iUBT403 – Dermatology and microbiology

URN – H/617/4348

Guided Learning Hours: 42

Learning outcome	Assessment criteria	Taught content to include
LO1 Know the structure and functions of the skin, hair and nails	1.1. Identify the anatomical structures of the skin, nails and hair	• The cell - Cell membrane ▪ Phospholipid bilayer ▪ Hydrophilic ▪ Hydrophobic ▪ Ion channels - Cytoplasm - Mitochondria - Nuclear membrane - Nucleus - Nucleolus - Ribosomes - Chromatin - Chromosomes - Centrosome - Centrioles - Endoplasmic reticulum - Vacuoles - Lysosomes - Golgi apparatus - Protein cell receptor sites - Cilia - Microtubules • The skin - Epidermis ▪ Stratum corneum – horny layer - Corneocytes

		- Filaggrin ▪ Stratum lucidum – transparent layer - Transitional layer - Eleidin ▪ Stratum granulosum – granular layer - Keratohyalin granules “glue” ▪ Stratum spinosum - prickle cell layer - Desmosome connection - Langerhans cells - Lipids - Fatty acids - Cholesterol - Ceramides - Lamellar granules ▪ Stratum germinativum – basal layer - Melanocytes - Keratinocytes - Dendrites - Basal cells - Stem cells - Amplifying cells - Post mitotic cells - Inflammatory chemical mediators - Dermis ▪ Papillary layer ▪ Dermal papillae ▪ Rete's pegs ▪ Capillaries ▪ Nerve endings ▪ Grenz zone ▪ Collagen ▪ Elastin ▪ Glycosaminoglycan’s (GAGs) ▪ Hyaluronan (hyaluronic acid) ▪ Leucocytes ▪ Histiocytes ▪ T lymphocytes ▪ Macrophages (histiocytes) and mast cells ▪ Reticular layer

		▪ Fibroblasts ▪ Golgi apparatus ▪ Rough endoplasmic reticulum ▪ Blood vessels ▪ Lymphatic vessels ▪ Sweat ducts: eccrine, apocrine ▪ Pilosebaceous unit ▪ Hair ▪ Intercellular cement ▪ Interstitial fluid - Subcutaneous tissue/hypodermis ▪ Adipose tissue ▪ Blood vessels ▪ Lymph vessels ▪ Subcutaneous nerves ▪ Mast cells ▪ Apocrine gland ▪ Eccrine gland ▪ Hair follicle root • The nail - Free edge - Hyponychium - