



# Course Content

Catalogue 2025

**Our catalogue of course contents is extensive and covers the diverse fields of knowledge listed below.**

**A login is required to gain access to our catalogue.**

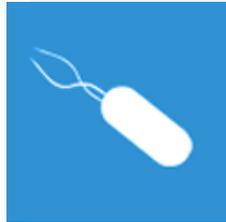
**Please contact us for obtaining access to content for your institution.**

# Table of Contents

## List of all scientific topics



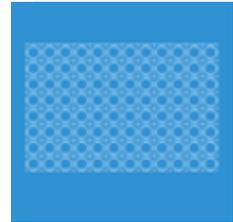
**Anatomy**  
**Physiology**



**Bacteriology**



**Clinical Trials**



**Enabling**  
**Methods**



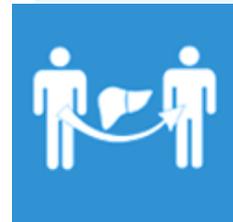
**Epidemiology**



**Hematology**



**Immunology**  
**Basic**



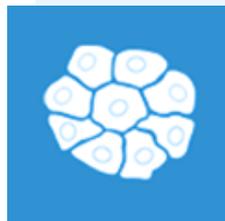
**Immunology**  
**Clinical**



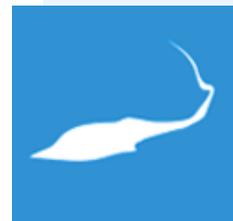
**Laboratory**  
**medicine**



**Nephrology**



**Oncology**



**Parasitology**



**Pharmacology**  
**Toxicology**



**Statistics**



**Vaccinology**



**Virology**



## Adipose tissue

- The adipose tissue
- Lipid metabolism
- Obesity

## Blood circulation

- Anatomy of the blood circulation
- Physiology of the blood circulation

## Bones

- Bone structure
- Bone growth and remodeling
- Epiphyseolysis
- Osteoporosis
- Osteomalacia & rickets
- Bone fracture

## Gastrointestinal tract

- The abdomen
- The stomach
- The duodenum
- The jejunum & ileon
- The colon & rectrum

## Heart

- Anatomy of the heart
- Physiology of the heart
- Cardiac investigations
- Cardiac malformations

## Joints

- Knee & ankle
- Cartilage
- Arthritis

## Lung

- Anatomy and Physiology of the lungs

## Liver

- Anatomy and Physiology of the liver

## Nervous system

- Anatomy and Physiology of the nervous system
- General organization
- The spinal cord
- Anatomy of the spine
- Motor unit, nerve-muscle interactions
- Somatosensory pathways & pain

## Pancreas

- Exocrine pancreas
- Endocrine pancreas

## Skin

- Anatomy and Physiology of the skin



## **Bacillus anthracis**

- Bacterial genome
- Epidemiology
- Pathogenesis & Virulence factors
- Diagnosis & Clinical presentation & Treatment
- Immunity & vaccines
- Bioterrorism

## **Bacillus cereus**

- Epidemiology
- Toxins

## **Basic concepts in bacteriology**

- Infective lifestyles
- Bacterial structure
- Microbial growth
- Virulence & pathogenicity
- Laboratory procedures

## **Bordetella pertussis**

- Structure & genome
- Pathogenesis & Toxins
- Vaccines

## **Campylobacter**

- Epidemiology
- Structure & Genome
- Pathogenesis & Virulence factors
- Diagnosis & Clinical presentation & Treatment

## **Chlamydia trachomatis**

- Epidemiology
- Structure & genome
- Diagnosis & Clinical presentation & Treatment
- Chlamydia psittaci
- Chlamydia pneumoniae

## **Clostridium botulinum**

- Epidemiology
- Structure & Genome
- Pathogenesis & Toxins
- Treatment & Prevention

## **Clostridium difficile**

- Structure & Genome
- Pathogenesis & Toxins
- Treatment
- Vaccines

## **Corynebacterium diphtheriae**

- Epidemiology
- Structure & genome
- Pathogenesis & Toxins
- Clinical presentation
- Vaccines

