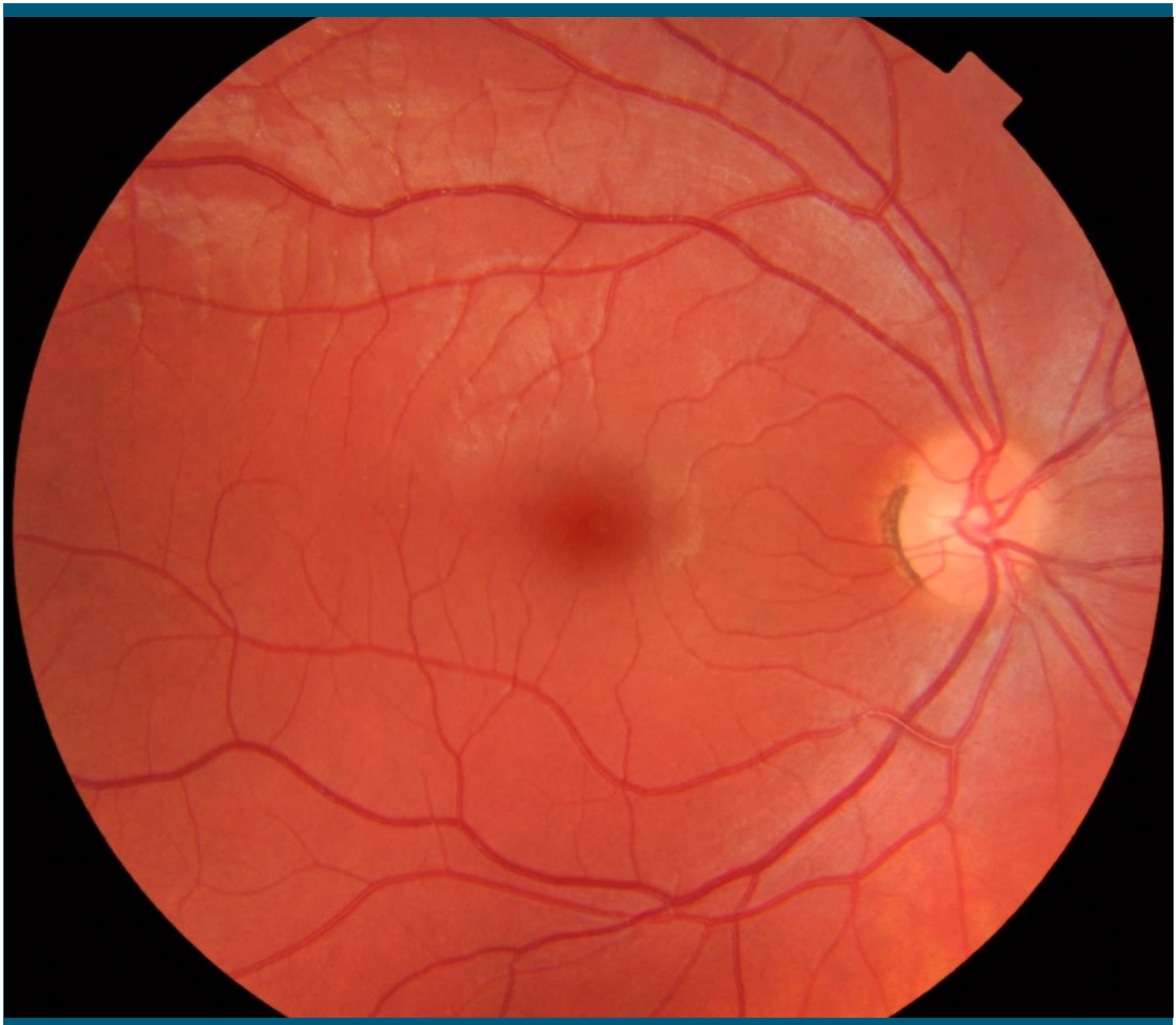

FEBOS-R 2025 Curriculum

EBO-EURETINA EXAM

EURETINA
European Society of Retina Specialists

EB SUBSPECIALTY

EURETINA EXAM

EBO-EURETINA Exam Curriculum

Contents

EBO-EURETINA FEBOS-R Exam Purpose

The Euretina FEBOS exam will attempt to harmonise the standard of expected knowledge and clinical acumen for retina specialists across Europe.

The exam will assess candidates' ability to manage a retina clinic. It could be seen as an "exit" exam, that someone has achieved a theoretical level of knowledge required to manage patients safely and effectively"

At a **minimum**, candidates should have **passed the comprehensive EBO examination** (FEBO) or **equivalent national or international boards-level exam** (FRCOphth, FRCS Ophthalmology (RCS Glasgow) etc.) And:

- Have completed a **retina fellowship** (where there are fellowships).
- **OR** have at least **two year's experience** working in a retina clinic.

Those with more extensive experience, but without a specific diploma will be considered.

- **Euretina is setting this exam**, as the society's mission is to promote the most up-to-date science and encourage evidence-based practice, to provide the best care and outcomes for patients
- **Candidates will sit the exam**, to attain certification that they have met the standards set by Euretina, regarding the knowledge and acumen of a retina specialist, who manages patients safely and effectively.
- **The exam will benefit the wider community**, as the standard for retina specialists across Europe is harmonised, fellowships and other opportunities for those training to become retina specialists can use the curriculum to inform their training. The curriculum itself will be designed to cover all aspects required to manage a retina clinic.

In this way, Euretina is setting the standard for retina specialists and patient care across Europe.

1. AMD & CSC

Age-Related Macular Degeneration

1. Classification

Being able to recognize, classify, and distinguish:

- Early AMD
- Intermediate AMD
- Late AMD
    - Geographic atrophy
    - Neovascular AMD

2. Epidemiology

Being able to discuss key epidemiological characteristics of AMD, including:

- Incidence and Prevalence
- Risk factors
    - Age
    - Gender
    - Ethnicity
    - Socioeconomic factors
    - Ocular risk factors
    - Behavioural and lifestyle factors
        - Smoking
        - Diet
        - Obesity and physical activity
    - Sunlight exposure
    - Medications
    - Cardiovascular diseases
    - Genetic factors

3. Early and intermediate AMD

To be able to identify different drusen subtypes and other potentially disease-associated lesions in early and intermediate AMD

- Sub-RPE drusen
- Reticular pseudodrusen/subretinal drusenoid deposits (SDD)
- Cuticular drusen
- Hypo- and hyperpigmentations

Being able to discuss high-risk features for progression to advanced AMD

4. Geographic atrophy

To be able to describe and distinguish iRORA/cRORA

Being able to described the natural history of GA

Risk factors for progression

- Ocular risk factors
- Genetic risk factors

Being able to identify major differential diagnostic diseases, including but not limited to:

- Monogenic macular dystrophies
- Myopic macular degeneration
- Medication-induced maculopathies

To be able to discuss the clinical management and key therapeutic approaches in (the prevention of progression of) GA

- Key treatment trials (e.g. complement inhibition trials), including outcomes and controversies

5. Neovascular AMD

To be able to describe and identify the different types of neovascular AMD, and their clinical/imaging characteristics

- Macular neovascularisation (MNV) type 1
- Exudative
- Nonexudative
- MNV type 2
- MNV type 3
- RPE tear
- Submacular hemorrhage
- Being able to describe important aspects of early detection and monitoring of AMD, such as
- Screening for AMD
- Early detection of conversion to neoavascular AMD
- Home monitoring of patients with neovascular AMD

To be able to describe current key concepts of evidence-based treatment of AMD

- Anti-VEGF therapy
- Therapeutic agents and their key clinical trial outcomes
- Photodynamic therapy
- Risks associated with treatment

- Treatment regimens
- Fixed
- PRN
- Treat & extend
- Risk of fellow eye involvement

Central Serous Chorioretinopathy

1. Epidemiology

To be able to describe the demographic characteristics and risk factors of CSC, including but not limited to:

- Gender predisposition
- Exogenous risk factors
- Genetic risk factors

2. Pathophysiological concepts

Being able to describe key players in an anatomy, physiology, and disease pathophysiology of CSC:

