

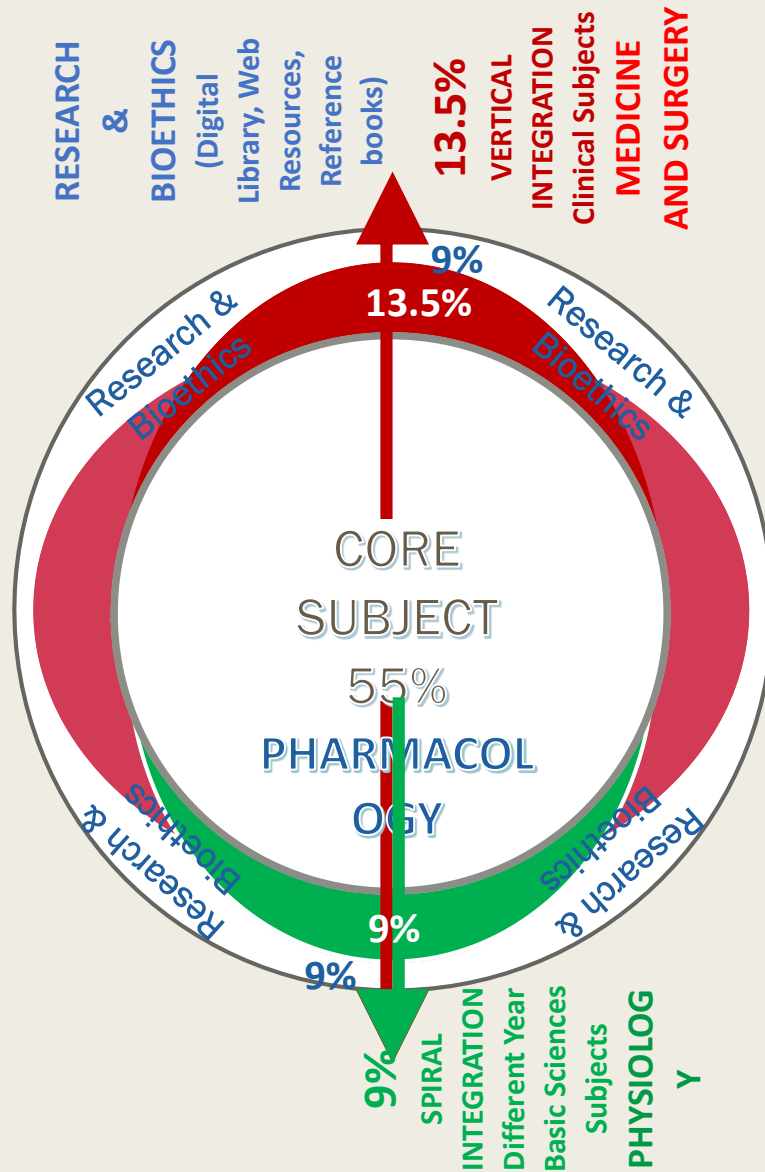




# MOTTO AND VISION



- 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



PHARMACOLOGY

| Model 3 <sup>rd</sup> Year Pharmacology CBL (22 slides) |  |
|---|--|
| Core Subject – 70%                                      |  |
| Horizontal Integration – 10%                            |  |
| Vertical integration (Clinical Subjects)                | <ul style="list-style-type: none"> <li>Medicine (10%)</li> </ul> |
| Spiral Integration – 15%                                |  |
| Different Year Basic Sciences Subjects                  |  |
| Research & Bioethics 5%                                 |  |



# PROGESTINS AND ANTIPROGESTINS

## 4<sup>TH</sup> YEAR MBBS LGIS

### Sources:

- Bertram G.Katzung Basic & Clinical Pharmacology 14th Edition
- Goodman and Gilman's The Pharmacological Basis of Therapeutics 13th edition.