## **Clostridium tetani**

- Epidemiology
- Structure & genome
- Toxins
- Clinical presentation
- Vaccines

## **Escherichia coli**

- Serotypes
- E.coli pathotypes
- Virulence factors

## **ETEC**

- Epidemiology
- Bacterial structure & genome
- Pathogenesis & virulence factors
- Clinical presentation & treatment
- Immunity & vaccines

## **Haemophilus influenzae type b**

- Epidemiology
- Structure
- Pathogenesis
- Vaccines



## Human Microbiota

- Microbiota & diet
- Microbiota & host immunity
- Microbiota & vaccination

## Listeria monocytogenes

- Epidemiology
- Structure & genome
- Pathogenesis & virulence factors
- Clinical presentation & Treatment
- Immunity

## Mycobacterium tuberculosis

- Epidemiology
- Bacterial structure & genome
- Pathogenesis & virulence factors
- Clinical presentation & treatment
- Immunity & vaccines

## Neisseria gonorrhoeae

- Pathogenesis & Virulence factors
- Diagnosis
- Clinical presentation & Treatment

## Neisseria meningitidis

- Epidemiology
- Serotypes
- Pathogenesis & Virulence factors
- Vaccines

## Salmonella

- Epidemiology
- Structure & Genome
- Pathogenesis & Virulence factors
- Typhoid fever & Gastroenteritis
- Treatment
- Vaccines

## Shigella

- Epidemiology
- Bacterial structure & genome
- Pathogenesis & virulence factors
- Clinical presentation & treatment
- Immunity & vaccines

## Staphylococcus

- Structure
- Virulence factors
- Diseases
- Preclinical models
- Vaccines

## Streptococcus pneumoniae

- Epidemiology
- Structure
- Pathogenesis
- Immunity
- Vaccines

## Streptococcus pyogenes

- Infections
- Complications

## Treponema pallidum

- Epidemiology
- Structure
- Pathogenesis
- Diagnosis
- Treatment
- Related pathogens: Borrelia Burgdorferi & Leptospira interrogans

## Vibrio cholera

- Epidemiology
- Structure
- Pathogenesis
- Immunity
- Vaccine



## Clinical research

- Design of clinical trials
- Clinical trial design
- The clinical trial protocol
- Pharmacoeconomics and quality of life
- The study of medicinal products in special populations
- The ethics and regulations of clinical research
- Informed consent and role of ethics committees
- International regulatory affairs
- Fraud and misconduct in clinical research
- The organization of clinical trials
- Essential and other required documents
- Role of the sponsor in the organization and conduct of the study
- International clinical trials and insurance coverage
- Management of investigational medicinal product
- Data collection and management : To » e » or not to » e » ?
- Role of the different clinical trial committees
- Audits and inspections in practice
- The analysis of data and publication
- Data analysis and interpretation
- Final report and publication
- Pediatric trials
- General guidance
- EU regulations
- US regulations
- Regulations comparison
- Drug development
- Pharmacokinetics
- Ethics I
- Ethics II
- Drug safety
- Challenges