- Choroidal anatomy and physiology
- Structure and function of the RPE and its interaction with the neuroretina and choroid
- Pachychoroid and its associated disease spectrum, as well as the potential role of factors such as venous overload choroidopathy, and arteriovenous anastomosis

3. Diagnosis

To be able to assess important diagnostic characteristics of CSC on multimodal imaging:

- Be aware of the normal OCT, OCT-angiography (OCT-A), fluorescein angiography (FA) and ICG angiography (ICGA) features of the retina and choroid
- Detailed understanding of typical characteristics of the spectrum of CSC on OCT, OCT-A, FA and ICGA, and the importance of such multimodal imaging for correct (differential) diagnosis
- Insight into the spectrum of CSC, and proposals for classification, and the potential consequences of specific disease features of CSC for therapeutic management and outcome

4. Differential diagnosis of CSC

To be able to recognize clinical features that point to a non-CSC background of serous maculopathy:

- The spectrum of (categories of) diseases associated with serous maculopathy
- Key clinical features and management of important causes of serous maculopathy other than CSC

5. Evidence-based treatment of CSC

To be able to describe key aspects of evidence-based treatment of CSC, including:

- Insight into the variability of the clinical course of CSC
- Aims of treatment in CSC

- Understanding the background of main treatments that have been advocated in CSC: photodynamic therapy (PDT), focal laser photocoagulation, micropulse laser, and mineralocorticoid receptor antagonists
- Proposed treatment algorithms for these advocated treatments
- Detailed insight into the major randomized controlled treatment trials performed in CSC, and other major treatment studies
- Reasons for superiority of PDT as a treatment of CSC
- Being able to discuss current evidence-based treatment recommendations

2. Diabetic Retinopathy and Retinal Vascular Diseases

The curriculum requires that background knowledge about retinal diseases, detailed pathophysiology of individual disorders, appropriate clinical evidence and treatment management (including laser treatment and intravitreal injections) are well known by any candidate.

More specifically:

1. Diabetic Retinopathy

Terminology and Classification

Describe and understand classification and terminology of diabetes, including major subtypes like type 1 diabetes, type 2 diabetes, and gestational diabetes.

Describe and understand classification of diabetic retinopathy with a basic understanding of the Early Treatment of Diabetic Retinopathy Study scale and a detailed understanding of the International Clinical Diabetic Retinopathy Disease Severity Scale.

Being able to recognize diabetic retinopathy associated lesions like retinal microaneurysms, hemorrhages, hard exudates, cotton wool spots, venous loops, intraretinal microvascular abnormalities, macular edema, and new vessels.

Epidemiology of diabetic retinopathy

Have knowledge of prevalence and incidence of diabetic retinopathy and understand differences in these between type 1 and type 2 diabetes.

Describe the most important non-modifiable and modifiable risk factors for diabetic retinopathy including type and duration of diabetes, pregnancy, glycemic regulation, blood pressure, and dyslipidemia.

Pathogenesis of diabetic retinopathy

Understand the pathogenesis of diabetic retinopathy including central concepts like oxidative stress, impaired autoregulation, endothelial dysfunction, disruption of the neurovascular unit, pericyte loss, basal membrane thickening, retinal ischemia, vascular non-perfusion, inner blood-retinal barrier breakdown, apoptosis, angiogenesis, and end-stage fibrosis.

Recognize central biomarkers in the pathogenesis of diabetic retinopathy included in inflammation and angiogenesis like vascular endothelial growth factor and inflammatory cytokines.

Recommended diabetes-related ophthalmic examinations

Understand the rationale for diabetic retinopathy screening and identify key elements for successful implementation like use of digital images with a sufficient field of view, use of mydriatic images, determination of optimized screening intervals, referrals of screen positives, and implementation of national screening programs.

Have knowledge of emerging technologies in diabetic retinopathy screening including use of artificial intelligence, ocular telehealth programs, and the potential use of handheld devises.

Abnormalities associated with vision loss from diabetic retinopathy

Have detailed knowledge of proliferative diabetic retinopathy and diabetic macular edema as sight-threatening end-stage complications in diabetic retinopathy and understand potential reasons for visual loss, including vitreous hemorrhage, tractional retinal detachment, and macular edema.

Nonproliferative diabetic retinopathy

Recognize relevant retinal lesions in nonproliferative diabetic retinopathy.

Have knowledge of intravitreal angiostatic therapy as potential ocular treatment in nonproliferative diabetic retinopathy and understand the rational for considering this in cases of advanced nonproliferative diabetic retinopathy or for patients with poor compliance or rapidly progressing disease.

Proliferative diabetic retinopathy (including management and complications)

Have intimate knowledge of and being able to recognize retinal lesions (new vessels on disc or elsewhere) in proliferative diabetic retinopathy using retinal imaging modalities like fundus photography, non-widefield or widefield fluorescein angiography, optical coherence tomography, and optical coherence tomography angiography.

Understand natural history of proliferative diabetic retinopathy, rational for ocular treatment, and potential complications.

Being able to provide detailed information on ocular treatment options in proliferative diabetic retinopathy including panretinal photocoagulation, intravitreal angiostatic therapy, and vitrectomy.

Diabetic macular edema (including classification and treatment)

According to EURETINA Guidelines for the Management of Diabetic Macular Edema, have intimate knowledge of classification of diabetic macular edema using retinal imaging modalities like fundus photography, fluorescein angiography, optical coherence tomography, and optical coherence tomography angiography.

Understand natural history of diabetic macular edema, rational for ocular treatment, and potential complications.

Being able to provide detailed information on ocular treatment options in diabetic macular edema including intravitreal angiostatic or steroid therapy, focal/grid photocoagulation and micropulse subthreshold laser.

Cataract surgery in patients with diabetes

Understand rational for cataract surgery in patients with diabetes, including potential risk of postoperative macular edema due to inner blood retina barrier disruption, and potential preventive or therapeutic options to target this.

Systemic (diabetes) control

Understand effects of glycemic control (glycemic memory and early worsening, age-related control) including continuous glucose monitoring and side effects on ocular disease

Understand effect of hypertension, renal disease and pregnancy and ocular disease

Systemic medical management of diabetic retinopathy

Recognize systemic therapeutic options for the prevention and arrest of diabetic retinopathy development, including optimized glycemic control, antihypertensive therapy, and cholesterol lowering therapy, and have basic knowledge of evidence for specific therapeutic options (renin-angiotensin system blockade and fenofibrate).

Knowledge on new oral antidiabetics (mode of action), Insulin pumps

2. Retinal Vascular Diseases Associated With Cardiovascular Disease

Systemic Arterial Hypertension

- Hypertensive Retinopathy
- Hypertensive Choroidopathy
- Hypertensive Optic Neuropathy

Retinal Vein Occlusion

- Classification of Branch Retinal Vein Occlusion, Hemiretinal and Central Retinal Vein Occlusion
- Pharmacologic Management of Retinal Vein Occlusion
- Being able to provide detailed information on ocular treatment options in macular edema secondary to Retinal Vein Occlusion including intravitreal angiostatic or steroid therapy, focal/grid photocoagulation laser

Ocular Ischemic Syndrome and Retinopathy of Carotid Occlusive Disease

- Symptoms and Signs of Ocular Ischemic Syndrome
- Etiology and Course of Ocular Ischemic Syndrome
- Treatment of Ocular Ischemic Syndrome

Arterial Occlusive Disease

- Capillary Retinal Arteriole Obstruction (Cotton-Wool Spots)
- Branch Retinal Artery Occlusion
- Cilioretinal Artery Occlusion
- Paracentral Acute Middle Maculopathy (PAMM)
- Central Retinal Artery Occlusion
- Ophthalmic Artery Occlusion
- Susac syndrome

Arterial Macroaneurysms

3. Other Retinal Vascular Diseases

Sickle Cell Retinopathy

- Nonproliferative Sickle Cell Retinopathy
- Proliferative Sickle Cell Retinopathy
- Other Ocular Abnormalities in Sickle Cell Hemoglobinopathies
- Management of Sickle Cell Retinopathy