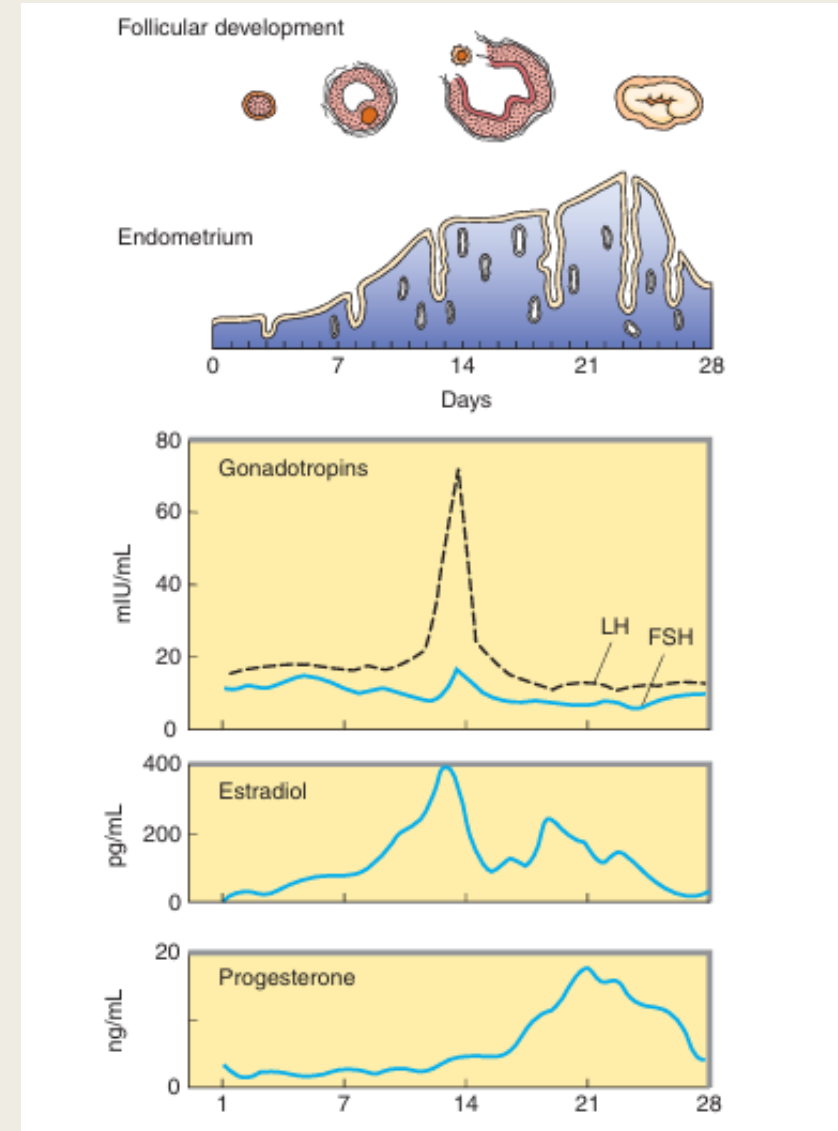
# LEARNING OBJECTIVES

At the end of the lecture, students should be able to:

- *Understand classification/generations of progestins and antiprogestins*
- *Discuss mechanism of action and pharmacological actions of progestins*
- *Enumerate clinical uses and adverse effects of progestin and anti-progestins*

# THE MENSTRUAL CYCLE

showing plasma levels of pituitary and ovarian hormones and histologic changes.





# INTRODUCTION TO PROGESTINS

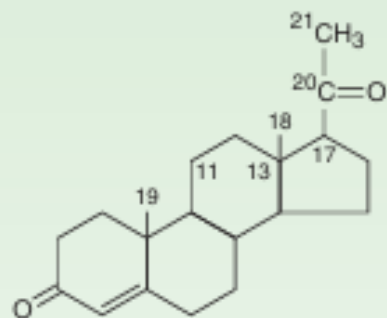
- Progestins are GONADAL HORMONES secreted in both males and females
- They are endogenous or NATURAL & exogenous or SYNTHETIC