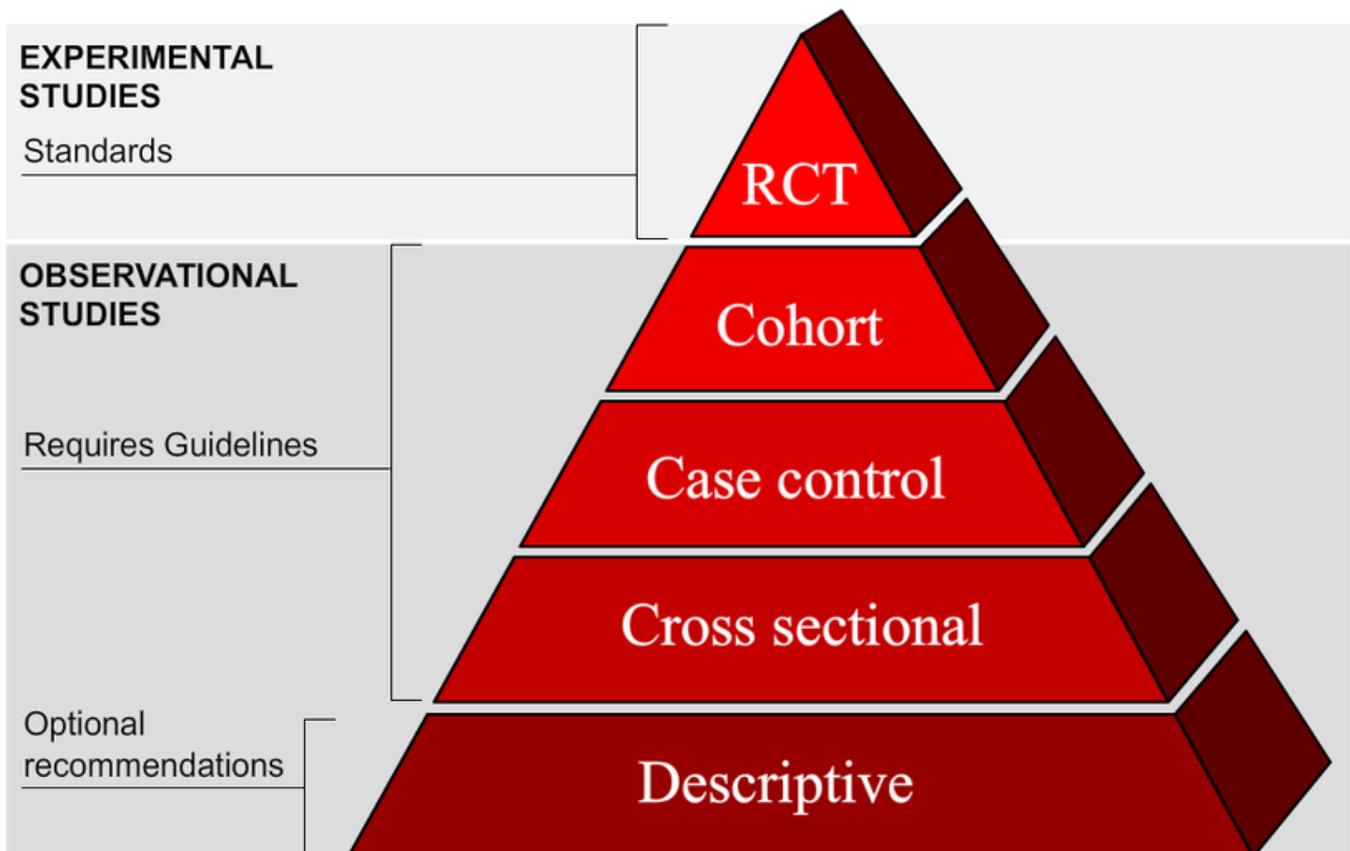
## Conduct of clinical trials

- Overview of drug development process
- Drug Development Process
- Product development timeline
- Clinical development
- Planning and preparation of a clinical trial
- Investigator Responsibilities
- Resources
- Interaction with sponsor
- Pre-initiation activities
- The initiation visit
- Wrap Up
- Patient recruitment and enrollment
- Recruitment
- Enrollment
- Informed Consent
- Entering subjects
- Randomization
- Wrap Up
- In-trial procedures
- Study Documentation
- Data Collection
- Study Activities
- Investigational Product
- Retention & Compliance
- Wrap Up
- Safety in clinical trials
- Safety
- Adverse Events
- Responsibilities
- Reporting Adverse Events
- Data & Safety Monitoring Board
- Managing Adverse Events
- Wrap Up
- Monitoring and auditing
- Quality
- Monitoring
- Audits & Inspections
- Publication, authorship
- Wrap Up



## Introduction to GCP

- Historical background
- Initiation to ICH
- ICH GCP Document: principles and standards
- Shared Responsibilities
- Clinical Trial Process: before, during and after a clinical trial