Vasculitis

Cystoid Macular Edema (CME)

- Etiologies of CME
- Incidence of CME
- Ocular treatment of CME

Coats Disease

Macular Telangiectasia

- Macular Telangiectasia Type 1
- Macular Telangiectasia Type 2
- Macular Telangiectasia Type 3

Phakomatoses

- Von Hippel-Lindau Disease
- Wyburn-Mason Syndrome
- Retinal Cavernous Hemangioma

Radiation Retinopathy

Valsalva Retinopathy

Purtscher Retinopathy and Purtscherlike Retinopathy

Terson Syndrome

4. Retinopathy of Prematurity

Introduction

- Epidemiology

Terminology and Classification

Pathophysiology of ROP

- Natural Course
- Associated Conditions and Late Sequelae

Screening Recommendations

- Screening Criteria
- Screening Intervals
- Fundus Photographic Screening of ROP

Prevention and Risk Factors

Treatment

- Laser and Cryoablation Surgery
- Anti-VEGF Drugs
- Vitrectomy and Scleral Buckling Surgery

Resources/texts:

American Academy of Ophthalmology books (Basic and Clinical Science Course: Retina and Vitreous)

Euretina courses and webinars

3. Imaging

1. Technical background, indications and potential pitfalls of different imaging modalities

Understand:

- Technical background, set-up requirements, indications, artefacts, risks and benefits for all imaging modalities :
  - Colour fundus photography/ Infra-red imaging /ultra widefield
  - Fundus autofluorescence
  - Fluorescein/indocyanine green angiography
  - OCT and OCT-A
  - Confocal scanning laser ophthalmoscopy
  - Ultrasound
  - Additional imaging modalities such as adaptive optics and microperimetry

Evaluate the diagnostic utility of ultrawide field imaging/vs wide field imaging/vs standard field imaging

2. OCT and OCT-A

Being able to describe and diagnose relevant retinal and subretinal/choroidal diseases/conditions by OCT and OCT-A including

- Differential diagnosis:
  - Diagnose and differentiate macular oedema due to different vascular and inflammatory retinal and subretinal conditions

Relevant retinal diseases/conditions including but not limited to:

- Retinal and subretinal/choroidal disorders (including but not limited to: DR, diabetic macular oedema, retinal vein occlusion)
- Exudative and atrophic subretinal maculopathies (including but not limited to: AMD, myopic maculopathies, CSCR, dystrophic maculopathies)
- Macular VR interface disorders (macular holes, VMT, etc)

Being able to define different bands and layers of OCT to their presumed anatomical location:

- OCT retinal layers and bands
- Choroid
- Vitreous
- Name:
    - Subretinal, intraretinal, preretinal space
    - Appearance in pathological conditions

Being able to detect activity signs by OCT in chorio-retinal diseases/retinal imaging biomarkers:

- Subretinal fluid
- Intraretinal fluid
- Diffuse retinal thickening
- Drusen
- Pigment epithelium detachment
- Ill-defined subretinal hyperreflective material (SHRM)
- DRIL
- Photoreceptor disruptions (EZ, ELM)
- PAMM
- VMA, VMT, Macular holes
- ERM
- Fibrosis
- Outer retinal tubulations
- Hyperreflective Foci

Be aware of how to identify best imaging method for different disease characteristics

Be aware of risk of confusion and misinterpretation of distinct disease patterns:

- Outer retinal tubulation versus intraretinal fluid due to edema versus hyporeflective cavities in neurodegenerative diseases (including but not limited to: MacTel), versus bacillary layer detachment
- Subretinal versus sub-RPE space

Resources/texts:

- Atlas of Retinal OCT- Goldman, Waheed, Duker

- OCT and OCT-A in retinal disorders, Ehlers et al

3. Autofluorescence, infra-red imaging, fluorescein angiography, indocyanine green angiography

Being able to describe the necessary imaging requirement and indications for diagnosing relevant retinal and subretinal/choroidal disorders:

- Fundus autofluorescence
- Infra-red imaging
- Fluorescein angiography
- Indocyanine green angiography

Relevant retinal and subretinal/choroidal disorders including but not limited to:

- Ischemic retinal diseases (including and not limited to: DR/retinal vein and arterial occlusions/telangiectatic retinal diseases, retinal angiomatosis, uveitis)
- Exudative and atrophic subretinal maculopathies (including but not limited to: AMD, myopic maculopathies, CSCR, dystrophic maculopathies)
- Inherited retinal diseases (including but not limited to: retinitis pigmentosa)
- Malignant and benign vascular and solid choroidal tumours

Resources/texts:

- Relevant text books (i.e. AAO books)
- Medical Retina-Focus on Retinal Imaging, Holz & Spaide
- The Retinal Atlas, K.B. Freund et al
- Ryan's Retinal Imaging and Diagnostics- Sadda
- Euretina courses
- Relevant online courses on imaging modalities

4. Ultra wide-field fundus imaging

Being able to describe and diagnose relevant retinal diseases/conditions by ultrawide field fundus imaging

Being able to identify relevant image analysis and grading schemes:

- ICDR and ETDRS grade level of DR

Comparison with fundus photographs taken with different methods

- Critically evaluate the potential impact on diagnosis

Relevant retinal diseases/conditions including but not limited to:

- Retinal and subretinal/choroidal disorders (including but not limited to: DR/retinal vein and arterial occlusions/telangiectatic retinal diseases, retinal angiomatosis; uveitis)
- Systemic neurodegenerative disease (including but not limited to: Alzheimer disease)
- Inherited retinal disease (including and not limited to: RP, Stargardt, etc.)

- ROP
- Exudative and atrophic subretinal maculopathies (including but not limited to: AMD, myopic maculopathies, CSCR, dystrophic maculopathies)
- Macular VR disease including retinal detachment

Resources/texts:

- Wilkinson CP, Ferris FL, Klein RE, Lee PP, Agardh CD, Davis M, Dills D, Kampik A, Pararajasegaram R, Verdaguer JT.
- Proposed international clinical diabetic retinopathy and diabetic macular edema disease severity scales. Ophthalmology. 2003; 110:1677-1682.

5. Ultrasound

To be able to interpret and make differential diagnosis in major retinal/choroidal disorders.

Major retinal disorders:

- Retinal detachment
- Vitreous hemorrhage

Major choroidal disorders:

- Choroidal tumors vs benign lesions (including but not limited to: retinoblastoma, malignant melanoma)

Resources/texts:

- Euretina courses
- Clinical Atlas of Ophthalmic Ultrasound, Springer 2019; Algaed & Kozak

6. Imaging in clinical pathways

To be able to place the imaging modalities in relevant clinical pathways, including virtual clinics and telemedicine

To be able to critically appraise the literature on new technologies, such as validation of mobile cameras

To understand the principles of those imaging modalities that are predominantly used in research settings currently: such as microperimetry and adaptive optics

Identify components of telemedicine and virtual clinics

Discuss good practice in conducting virtual consultation

Resources/texts:

- FutureLearn course

4. Inherited Retinal Diseases (IRDs)

Background

The curriculum requires thorough background knowledge about the most frequent inherited retinal diseases, be it stationary or progressive, which includes inheritance patterns and molecular pathophysiology of individual disorders, as well as appropriate insight into managing and treating individual patients. This includes knowledge of genetic counseling, pedigree analysis, options for procreation, medication for cystoid macular edema, and the current state of gene therapy, cell therapy, and bionic ocular systems by all successful candidates.