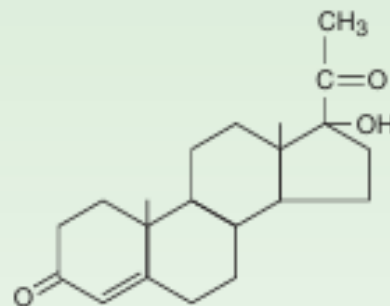
# CLASSIFICATION

- Natural
  - *Progesterone*
- Synthetic
  - *Progesterone derivatives*
    - Hydroxyprogesterone caproate
    - Medroxyprogesterone acetate
    - Megestrol acetate
    - dydrogesterone
    - Nomogestrol acetate
  - 17-ethinyl testosterone derivatives
    - Dimethisterone
  - 19 nortestosterone derivatives
    - Older compounds
      - Norethindrone
      - Norethynodrel
      - Ethynodiol
      - Lynestrol
      - Norgestrel
      - levonorgestrel
    - Newer compounds
      - Desogestrel
      - Gestodene
      - norgestimate

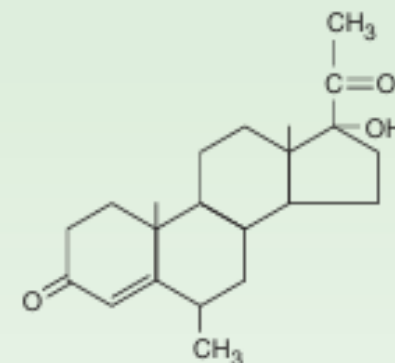
# STRUCTURE



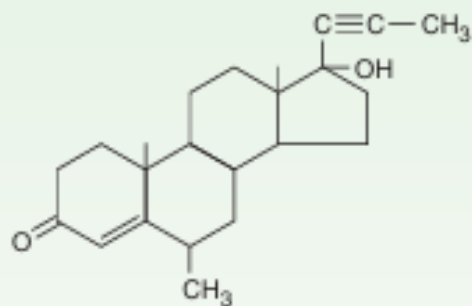
**Progesterone**



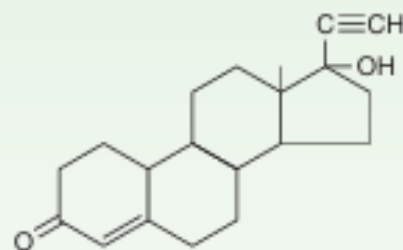
**Hydroxyprogesterone**



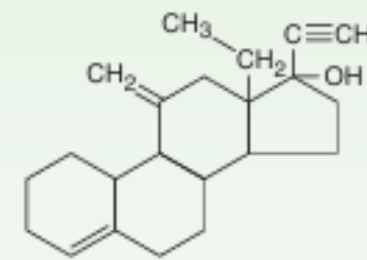
**Medroxyprogesterone**



**Dimethisterone**



**Norethindrone**



**Desogestrel**

# PRODUCTION OF PROGESTERONE IN VITRO

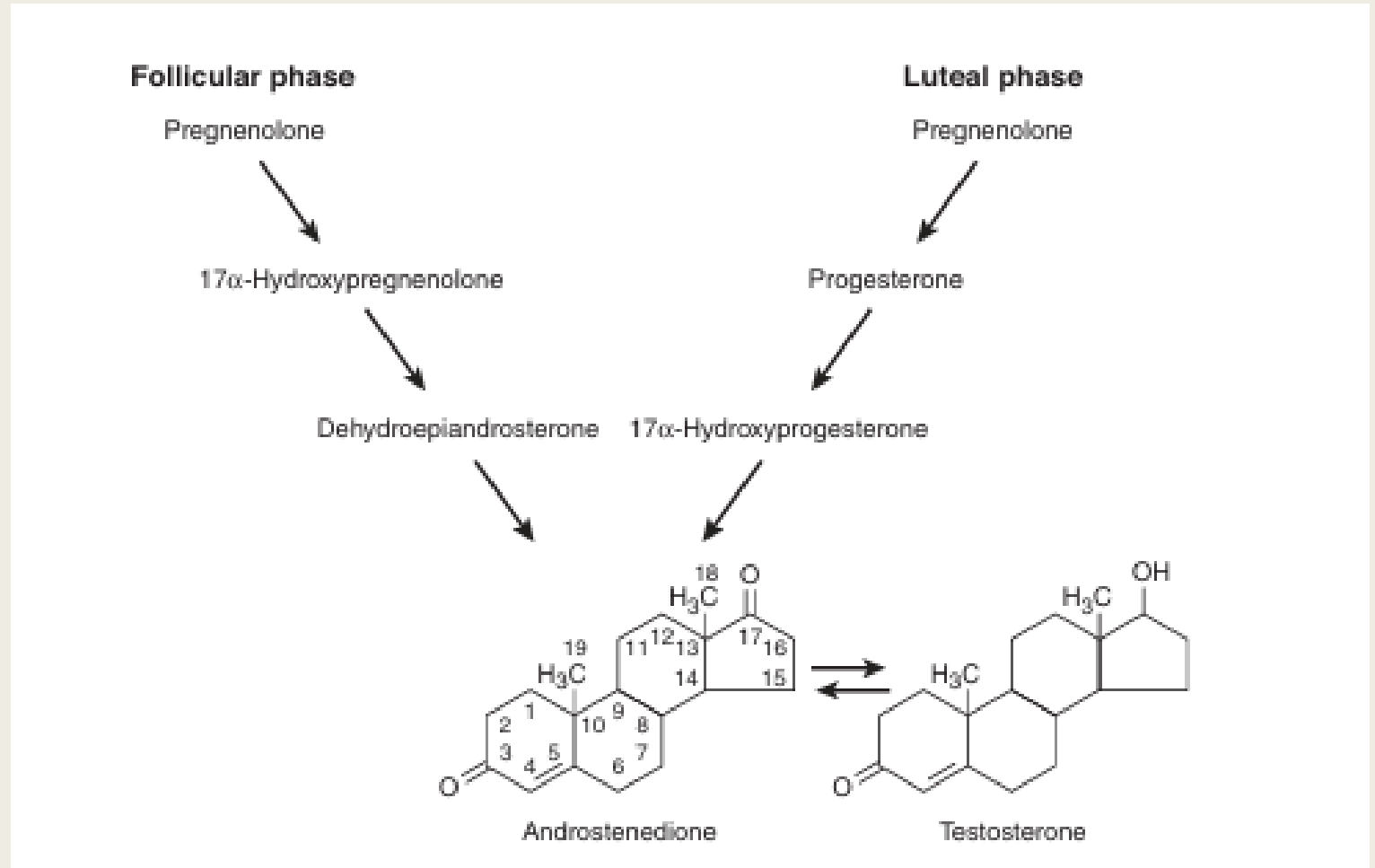
## ■ Natural Progesterone

most important progestin in humans.