## Blood collection

- Venous sampling
- Capillary sampling

## Binding measurement methods

- Experimental principle

## Centrifugation

- Principles of centrifugation
- Centrifuges
- Applications
- Operating

## Imaging methodology

- Computed Tomography
- Magnetic Resonance Imaging
- Positron Emission Tomography
- Confocal microscopy
- Two photon microscopy

## Immunological methods

- CFSE proliferation assay
- Multiplex bead array
- MSD assay
- Elispot assay
- ELISA
- Chromium release
- Intracellular Cytokine Staining
- T cell antigen preparations
- Tetramer staining
- Polyclonal expansion of CD8 T cells

## Molecular biology methods

- DNA fingerprinting
- PCR
- FISH
- Nucleic acid sequence-based amplification
- RNase protection assay
- ChIP
- Electrophoretic mobility shift assay

## Other specimen collection

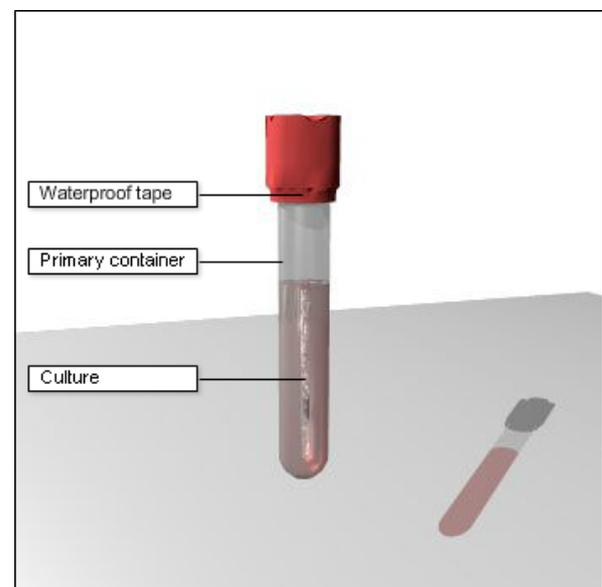
- Anoscopy
- Ascites
- Bone marrow
- CSF
- Cervical fluid
- Fine needle aspiration
- Semen
- Urine
- Stool
- Pleural fluid
- Throat and nasopharynx smears
- Synovial fluid
- Sigmoidoscopy

## PBMC separation

- Creating the gradient (Ficoll Hypaque method / Accuspin method)
- Plasma & buffy coat removal
- PBMC counting