Overarching Knowledge Required

1. Essentials of retinal physiology including the phototransduction cascade and retinoid cycle

Photoreceptor topography and clinical phenotypes: Describe the human photoreceptor topography and how cellular-susceptibility/topography of IRDs relates to their symptoms

Visual cycle and fundus autofluorescence: Explain the visual cycle and understand its relation to fundus autofluorescence imaging (e.g., low background RPE signal in RPE65-RP versus high background RPE signal in STGD1)

Electroretinogram and retinal circuitry: Identify the electroretinogram phenotypes (rod dystrophy, rod-cone dystrophy, cone-rod dystrophy, cone dystrophy, macular dystrophy, electronegative ERG)

- Explain the components of the ERG signal in the ISCEV standard ERGs
- Recall diagnoses underlying an electronegative ERG (incl. CSNB, XLRS, MAR) and describe their diagnostic workup

2. Principles for Managing IRD Patients

Inheritance Patterns

Draw and read pedigrees (incl. conventions for consanguinity, monozygotic and dizygotic twins)

Recognize from a pedigree and explain autosomal dominant, autosomal recessive, X-linked recessive, and mitochondrial inheritance

Explain pseudo-dominance and its relation to the frequency of the mutant allele

Explain haploinsufficiency

Molecular genetics and genetic testing strategies

Explain the mutation types: Silent, Missense, Nonsense, or Frameshift

Explain Splice site mutations, intronic mutations

Recall genetic testing approaches and their advantages and disadvantages: Sanger sequencing, whole exome sequencing, whole genome sequencing

General treatment recommendations

Low vision aids: Recall Kestenbaum's rule, and list common low vision aids (stand magnifier, video magnifier system, Apple VoiceOver)

Recall international patient-led organizations that can aid in consulting IRD patients (e.g., https://retina-international.org/)

Vitamin A and UV light: Avoidance of retinyl palmitate supplements, AREDS1 formula, and liver meat – especially in A2E-accumulating IRDs (e.g., STGD1); avoidance of excessive UV light

Disease-Specific Knowledge Required

Please note: Candidates should be able to recall the phenotype of all the below-listed diagnoses. For (1.) frequent IRDs, (2.) IRDs with treatment (potential), or (3.) IRDs associated with systemic complications, more detailed knowledge is expected.

Progressive IRDs

Isolated progressive IRDs

- Generalized retinal dystrophies
    - Rod-cone dystrophies
        - Common autosomal recessive causes: USH2A, USH2B, PDE6B, PDE6A
        - Common autosomal dominant causes: RHO, RP1
        - Common X-linked causes: RPGR, RP2
    - Cone-rod dystrophies
    - Leber congenital amaurosis (LCA) and early-onset retinal dystrophies
    - RPE65-associated LCA
        - Genetics: Autosomal-recessive, RPE65 gene (RPE65 protein reverses the photoisomerization by re-cycling all-trans-retinyl ester to 11-cis-retinol)
        - Clinical characteristics: extremely low autofluorescence signal, relatively preserved outer nuclear layer
        - Treatment: Voretigene neparvovec

Chorioretinal dystrophies

- Choroideraemia
    - Genetics: CHM gene, X-linked
    - Clinical characteristics: scalloped atrophy, pronounced outer retinal tubulations; female carriers (i.e., patients' mothers) often show frequently mild granular RPE changes
- Gyrate atrophy
    - Genetics: OAT gene, autosomal recessive
    - Clinical characteristics: circular areas of chorioretinal atrophy that coalesce over time; plasma ornithine 10 to 20 elevated
    - Management: Low-protein, arginine-restricted diet (possibly vitamin B6 supplementation)
- Bietti chorioretinal crystalline dystrophy

Dystrophies with predominant macular involvement

- Stargardt disease
    - Genetics: ABCA4 gene, autosomal-recessive
    - Clinical characteristics: Pisciform flecks, peri-papillary sparing, central atrophy
        - Wide-spectrum of fundoscopy-based severities (Fishman I [bull's eye phenotype] to Fishman IV [generalized retinal dystrophy]), ERG-based severities (Lois I [isolated pattern-ERG dysfunction] to Lois III [cone-rod dystrophy])
        - Variable age-of-onset: early onset (<10 yr), intermediate onset (11 – 44 yr), and late-onset (≥ 45 yr)
    - Management: Avoidance of vitamin A supplements
    - 'Dominant inheritance': pseudo-dominance (esp. in consanguineous families); Stargardt-like dystrophies: multifocal pattern dystrophy simulating STGD1 (PRPH2), STGD3 (ELOVL4), STGD4 (PROM1)
- Cone dystrophies
- Occult macular dystrophy
- North Carolina macular dystrophy
- Pattern dystrophies
- Maternally inherited diabetes & deafness with maculopathy
    - Diagnosis: Explain heteroplasmy of mtDNA (urinary sediment cells or muscle biopsy may be required to confirm the diagnosis)
- Sorsby fundus dystrophy
- Malattia Leventinese / Doyne Honeycomb Retinal Dystrophy

Bestrophinopathies

- Best vitelliform macular dystrophy
    - Diagnosis: Explain the principle of EOG and Arden's ration
- Autosomal recessive bestrophinopathy
- Autosomal dominant vitreoretinochoroidopathy

Transretinal dystrophies

- X-linked retinoschisis
    - Diagnosis: Explain the principle underlying electronegative ERGs

3. Syndromatic progressive IRDs

Bardet–Biedl syndrome

Joubert syndrome

Alström syndrome

Usher syndromes

Pseudoxanthoma elasticum

- Treatment: Frequently complicated by MNV, responds well to anti-VEGF therapy

Long-chain L-3 hydroxyacyl-CoA dehydrogenase (LCHAD) deficiency

Neuronal ceroid lipofuscinoses

Cobalamin C deficiency

Cohen syndrome

Adult Refsum disease

- Treatment: Phytanic acid-restricted diet

4. Stationary IRDs

Congenital stationary night blindness

Achromatopsia

Blue cone monochromacy

Congenital color vision deficiencies

5. Optic Neuropathies

Leber hereditary optic neuropathy

- Genotypes: G11778A is the most common, T14484C best prognosis, G3460A worst prognosis
- Clinical characteristics: Males are more frequently affected than females, early 20-ties, painless blurring of vision and loss of contrast, second eye involvement after weeks to months, peripapillary telangiectasias, and pseudo-edematous appearance
- Treatment: Idebenone (RHODOS trial, but primary endpoint negative)

Autosomal dominant optic atrophy

Autosomal recessive optic neuropathies

Wolfram disease or DIDMOAD syndrome (Diabetes Insipidus, Diabetes Mellitus, Optic Atrophy, and Deafness)

6. Vitreoretinopathies

Stickler syndromes

Marfan syndrome

Wagner syndrome

Incontinentia pigmenti

Familial exudative vitreoretinopathies

Norrie disease

Knobloch syndrome

7. Ocular Developmental Disease Affecting the Retina

Microphthalmia, anophthalmia & coloboma spectrum

Nanophthalmos and microphthalmia

Aniridia spectrum

- Autosomal dominant: PAX6 gene
- Sporadic form (one-third of patients), de novo deletions on chromosome 11p13 involving the PAX6 gene and possibly adjacent WT1 (Wilms tumor) gene → WAGR syndrome (Wilms tumor, Aniridia, Genitourinary anomalies, and mental Retardation) → surveillance for Wilms tumor risk
- Autosomal recessive (associated with cerebellar ataxia and intellectual disability [Gillespie syndrome])

Albinism

5. Myopia

1. Myopia development in children and young adults

Terminology and Classification (IMI convention)

- low, moderate and High myopia and pre-myopia
- pathologic myopia

Tissue changes in axial Myopia

- Know the terms of Optic disc diversion, BMO (Brusch membrane opening), enlarged delta and gamma zone and recognize OCT features
- Thin choroid, especially because of reduction of Haller and Sattler layers
- Sclera remodelling, downregulation of type 1 collagen by scleral fibroblasts, mediated by mediators such as dopamine, retinoic acid on specific receptors (see signalling pathway)

Worldwide myopia prevalence and predictions thereof

Eye growth in children

Genetics of myopia

- presence of refractive error genetic variants
- understand and explain polygenic risk of myopia
- explain retina to sclera signalling pathway
- explain Environnement-genetics interaction

Genetic syndromes with high myopia

- Stickler
    - know that SS is mostly autosomal dominant (SLT1), COL2A1 gene variants

  - complications ocular, craniofacial, auditory and skeletal
  - Prognosis of retinal detachment and management
- Marfan
  - know that MS is mostly autosomal dominant, FBN1 gene variants
  - modified fibrillin 1 protein: complications ocular, vascular and skeletal
  - management of ocular diseases
- Know that many other secondary myopias are associated with inherited retinal dystrophies (Rod cone, Bietti, Albinism etc…)

Lifestyle factors and lifestyle recommendations

- Outdoor exposure
- Digital screens
- Reading and other near work

Current insight into myopia pathogenesis (be able to briefly explain)

- Myopia signalling cascade
- Choroidal response (thickness/blood flow)
- Scleral remodelling (light induced retina sclera pathway)

2. Myopia control of progression

Clinical examination for myopia control

Clinical management and target for intervention

- Risk factors
  - education/nearwork
  - time outdoor

Axial length versus refractive error

Pharmacological control regimen

- High dose atropine
- Low dose atropine

Optical control regimen

- Ortho-K
- Multifocal contact lenses
- DIMS glasses

3. Consequences of myopia in adults

Visual prognosis as a function of axial length and age

Clinical examination

Clinical management

- Myopic glaucoma
    - explain diagnosis/difficulty of analysing OCT/visual field/IOP results
    - treatment/control regimen/prognosis
- Cataract: treatment/control regimen
- Retinal detachment
    - Types: Rhegmatogenous/Myopic round hole/Dialysis/GRT
    - Tears
    - Fundamentals of laser- and cryopexy
    - RD surgery Timing Macula off/on
    - choice for vitrectomy or cryopexy
    - Prognosis (anatomical and functional)

Peripheral degenerations

MTM (foveoschisis)

- OCT description
- Physiopathology
- management/surgical techniques

Macular hole

- OCT description
- Physiopathology/specific features in pathologic myopia
- management in pathologic myopia/surgical techniques

Staphyloma

- nomenclature axial elongation vs staphyloma
- Classification: extent and location
- wild field color fundus photograph and OCT criteria for staphyloma
- consequences and complications associated with staphyloma

Myopic macular degeneration

- META-PM Classification

- Lacquer cracks
    - cause, risk factors, symptoms and management
    - OCT description/evolution
- Categories of atrophy
    - Classification (Ohno-Matsui/4 types)
    - OCT features
- Choroidal neovascularization
    - diagnosis/treatment/control regimen/prognosis
    - OCT description/myopic specificities
    - OCT A use and limits/artefacts in Pathologic Myopia
    - AF and ICG features and use

4. Other Retinal Disease associations & presentations (related to or in association with myopia)

Retinopathy of prematurity

MEWDS and PIC

Central Serous Retinopathy

Dome Shaped macula

- symptoms/evolution
- OCT and FA/ICG description
- managment

5. Bibliography

IMI reports (international myopia institute)

6. Ocular Oncology and Tumours

1. Retinoblastoma

Understand:

- The epidemiology of retinoblastoma, including
    - Incidence and heredity
    - Knudson's two hit theory
- The presentation of retinoblastoma
    - Leukocoria and its differentials

  - Unilateral vs. Bilateral vs. Trilateral disease
  - Retinoma / retinocytoma
- Clinical examination findings
- Ancillary testing and its application

Awareness of:

- Grouping and staging systems (recall of specific details is not required)

Describe and discuss:

- Treatment modalities and indications, including
  - Local ocular treatments such as laser, cryotherapy and brachytherapy
  - Intraarterial chemotherapy (whole eye treatment) and its limitations
  - Intraocular and periocular chemotherapy
  - Intravenous chemotherapy
  - Enucleation
  - External beam radiotherapy
- Complications of treatment, including
  - Recurrence
  - Radiation maculopathy
  - Radiation papillopathy
  - Cataract
  - Neovascular glaucoma

Demonstrate an understanding of

- Survival and follow up of Rb survivors
- Screening of Rb family members and offspring
- Lifetime risk of secondary cancers later in life

2. Medulloepithelioma

Describe:

- The presentation of these tumours
- Clinical signs and use of ancillary testing, and apply knowledge of this to help differentiate it from other lesions
- Treatment modalities and their potential complications (general principles only)
- Awareness of the likely prognosis and follow up of these patients

3. Uveal melanoma

Understand and apply an in-depth knowledge of uveal melanomas (iris, ciliary body and choroidal), and be able to fully evaluate a clinical case, including but not limited to:

- Incidence and epidemiology
- Clinical presentation and features
- The utility of ancillary testing and the likely features on such modalities, including but not limited to:
    - Colour fundus imaging / slit lamp imaging
    - OCT
    - Ultrasound
    - autofluorescence
    - angiography
    - radiology
- Genetic aberrations within the tumour
- Predisposition syndromes, including but not limited to ocular melanocytosis, familial cancer syndromes such as BAP1
    - Awareness of the requirement for surveillance of these patients
- Simulating lesions and how to distinguish them, including but not limited to:
    - Choroidal naevi
    - Cysts
    - Granuloma
    - Haemorrhage (including peripheral exudation haemorrhagic chorioretinopathy)
    - Other mass lesions
- Scoring criteria to differentiate benign melanocytic lesions from melanoma:
    - Candidates should have thorough understanding of the systems including their utility and limitations.
    - The candidate should be able to apply this knowledge to appraise clinical cases and recommend management based on the evidence
        - MOLES score
        - TFSOM-DIM
- The prognosis of uveal melanoma, and factors which affect this
- The utility and an overview of biopsy techniques for uveal melanoma, including potential risks
- Treatment modalities including
    - Laser-based treatments
    - brachytherapy
    - teletherapy (including proton beam and stereotactic radiosurgery)

  - enucleation
  - external beam radiotherapy (especially in extraocular extension)
- Complications of treatment, and the management of such complications, including:
  - Tumour recurrence
  - Radiation maculopathy / retinopathy – candidates would be expected to have a good understanding of assessment and management of these complications and be able to demonstrate such knowledge.
  - Radiation papillopathy
  - Cataract
  - Neovascular glaucoma
- Overall patient survival and long term follow up, including surveillance for metastatic disease

4. Intraocular lymphoma

Vitreoretinal lymphoma:

- Understand:
  - The association with CNS lymphoma, and that CNS lymphoma patients require screening for ophthalmic disease, and vice versa.
  - Incidence and epidemiology
  - Clinical presentation and features, including masquerade
  - The utility of ancillary testing and the likely features on such modalities, including but not limited to:
    - Colour fundal imaging / slit lamp imaging
    - OCT
    - Ultrasound
    - autofluorescence
    - angiography
    - radiology
  - Confirmatory testing
    - Effect of systemic / local steroids and the timing of biopsy
    - Vitreous biopsy (including the techniques required to maximise the diagnostic efficacy)
    - Awareness of the tests performed, including cytology, immunohistochemistry, flow cytometry and gene rearrangement studies including MYD88
    - Interleukin ratios from aqueous sampling
  - Awareness of the Consensus Recommendations for the Diagnosis of Vitreoretinal Lymphoma 2021 as a resource for identification and management of possible lymphoma patients (details of the recommendation are not required).
  - Treatment modalities including:

        - Therapeutic vitrectomy
        - Intravitreal chemotherapy
        - Systemic chemotherapy
        - External beam radiotherapy
    - Likely prognosis and survival

Choroidal lymphoma:

- Understand:
    - The difference between vitreoretinal lymphoma and choroidal lymphoma
    - Clinical features and presentation
    - Ancillary testing and biopsy techniques
    - Treatment

Appreciation of the need for MDT approach to these patients, including investigation of differential diagnoses in conjunction with uveitis teams, and the haemato-oncologist

5. Vascular Tumours

Retinal Hemangioblastoma

- Isolated or in association with von Hippel Lindau syndrome (VHL)
- Candidates are expected to understand the diagnostic criterial for VHL and the need for multidisciplinary management including:
    - Geneticist – candidates should be aware of the inheritance pattern of VHL
    - Renal / nephrologist
    - Gastroenterologist
    - Audiologist
    - Neurologist
    - Requirement for annual ocular screening for new lesions
- Clinical features and ancillary testing
- Treatment modalities, indications, limitations and potential complications, including:
    - Observation
    - Laser
    - Cryotherapy
    - Brachytherapy / teletherapy
    - Endoresection
    - Intravitreal therapies