Synthesized from cholesterol

Site of release , ovaries, testes, adrenal cortex and placenta

Precursor of estrogen, androgens, and adrenocortical steroids





# PHARMACOKINETICS

## ABSORPTION

- Readily absorbed

## PLASMA HALF LIFE

- 5 minutes
- Stored temporarily in fats

## ROUTE OF ADMINISTRATION

- Oral , injections. implants. local

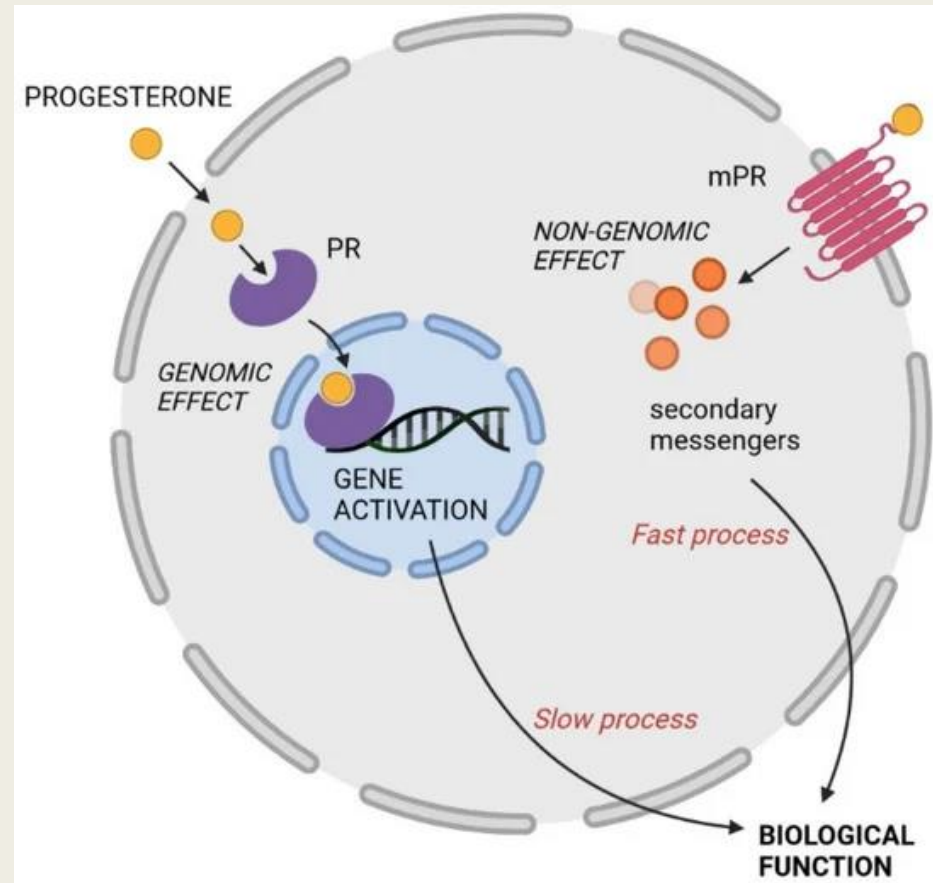
## METABOLISM

- Extensive first pass metabolism
- Metabolized in liver to pregnanediol and conjugated with glucuronic acid

## EXCRETION

- Excreted as pregnanediol glucoronide in urine

# MECHANISM OF ACTION





# PHARMACOLOGICAL ACTIONS OF PROGESTINS

- Endometrium
- Cervical secretions
- Vaginal epithelium & secretion
- Mammary glands
- Effect on metabolism