## Urine analysis

- This chapter is from Urosurf



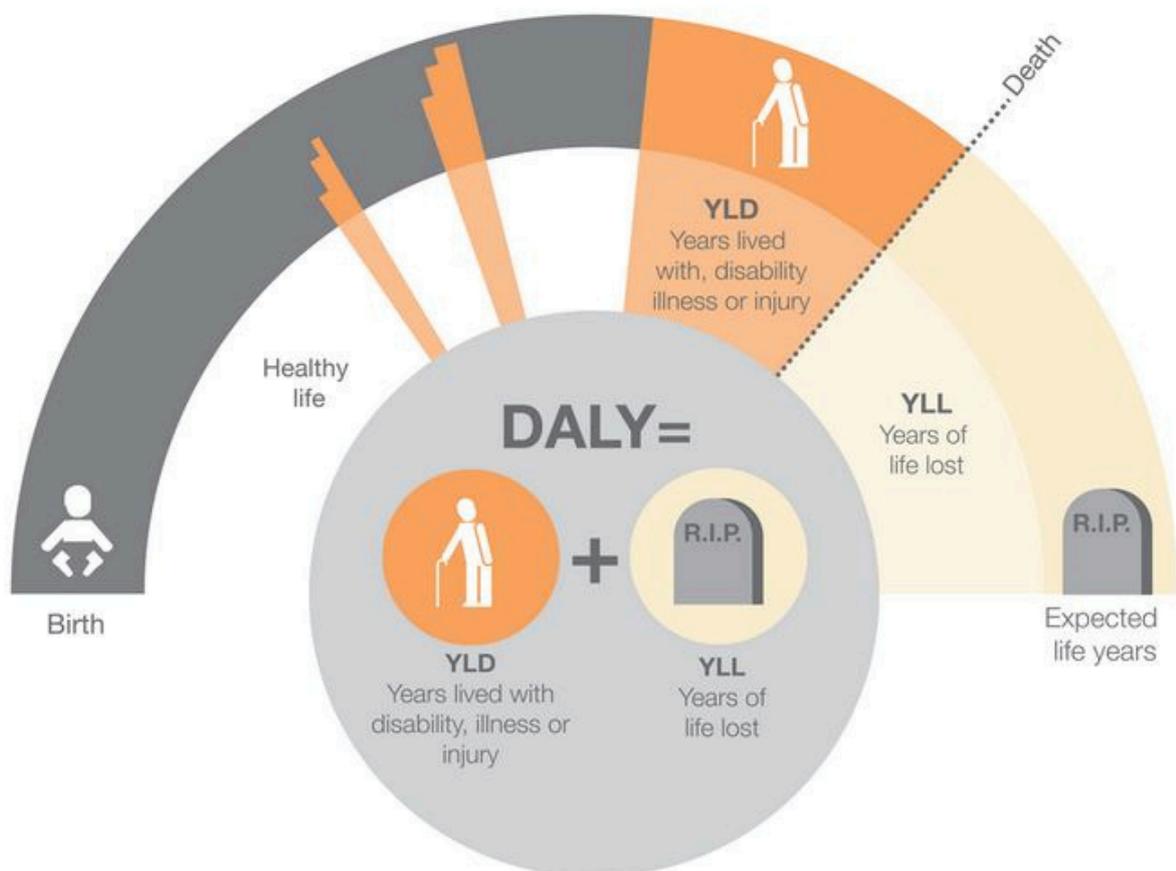


## Basic concepts in epidemiology

- Measuring health & disease
- Types of epidemiological studies
- Causation in epidemiology
- Communicable diseases: epidemiology surveillance and response
- Clinical epidemiology
- Health policy & planning

## Course in epidemiology

- Historic developments in epidemiology
- Risk indicators
- Study designs
- Association interpretation
- Screening/sampling/matching





## Anemias

- Definition and evaluation of anemia
- Mechanisms of anemia
- Hyporegenerative Normocytic Normochromic Anemia
- Microcytic Hypochromic Anemia
- Macrocytic Normochromic Hyporegenerative Anemia
- Normocytic Normochromic Regenerative Anemia

## Myeloid neoplasms

- Myeloproliferative neoplasms
- Myelodysplastic syndromes
- Myelodysplastic / Myeloproliferative neoplasms
- Acute myeloid leukemia

## Lymphoid neoplasms

- Precursor B/T-cell Neoplasms
- Mature B-cell Neoplasms
- Mature T/NK-cell Neoplasms
- Hodgkin lymphoma

## Diagnostic algorithms

- Normocytic anemia
- Microcytic anemia
- Macrocytic anemia
- Regenerative anemia
- Polycythemia
- Absolute Neutropenia
- Absolute Neutrophilia
- Absolute Lymphocytosis
- Absolute Eosinophilia
- Absolute Monocytosis
- Myelodysplasia
- Thrombocytopenia
- Monoclonal Ig
- Thrombocytosis
- Thrombotic Microangiopathy
- Prolonged PT
- Prolonged aPTT
- Antiphospholipid antibodies

## Hemostasis

- Primary hemostasis
- Secondary hemostasis
- Tertiary hemostasis
- Hemorrhagic syndrome
- Thromboembolic disease



## Basic concepts in immunology

- Three lines of defense
- Disease-causing agents
- Defense against pathogens

## Cells of the immune system

- Development, distribution, phenotype, activation & function of:
- Neutrophils, Eosinophils, Basophils
- Mast cells
- Monocytes, Macrophages
- Dendritic cells
- B and T lymphocytes
- Innate lymphoid cells, Natural killer cells
- Erythrocytes
- Platelets