Choroidal haemangiomas

- Circumscribed choroidal haemangiomas and diffuse choroidal haemangiomas

- Clinical features and associations, including Sturge-Weber syndrome
- Ancillary testing and the ability to differentiate these lesions from other intraocular mass lesions
- Treatment options and complications, including:
    - Intravitreal therapy
    - Laser (incl. PDT)
    - Brachytherapy and teletherapy

Vasoproliferative tumours

- Understanding of the presentation and associations including pre-existing ocular disease
- Clinical features
- Ancillary testing and the ability to differentiate these lesions
- Treatment options and complications, including:
    - Intravitreal therapy
    - Laser (incl. PDT)
    - Brachytherapy and teletherapy
    - Management of secondary effects including ERM

6. Intraocular metastatic disease

Appreciation of the presentation and features of intraocular metastases

Understanding of clinical features

Application of ancillary testing and the ability to identify these lesions

Systemic screening in undiagnosed systemic carcinomatosis

Awareness of the most likely origin of intraocular metastases, including:

- Lung
- Breast
- Prostate
- Colon
- Carcinoid tumours

Treatment options and management of complications, including but not limited to:

- observation if small and not visually significant
- systemic therapy efficacy within the eye
- laser
- intravitreal therapy
- brachytherapy / teletherapy / external beam radiotherapy

7. Benign Tumours

Candidates should be able to demonstrate an understanding of the presentation, clinical features, and ancillary testing findings of the following lesions, and should be able to differentiate them from other lesions:

- Choroidal osteoma
- Retinal astrocytic hamartoma (and its potential association with the Tuberous Sclerosis Complex)
- Melanocytoma
- Hamartomas of the iris, RPE and retina (and the association with neurofibromatosis) CHRPE (including the difference between typical, grouped and atypical CHRPE associated with FAP)
- Adenoma / adenocarcinoma of the RPE
- Focal scleral nodule / scleroma

Candidates should also understand the likely prognosis and whether there is need for treatment / follow up of these lesions

8. Ocular ultrasound examinations

Candidates should be able to demonstrate thorough understanding of:

- Indications
- Principles and procedures
- Types (A / Diagnostic A/ B / UBM)
- The key ultrasonic features of
    - Uveal melanoma
    - Choroidal naevi
    - Choroidal haemangioma
    - Medulloepithelioma
    - Cysts
    - Haemorrhage
    - Choroidal infiltration by lymphoma

7. Uveitis

1. Basics of Ocular Inflammation

Detailed anatomy of the uveal tract

Pathophysiology of ocular inflammation

Describe the SUN classification and grading of ocular inflammation

Describe various automated and semi-automated techniques of grading ocular inflammation

Describe and understand all findings on clinical examination including but not limited to

- Anterior segment: iris nodules, pupillary membrane, posterior synechiae, peripheral anterior synechiae, iris bombe, patterns of keratic precipitates, iris defects and their distribution, anterior chamber cells, hypopyon, anterior chamber flare, complicated cataract, scleral inflammation, among others
- Posterior segment (vitreal findings): vitreous cells, vitreous haze, vitreous snowballs, snowbank, vitreous precipitates, vitreous strands
- Posterior segment (retinal findings): superficial retinal infiltrates, retinochoroidal lesions, necrotizing retinitis, types of retinal vasculitis, macular edema and its patterns, types of retinal detachment, retinoschisis, preretinal neovascularization. Differentiate active from inactive disease and arterial from venous side disease.
- Posterior segment (choroidal findings): recognize the different patterns of presentation including choroidal granuloma, multifocal choroiditis, punctate inner choroiditis, serpiginous and serpiginous-like choroiditis, and APMPPE. Recognize complications such as choroidal neovascular membranes and recognize metastatic lesions.
- Optic nerve findings: edema, swelling, hemorrhage, peripapillary neovascularization, optic disc granuloma

Detailed information on the changing epidemiology of disease (with relevance to European countries)

Re-emerging diseases, and endemicity of infectious uveitis (with relevance to European countries

Detailed information on the demographics of the uveitic conditions

- Comments: Adult versus children; immunocompetent versus immunocompromised
- Patterns of involvement in immunocompetent individuals
- Demographic details in immunocompromised individuals
- Demographic details in patients with other primary/acquired immunodeficiencies, organ transplants, and other such conditions including COVID-19

Differentiate serious infective from noninfective causes of uveitis (e.g., recognize an endogenous endophthalmitis and differentiate this from an immune-mediated uveitis, such as Behçet's disease).

2. Concepts in Immunology and Uveitis

Triggers of immune responses including bacterial membranes, lipopolysaccharides, mycobacteria, toxic products, and environmental factors, parasites, and viruses triggering immune responses including COVID-19

Role of HLA molecules as a risk factor of inflammation

3. Ocular Investigations and Imaging in Uveitis

Recognize and evaluate the typical demographic features, clinical features, and differential diagnosis of uveitis common in the region via the process of history taking, clinical examination, and the use of investigative tools (such as fluorescein angiography - FA, indocyanine green angiography - ICGA, fundus autofluorescence – FAF, B-scan ultrasound, optical coherence tomography – OCT, and optical coherence tomography angiography - OCTA)

Describe the indications for performing FA, FAF, ICGA, OCT and OCTA

Understand the anatomy and clinical features on B-scan ultrasound

Understand the patterns on FA and ICGA including:

- Detection of active retina;/choroidal lesions
- Detection of choroidal granulomas
- Detection of retinal vasculitis and its pattern, involvement of vessels, and presence of occlusive retinal vasculitis
- Detection of optic nerve head inflammation
- Detection of complications including choroidal neovascularization, macular edema, vascular occlusion, retinal angiomatous proliferation, vasoproliferative tumor, and angiomas (such as cat-scratch disease)

Differentiate active from inactive uveitis

Detect features such as capillary drop-out, choroidal neovascularization and other patterns on OCTA

Describe indications for ultrasound biomicroscopy (e.g., assess state of ciliary body in hypotony), laser flare photometry, visual field testing, and electrophysiology in the evaluation of uveitis

Describe wide field and ultra-wide field imaging in uveitis

4. Laboratory Testing in Uveitis

Detailed understanding of indications and contraindications of laboratory testing in uveitis including targeted testing

- Testing based on the clinical phenotype of the disease
- Testing based on endemicity/epidemiology
- Testing based on patient factors such as age, gender, travel history, pets, among others
- Testing based on history and physical examination

Detailed information on review of systems and previous ocular history (including cases with recurrent disease, and previously evaluated by laboratory testing)

Invasive testing including anterior chamber paracentesis, vitreous biopsy, diagnostic enucleation, retinal/choroidal biopsy

Genetic testing (e.g., NOD2 gene mutations in Blau syndrome)

Specific testing for certain uveitic conditions:

- Syphilis: specific and non-specific tests, and international guidelines for testing of the patients
- Tuberculosis: interpretation of tests such as Mantoux and interferon gamma release assay
- Systemic antibody testing: tests such as anti-dsDNA, anti-ANA, anti-ribosomal, anti-ANCA, and other tests; indications and interpretation, types of testing
- HIV testing
- Serum testing including: ACE levels, antibody assays for systemic infections (such as toxoplasmosis) and their interpretation
- Systemic investigations including CT-scan and PET-scan, and their interpretation

- Systemic fluid/tissue analysis: PCR, histopathology (e.g., salivary gland biopsy), indications and their interpretation
- HLA typing

5. Anterior chamber Paracentesis and Diagnostic Vitrectomy in Uveitis

Indications for anterior chamber paracentesis and diagnostic vitrectomy including diagnostic challenges, bacterial/fungal/viral/atypical infections, lymphoma, other masquerade syndromes, endophthalmitis

Pre-procedural patient evaluation including laboratory tests and systemic imaging

Technique for surgery and sample collection

Cytopathological analysis – types, special stains, sample preservation, and interpretation