- Body temperature
- Weak inhibitor of gonadotropins



# USES OF PROGESTINS

- Contraception
- HRT
- Diagnosis of cause of amenorrhea
- PCOS
- DUB
- Endometriosis
- To risk of CA endometrium in combo with estrogens
- Premenstrual tension
- Dysmenorrhea
- Threatened / habitual abortion
- Fibrocystic disease of breast
- Precocious puberty
- Postponement of menstruation
- Menopausal hot flushes

# ANTI-PROGESTINS



# ANTI PROGESTINS

- Mifepristone:
  - *Anti-progestin*
  - *Anti-glucocorticoid*
  - *Anti-androgen*
- Danazol
  - *Weak progestational*
  - *Androgenic*
  - *Glucocorticoid activity*



# ACTIONS OF MIFEPRISTONE



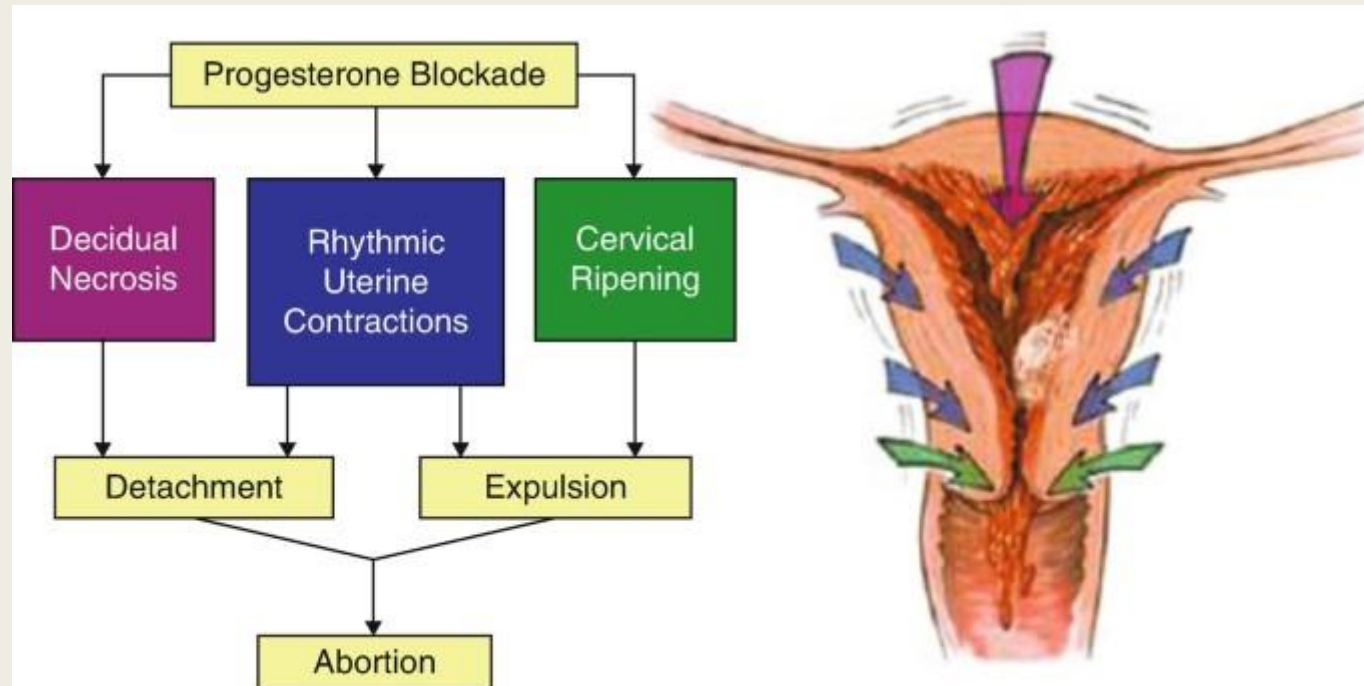
- Inhibit LH surge
- PG release in luteal phase
- Conceptus is dislodged