## Lymphoid tissues and organs

- Primary lymphoid organs
- Bone marrow & Thymus: functional anatomy
- Myelopoiesis
- Lymphopoiesis
- Secondary lymphoid organs
- Lymph nodes, spleen, MALT: functional anatomy
- Extralymphoid tissues
- Skin, Airways, Gut, Urogenital tract: functional anatomy

## Antigen receptors

- Antigen recognition by T and B cells
- B cell receptor
- T cell receptor
- Immunoglobulin genes
- TCR genes

## Antigen presentation

- Antigen
- Antigen sampling
- Antigen presentation
- Ag-presenting pathways
- Ag-presenting cells
- Ag-presenting molecules: MHC & CD1

## Leukocyte migration

- Molecular mechanisms of cell extravasation
- Migratory routes of leukocytes
- Chemoattractants
- Cell adhesion molecules
- Integrins
- Selectins
- Mucins
- CAMs

## Innate Immunity

- Defense mechanisms of epithelial linings
- Innate immune recognition strategies
- Detection of microbes
- Detection of missing self
- Detection of altered self
- Pattern recognition receptors
- Soluble PRR
- Phagocytic PRR (Scavenger receptors, Mannose receptor)
- Signaling PRR (TLRs, NLRs, RLRs)
- The complement

## T cell immunity

- T cell activation
- T cell-APC interactions
- TCR signaling
- T cell differentiation
- Conditions of differentiation of CD4 T cells into Th1, Th2, Th17, T<sub>H</sub>F, Treg
- Effector T cell functions
- CTL, Th1, Th2, Th17, T<sub>H</sub>F, Treg
- End of T cell response
- T cell exhaustion



## **B cell immunity**

- T-cell dependent B cell response
- B cell activation
- B cell differentiation
- Extrafollicular pathway
- Germinal center reaction (Affinity maturation, Class switching)
- Effector B cell functions
- Antibody-mediated functions
- Distribution and function of Igs
- T-cell dependent B cell response
- B cell activation
- B1 cells and MZ cells
- TI antigens

## **Immunological memory**

- T cell memory
- T cell memory subsets
- Differentiation pathways
- Migratory properties
- Maintenance
- B cell memory
- Memory B cells
- Plasma cells

## **Immunological tolerance**

- Central tolerance (mechanisms)
- Peripheral tolerance (mechanisms)

## **Mucosal immunity**

- Mucosal surfaces
- Innate and adaptive immunity of the airways
- Innate and adaptive immunity of the gut
- Control of the microbiota
- Innate and adaptive immunity of the genital tract
- Innate and adaptive immunity of the urinary tract

## **Skin immunity**

- Innate and adaptive immunity of the skin

## **Cytokines**

- Definition and modes of action
- Cytokine families
- Cytokine receptors
- Signaling pathways



## Allergy

- Hypersensitivity reactions
- Allergens
- Th2 polarization & atopy
- IgE
- Fc receptor
- Th2 responses against parasites
- Effector cells: mastocytes, basophils, eosinophils
- Effector molecules

## IgE mediated Immunity & Allergy

- Hypersensitivity reactions
- IgE, Th2 cells, Allergens, Mast cells, Aasophils, Eosinophils
- The four types of hypersensitivity reactions

## Transplantation

- **Organ transplantation**
  - Recipient & Transplantation
  - Donor & Compatibility
  - Transplantation barriers
  - Immunosuppression
  - Complications
  - Organ available for transplant
- **HSC transplantation**
  - Recipient & Transplantation
  - Donor & Compatibility
  - Transplantation barriers
  - Immunosuppression
  - Reconstitution
  - Complications
- **Blood transfusion**
  - Recipient & Transfusion
  - Donated blood
  - Transplantation barriers
  - Risks & Hemovigilance



## Content

- The preanalytical phase (English)
- La phase préanalytique (Français)
- Acid-base equilibrium (English)
- Equilibre acide-base (Français)

## Statistics in the medical laboratory

- Descriptive statistics
- Inferential statistics
- Diagnostic interpretation
- Clinical trials