Interleukin analysis in vitreous – tests such as IL6/10 ratio, levels of chemokines

Complications of diagnostic vitrectomy

Indications and techniques of vitreous, retinal, and choroidal biopsy and sample processing

Postoperative care and follow-up management of the patient

6. Uveitis: Anatomical Location of Inflammation

A. Anterior Uveitis

Acute anterior uveitis – etiologies, manifestations, and diagnostic testing (when indicated)

Differentiating between infectious and non-infectious etiologies, diagnosing idiopathic uveitis; distinguishing the pattern (viral, HLA-B-27, among others) and other associated signs

Identification of systemic conditions such as tubulointerstitial nephritis

Identification of lens-associated uveitis

Chronic anterior uveitis – identification of features such as synechiae, iris bombe, and other complications

Diagnosis and management of ciliary body complications such as cyclitic membranes, ciliary body detachment and hypotony

Management including biological therapies, and management of complications such as band-shaped keratopathy

Follow-up of patients, including evaluation by laser flare photometry

B. Intermediate Uveitis

Diagnosis of pars planitis and intermediate uveitis due to known causes

Work-up for systemic conditions including sarcoidosis, multiple sclerosis, Lyme's disease, tuberculosis, and syphilis, among others

Identification of features such as snowballs/snow-banking, peri-arteritis/periphlebitis, macular edema, retinoschisis, vasoproliferative tumor, among others

Targeted investigations including interpretation of investigations such as cerebrospinal fluid analysis, serologies, cultures/PCR, among others

Indications of medical/surgical therapies for intermediate uveitis

Diagnosis and management of complications including macular edema, secondary cataract/glaucoma, hypotony, retinal detachment, and epiretinal membranes

C. Posterior Uveitis

Differential diagnosis of white dot syndromes including multiple evanescent white dot syndrome, acute posterior multifocal placoid pigment epitheliopathy, multifocal choroiditis, punctate inner choroidopathy, birdshot retinochoroiditis, serpiginous choroiditis, among others

Identification of rare causes of choriocapillaritis including presumed ocular histoplasmosis syndrome

Diagnosis of unifocal/multifocal retinitis/retinochoroiditis

Differential diagnosis of occlusive and nonocclusive retinal vasculitis

Differential diagnosis of necrotizing retinitis

Diagnosis of choroiditis due to etiologies such as tuberculosis or sarcoidosis

Multimodal imaging findings in choroiditis including autofluorescence, FA, ICGA, OCT and OCTA

Identification and differential diagnosis of choroidal granulomas

Detailed pathology, morphology, clinical features, differential diagnosis, and management of relevant posterior uveitis with high prevalence and/or visual morbidity (along with their SUN diagnostic criteria, wherever applicable):

- Sarcoidosis
- Birdshot chorioretinopathy
- Vogt-Koyanagi-Harada’s disease
- Sympathetic ophthalmia
- Behçet disease
- Ocular tuberculosis
- Syphilis
- Lyme disease
- Bartonella
- Toxoplasmosis
- Toxocariasis
- Acute retinal necrosis syndrome
- CMV retinitis

Management of posterior uveitis including:

- Local therapies (periocular steroids, local intravitreal implants/injections, anti-VEGF therapies)

- systemic immunosuppressive therapies
- Biological therapies
- Systemic antibiotic therapies (e.g., anti-tubercular therapy)

Identification of infectious retinitis:

- diagnosis and investigations in acute retinal necrosis, cytomegalovirus retinitis, and other forms of infectious/necrotizing retinitis

Diagnosis and laboratory work-up of toxoplasma retinochoroiditis

Rare infectious parasitic causes of posterior/panuveitis including diffuse unilateral subacute neuroretinitis (DUSN), toxocariasis, cysticercosis,

D. Panuveitis

Identification and differential diagnosis of stromal choroidal conditions such as Vogt-Koyanagi-Harada's syndrome and sympathetic ophthalmia

Diagnosing sarcoid/tubercular panuveitis

Work-up and diagnosis of Behcet's disease including systemic manifestations

Infectious panuveitis including bacterial endophthalmitis (acute/subacute/chronic), syphilitic uveitis, leptospirosis, cat-scratch disease, brucellosis, and rare forms of fungal endophthalmitis including candidiasis, aspergillosis, among others

clinical features and differential diagnoses for less common forms of uveitis (e.g., Whipple's disease, Crohn's disease, bilateral acute depigmentation of the iris (BADI), among others)

Identification and management of rare forms of uveitis including:

- Masquerade syndromes
- HIV and related opportunistic ocular inflammations

E. Drug-Induced Uveitis

Detailed knowledge of the drugs associated with uveitis, pharmacokinetics/pharmacodynamics, pathophysiology of ocular inflammation, and other adverse effects

Patterns of ocular presentation associated with various drugs

Findings on clinical examination, OCT, FA, and other imaging modalities such as ICGA

Differentiation from established forms of uveitis; establishing a cause-and-effect relationship

F. Scleritis

Differentiation between infectious and non-infectious scleritis; classification of scleritis based on anatomical locations (anterior/posterior), and nodular versus diffuse versus necrotizing

Identification of healed/active disease

Scleral imaging using newer techniques such as anterior segment OCT

Differential diagnosis, and identification of etiologies/associations such as exudative retinal detachments

Description of complications of scleritis including necrotizing scleritis, globe perforation, uveal prolapse, and systemic comorbidities

Detailed understanding of diagnostics in scleritis including scleral biopsies, cultures/PCR for infectious agents

7. Therapies for Uveitis

A. Medical Therapies for Uveitis

Appropriate strategies for the treatment of acute anterior uveitis (types of topical agents to be used, frequency, duration)

Appropriate strategies for the management of chronic anterior uveitis (use of drops, decisions regarding use of systemic therapy and monitoring)

Utility of corticosteroids and their complications (local and systemic therapies) in uveitis

Use of non-steroidal anti-inflammatory agents

Biological therapies including newer agents, and agents approved for associated systemic conditions such as juvenile idiopathic arthritis, or rheumatoid arthritis

Knowledge of approved drugs (especially approved by EMA)

Management of patients with special needs, geriatric population, patients with renal or liver compromise, pregnancy, patients with concomitant systemic diseases and risk of infections, children, and adolescents

Describe indications, contraindications, and complications of retinal laser photocoagulation in uveitis.

Describe indications, contraindications, and complications of intravitreal injection of medications (e.g., corticosteroids, antiviral therapy, antibiotics, anti-VEGF, anti-mitotic agents) and drug delivery systems (e.g., for corticosteroid, ganciclovir)

Systemic therapies including antibiotics, antiviral therapies, and other adjunctive therapies

B. Surgical Management of Uveitis and its complications

Indications, contraindications, and complications of surgical management of uveitis including scleral patch grafting, pars plana vitrectomy, retinochoroidal biopsy/excision, and cyclitic membrane removal

Surgical management of complications such as hypotony, iris bombe and other associated complications

Benefits, risks and alternatives to surgical management of uveitis

8. Miscellaneous – complications and referrals

Ocular surgeries (cataract, glaucoma, retina, among others) in the context of ocular inflammation: pre-operative preparation, pre and postoperative treatments, specificities of surgical techniques.