# CLINICAL USES

- Termination of pregnancy
- Cervical ripening
- Post coital contraceptive
- Once a month contraceptive
- Induction of labor
- Cushing syndrome
- Endometriosis
- CA breast
- Meningioma
- Uterine fibroids

# CLINICAL USES





# ADVERSE EFFECTS

- Nausea
- Vomiting
- Diarrhea
- Abdominal pain
- Heavy prolonged vaginal bleeding



# ACTIONS OF DANAZOL

- Inhibits 17 alpha hydroxylase, 11 beta OH , 21 beta OH .....suppress ovarian function
- Eliminates midcycle surge
- In postmenopausal , inhibits compensatory increase in FSH , L
- Endometrial atrophy , amenorrhea



# CLINICAL USES

- Endometriosis
- Menorrhagia
- Fibrocystic disease of breast
- Hereditary angineurotic edema
- Gynecomastia
- Infertility
- Precocious puberty
- Allergic or hematological disorders



# ADVERSE EFFECTS

- Androgenic effects
- Hepatocellular damage
- Adrenal suppression
- Hot flushes



# CONTRAINDICATIONS

- Hepatic disease
- Pregnancy
- Breast feeding



## FURTHER READING

- Wang R, Pan W, Yu L, Zhang X, Pan W, Hu C, Wen L, Jin L, Liao S. AI-Based Optimal Treatment Strategy Selection for Female Infertility for First and Subsequent IVF-ET Cycles. *Journal of Medical Systems*. 2023 Aug 16;47(1):87.
- Haiyan L, Gang Y, Yu L, Lin L, Xiaoli C, Qingxue Z. Does serum progesterone level impact the ongoing pregnancy rate in frozen embryo transfer under artificial preparation with vaginal progesterone? Study protocol for a randomized controlled trial. *Trials*. 2022 Dec;23:1-6.



# BIOMEDICAL ETHICS

- Johnson DM. The Promise of Abortion Pills: Evidence on the Safety and Effectiveness of Self-Managed Medication Abortion and Opportunities to Expand Access. SMU L. Rev.. 2023;76:135.
  - **life-threatening** maternal complications as induced **abortion**, especially when physicians and institutions have less **abortion** ... in most cases, **illegal**



# HOW TO ACCESS DIGITAL LIBRARY

## ■ Steps to Access HEC Digital Library

1. Go to the website of HEC National Digital Library.
2. On Home Page, click on the INSTITUTES.
3. A page will appear showing the universities from Public and Private Sector and other Institutes which have access to HEC National Digital Library HNDL.
4. Select your desired Institute.
5. A page will appear showing the resources of the institution
6. Journals and Researches will appear
7. You can find a Journal by clicking on JOURNALS AND DATABASE and enter a keyword to search for your desired journal.