## Renal anatomy

- Kidney structure (cortex, medulla)
- Nephron structure (renal corpuscle, renal tubule, juxtaglomerular apparatus)
- Kidney vascularisation and innervation

## Renal control of calcium and phosphate homeostasis

- Calcium and phosphate homeostasis: an overview
- Calcium handling by the intestine, kidney and bone and its regulation by calcitropic hormones (PTH, vitamin D, calcitonin)
- Phosphate handling by the intestine and kidney and its regulation by phosphotropic hormones (PTH, vitamin D, FGF23, Klotho)

## Renal control of blood pH

- Blood pH homeostasis: an overview
- Acid base: basic principles
- Renal handling of acids and bases
- Acid-base disorders

## Renal physiology: an overview

- Overview of kidney functions
- Overview of renal physiologic mechanisms
- Focus on glomerular functions

## Renal control of oxygen homeostasis

- Oxygen homeostasis: an overview
- Gas exchange and transport: basic principles
- Kidney and erythropoietin (stimuli for renal EPO production, structure, regulation and biologic effects of EPO)
- Hypoxia-inducible factors (structure, tissue distribution, regulation of activity, transcriptional targets)
- von Hippel-Lindau & VHL disease

## Renal control of blood pressure

- Blood pressure homeostasis: an overview
- Renal handling of sodium and water and its regulation by the renin-angiotensin-aldosterone system (RAAS) and ADH
- Renal handling of urea
- Hypertension



## Hallmarks of cancer (for biologists)

### Hallmarks of cancer (for medics)

- Autonomous cell growth
- Evading programmed cell death
- Escaping growth inhibitory signals
- Acquisition of an unlimited lifespan
- Growth beyond natural boundaries
- Capacity to attract sufficient blood supply
- Deregulation of cellular energetics
- Evading immune destruction
- Genome instability
- Tumor-promoting inflammation

## Angiogenesis & Lymphangiogenesis

- Normal angiogenesis
- Tumor angiogenesis
- Angiogenic factors
- Lymphatic vessel formation

## Invasion and metastasis

- The metastatic cascade
- Underlying molecular mechanisms of tumor metastasis

## Tumor stem cells

- Basic features of stem cells
- Hematopoietic, intestinal, skin, mammary gland stem cells
- Cancer stem cell

## Genomic instability & cancer

- DNA lesions and cancer
- Mechanisms of DNA repair

## Tumor host interactions

- Tumor microenvironment
- Epithelial-Mesenchymal Transition

## Cell death

- Apoptosis
- Necrosis
- Necroptosis
- Autophagy

## Signaling pathways in cancer

- Chemokine pathway
- Hedgehog pathway
- JAK/STAT pathway
- MAP-kinase pathway
- NFκB pathway
- Notch pathway
- PLC-γ1 pathway
- TGFβ pathway
- TNFα pathway
- mTOR
- Wnt pathway

## Signaling pathways in cancer

- Chemokine pathway
- Hedgehog pathway
- JAK/STAT pathway
- MAP-kinase pathway
- NFκB pathway
- Notch pathway
- PLC-γ1 pathway
- TGFβ pathway
- TNFα pathway
- mTOR
- Wnt pathway



## **Leishmania**

- Epidemiology
- Species
- Structure
- Life cycle
- Pathogenesis
- Diseases
- Immune response
- Animal models
- Diagnosis & Treatment
- Vaccination strategies

## **Malaria**

- Epidemiology
- Structure
- Life cycle
- Disease
- Immune response
- Vaccination strategies



## **Basic concepts in pharmacology / toxicology**

- Definitions
- History
- Fields of study
- Types and toxicity of Xenobiotics

## **Pharmacodynamics**

- Cell/ drug interactions (receptor & non-receptor mediated mechanisms)
- Binding studies
- Relationship between binding and effect
- Potency versus Efficacy
- Agonism and Antagonism
- Synergism and Potentiation
- Tolerance and Tachyphylaxis
- Adverse Drug Reactions
- Pharmacokinetic models

## **Pharmacokinetics**

- Transporters
- Absorption
- Distribution
- Metabolism or Biotransformation
- Excretion
- Pharmacokinetic parameters
- Drug delivery profiles

## **Chronopharmacology**

- Circadian timing system
- Chronopharmacokinetics
- Chronopharmacodynamics
- Circadian transcription factors & detoxification pathways
- Chronotherapeutics

## **Toxicology**

- Toxicity mechanisms
- Risk characterization (toxicity testing and risk assessment.)
- Description of main groups of toxic agents (metals, pesticides,...)