Identification and features of complications including inflammatory choroidal neovascular membranes (activity/inactivity, treatment options, appearance on OCT/OCTA and other dye-based angiographies), cataract, glaucoma, band-shaped keratopathy, retinal detachment, epiretinal membranes, among others

Uveitic Macular Edema:

Etiologies, pathophysiology, detection, differentiation from edema due to other causes, and management

Association with various uveitic entities

Appearance on OCT, FA, and other imaging modalities

Visual morbidity associated with uveitic macular edema

Identification and management of rare forms of uveitis such as autoimmune retinopathy

Knowledge of indications of referrals to other subspecialties including cataract surgery, glaucoma, vitreoretinal services, low vision aids, among others

8. Vitreoretinal Surgery

1. Retinal Detachment

Identify, describe, understand the underlying pathogenesis, and formulate evidence-based management options for the following:

- Posterior vitreous detachment
- Retinal holes vs horse-shoe tears
- Peripheral retinal degeneration
- Retinoschisis
- Rhegmatogenous retinal detachment, including the following sub-types:
    - U tear secondary to posterior vitreous detachment
    - Myopic round hole
    - Dialysis
    - GRT
    - Retinoschisis-associated

Understand the importance of the following on surgical outcomes:

- Macular status (on/off)
- Time to surgery
- Proliferative vitreoretinopathy

Vitreoretinal Interventions for Retinal Detachment

Describe the indications for and limitations of laser- vs cryo-pexy for management of retinal breaks

Describe the fundamental surgical steps and post-operative care for the following in retinal detachment repair:

- Scleral buckling
- Pars plana vitrectomy
- Pneumatic retinopexy

Compare and contrast scleral buckling versus vitrectomy versus pneumatic retinopexy

- List the classic indications for each approach
- Demonstrate an awareness of the advantages / disadvantages of each technique (including anatomical and functional outcomes)
- Describe the potential complications associated with each technique

Tamponade Agents

- Demonstrate familiarity with the available types and properties of vitreoretinal tamponade agents (air, gas, silicone oil, heavy silicone oil)
- Demonstrate an understanding of when to use each
- Describe the potential complications of gas and silicone oil (and how to manage them).
- Suggest indications and potential complications of intraoperative use of heavy liquids
- Demonstrate awareness and best practice in terms of safety considerations in relation to gas tamponades and aviation/altitude/general anaesthesia

2. Vitreous Haemorrhage

List the potential aetiologies / differential diagnosis of vitreous haemorrhage

Identify cases which represent a high risk of tear-induced vitreous haemorrhage/retinal detachment/proliferative vitreoretinopathy (and propose how to manage)

3. Vitrectomy in Diabetic Retinopathy

Indications for vitrectomy in diabetic retinopathy

Describe the basic pathophysiology of proliferative diabetic retinopathy and tractional detachment

Describe the fundamental surgical steps of vitrectomy for diabetic retinopathy

Describe how laser photocoagulation and anti-VEGF agents can supplement surgery

Display awareness of the 'angio-fibrotic switch' in terms of anti-VEGF use

4. Vitreoretinal Interface Disorders (Vitreomacular Traction and Full thickness Macular Hole)

For both conditions:

- Describe the pathogenesis and natural course (including OCT features)
- Discuss management options (including enzymatic vitreolysis, pneumatic vitreolysis, pars plana vitrectomy)
- Discuss the indication for and timing of intervention
- Describe the outer retinal changes observed in tractional maculopathy

Demonstrate familiarity of vitrectomy for full thickness macular hole:

- Describe the fundamental surgical steps of vitrectomy
- Discuss the intra-operative use of dyes and internal limiting membrane management

- Detail the expected closure rates and visual outcomes of surgery (and understand the key pre-operative prognostic factors that influence these)
- Discuss the available evidence regarding face down vs non face down posturing
- Discuss potential novel options for the management of recalcitrant/large holes, including the rationale for each

5. Myopic Traction Maculopathy

Discuss vitreoretinal pathologies associated with high myopia (e.g. maculoschisis, retinal detachment and full thickness macular hole).

Discuss the natural course (including OCT features), timing, risks and limitations of surgery in myopic traction maculopathy.

Differentiate myopic macular atrophy versus tractional vision loss

6. Epiretinal Membrane

Describe the various aetiologies and pathogenesis of epiretinal membrane

Be familiar with the typical time-course (including OCT features) and prognosis of naive and treated patients

Be aware of the potential co-existence/association of epiretinal membrane and vitreoschisis/vitreomacular traction

Define the indications for surgical case selection vs observation

Describe the fundamental surgical steps of vitrectomy for epiretinal membrane

Discuss epiretinal membrane in the context of concomitant disease (macular degeneration, retinal vascular disease etc.)

Discuss the anticipated visual benefits of surgery (including time-scale)

7. Non Full Thickness Macular Holes

Differentiate the clinical and OCT features, pathogenesis and natural course of various sub-types of non full thickness (including lamellar) macular holes

Discuss the indications for and prognosis of surgical intervention for each

8. Vitreous Floaters / Syneresis / Synchysis and Asteroid Hyalosis

Discuss these entities in relation to surgical intervention, case selection and associated risks

9. Vitrectomy and Uveitis

Discuss the role of and fundamental surgical steps for diagnostic and therapeutic vitrectomy in vitritis

10. Vitrectomy for intraocular lens luxation

Discuss the basic steps of surgical intervention to manage intraocular lens luxation

Describe potential options for the management of aphakia in the presence and absence of capsular support (including conservative and basic surgical options)

11. Vitrectomy for Complicated Cataract Surgery and Retained Crystalline Lens Matter ('Dropped Nucleus')

Demonstrate familiarity with the acute, safe surgical and medical management of posterior capsular rupture and dropped nucleus

Discuss the indications and timing for surgical intervention in this scenario

Be aware of the signs and consequences of retained lens matter

Discuss the basic steps of surgical intervention to manage retained lens matter (including pars plana vitrectomy and fragmatome/endo-phaco)

Describe potential options for the management of aphakia in the presence and absence of capsular support (including conservative and basic surgical options)

12. Vitreoretinal interventions in age related macular degeneration

Be familiar with the available surgical and conservative approaches for the management of subretinal haemorrhage (including anti-VEGF agents, tissue plasminogen activator (intravitreal and subretinal delivery), pneumatic displacement and vitrectomy)

13. Vitreoretinal interventions for trauma

Appreciate the prognostic implications of baseline vision (particularly 'NPL')

Discuss the basic steps of surgical intervention to manage ocular trauma complications such as globe rupture, anterior segment reconstruction supra-choroidal haemorrhage and intra-ocular foreign body.

Understand the role of temporary keratoprosthesis

14. Post-Operative Endophthalmitis

Demonstrate a firm grasp of the clinical features, typical time-line, microbiological profile and acute practical management of presumed post-operative endophthalmitis.

Demonstrate awareness of the importance of immediate intervention

Differentiate between pseudophakic vs post injection cases, in terms of microbiological profile, prognosis and management

Demonstrate a firm grasp of the risk factors for development of post-operative endophthalmitis, and how to prevent it.

Understand the potential role of pars plana vitrectomy (early and late) in post-operative endophthalmitis.

15. Paediatric and Syndromic Vitreoretinal Surgery

Understand the genetic basis and pathogenesis of Stickler Syndrome, and recall the phenotypes and associated vitreoretinal pathologies (including the potential role for prophylactic retinopexy)

Basic understanding of other genetic vitreoretinopathies, including familial exudative vitreoretinopathy and X-linked retinoschisis.

Discuss basic concepts in the surgical management of retinopathy of prematurity and familial exudative vitreoretinopathy

16. Imaging and Vitreoretinal Disease

Prepare to describe and interpret the following imaging modalities in relation to vitreoretinal disease: ultrasound, autofluorescence, OCT, and ultra-wide field fundus imaging.

17. Pars Plana Vitrectomy

Demonstrate familiarity with common indications for vitrectomy

Discuss complications of vitrectomy, and the practical management of these (including glaucoma, retinal folds, metamorphopsia, proliferative vitreoretinopathy, re-detachment, hypotony and choroidal detachment)

Demonstrate awareness of the advantages and disadvantages of combined versus sequential phacoemulsification + IOL with vitrectomy for different surgical indications

Understand the challenges of phacoemulsification in vitrectomised eyes, and describe how to avoid complications

Demonstrate an awareness of the fundamental steps of pars plana vitrectomy:

- Anaesthetic options
- Sclerotomy (including valved trochar systems and the advantages/disadvantages of high/low gauges)
- Core vitrectomy
- Induction of posterior vitreous detachment
- Vitreous base shaving
- Membrane peeling (dyes)
- Tamponade agents

18. Miscellaneous

Be aware of and prepared to discuss these in general terms:

- Management of optic disc pit maculopathy
- Retinal gene therapy
- Sub-retinal chip implantation
- Radial optic neurotomy