorders.	Lecture/Seminar	MCQ
• Circadian genotypes that cause circadian disturbance and leads to cardiopulmonary disorders.	Lecture/Seminar	MCQ
• Environmental factors that cause circadian disturbance and leads to neurobehavioral disorders	Lecture/Seminar	MCQ
• Environmental factors that cause circadian disturbance and leads to metabolic disorders	Lecture/Seminar	MCQ

Professor
Department of Physiology
K.G.'s Medical University
Lucknow

HEAD
Department of Physiology
K.G. Medical University
Lucknow

• Environmental factors that cause circadian disturbance and leads cardiopulmonary disorders	Lecture/Seminar	MCQ
• Circadian disturbances and immune and inflammatory disorders, neurological autoimmune attacks.	Lecture/Seminar	MCQ
• Neurobiological mechanisms coupling chronic circadian disruption with mental, attention, anxiety, stress, pain, and depressive disorders	Lecture/Seminar	MCQ
• Circadian disruption of sleep-wake cycle during childhood and adolescence and their impact on affective, attention and impulse control disorders.	Lecture/Seminar	MCQ
• Circadian disruption of sleep-wake cycle during childhood and adolescence their impact on development of autonomic nervous system regulation.	Lecture/Seminar	MCQ
• Circadian disruption of sleep-wake cycle during childhood and adolescence their impact on energy metabolism.	Lecture/Seminar	MCQ
• Neurobiological and other pathways coupling disrupted circadian rhythms to abnormal secretion of insulin by the pancreas.	Lecture/Seminar	MCQ
• Resetting of the phase, alter the period of the circadian clock at the organismal, tissue or cell.	Lecture/Seminar	MCQ

Professor
Department of Physiology
K.G's Medical University
Lucknow

HEAD
Department of Physiology
K.G. Medical University
Lucknow

CLINICAL SKILLS

Clinical Skills	Tools of Learning	Tools of Assessment
To diagnose, evaluate and effectively plan treatment for The following conditions:		
• Allergy (Skin, Rhinitis, Bronchitis etc.)	Seminar/Demonstration /Video	MCQs/PBL
• Asthma	Seminar/Demonstration /Video	MCQs/PBL
• Seasonal affective disorders - Anxiety -Stress -Depression	Seminar/Demonstration /Video	MCQs/PBL
• Heart disease (Hypertension)	Seminar/Demonstration /Video	MCQs/PBL
• Metabolic disorders; -Diabetes -Thyroid disorders - Hyperlipidemia	Seminar/Demonstration /Video	MCQs/PBL
• Circadian disorders of sleep-wake cycle; -Delayed sleep-wake phase disorders -Advanced sleep-wake phase disorders -Shift work sleep disorder -Jet lag disorder	Seminar/Demonstration /Video	MCQs/PBL

HEAD
Department of Physiology
K.G. Medical University
Lucknow