## **Pharmacogenetics**

- Genetic factors involved in variable drug response
- Genetic polymorphisms in drug receptors
- Genetic polymorphisms in drug metabolizing enzymes
- Genetic polymorphisms in drug binding plasma proteins
- Genetic polymorphisms in drug transporters
- Disease- or treatment-modifying drug response
- Drug dosing and pharmacogenetics

## **Ecopharmacovigilance**

- Classification & surveillance of pharmaceuticals
- Drug development procedure & ecological risk assessment
- Case studies: antibiotics, NSAIDs, carbamazepine



## **Basic concepts in biostatistics**

- Graphical methods to explore raw data
- Summarizing data
- Probabilities
- Distributions: normal, binomial, t
- Central limit theorem
- Confidence interval
- Sample size computation
- Hypothesis testing, part I
- T test, paired, not paired, non parametric tests
- Comparison of proportions, Chi-square
- Simple linear regression and correlation
- Hypothesis testing, part II
- Multiple regression analysis
- One-way ANOVA, Kruskal-Wallis
- Two-way ANOVA
- Survival analysis
- Kaplan-Meier curves and log-rank test
- Cox regression



## General vaccinology

- Vaccine history
- Types of vaccines
- Immune memory: the basis for vaccination
- Adjuvants
- Correlates of protection
- Herd immunity
- Routes of administration
- Vaccine market & manufacture

## Registered vaccines

- Argentine haemorrhagic fever
- Hepatitis A, B & E
- Human papillomavirus
- Influenza
- Japanese encephalitis
- Measles
- Mumps
- Poliomyelitis
- Rabies
- Rubella
- Rotavirus
- Smallpox
- Tick-borne encephalitis
- Varicella
- Yellow fever
- Cholera
- Diphtheria
- Haemophilus influenzae type b
- Meningococcal meningitis
- Pertussis
- Pneumococcal disease
- Tetanus
- Tuberculosis
- Typhoid
- Coronaviruses

## Mucosal vaccines

- Vaccine sampling by mucosal tissues
- Mucosal vaccine design
- Mucosal adjuvants
- Mucosal readouts
- Correlates of protection
- Licensed vaccines
- Future vaccines

## Vaccines in development

- Chikungunya fever
- Cytomegalovirus
- Dengue
- Ebola hemorrhagic fever
- ETEC
- Hepatitis C
- Herpes simplex virus
- Herpes zoster
- HIV
- Lassa haemorrhagic fever
- Leishmania
- Malaria
- Norovirus
- Respiratory syncytial virus
- Shigella
- Staphylococcus
- Tuberculosis



- Basic concepts in virology
- Modules on specific viruses: for each virus epidemiology, structure & genome, pathogenesis, immune responses, clinical features, treatment, pathology, diagnostic, and vaccines are treated
  - Arenaviruses
  - Chikungunya virus
  - Coronaviruses
  - Cytomegalovirus
  - Dengue virus
  - Ebola virus
  - Flaviviruses
  - Hepatitis A virus
  - Hepatitis B virus
  - Hepatitis C virus
  - Hepatitis E virus
  - Herpesviridae
  - Herpes simplex virus
  - HIV
  - Human papilloma virus
  - Influenza virus
  - Japanese encephalitis virus
  - Measles virus
  - Polio virus
  - Poxviruses
  - Respiratory syncytial virus
  - Rotavirus
  - Tick-borne encephalitis virus
  - Varicella zoster virus
  - West Nile virus
  - Yellow fever virus
  - Zika virus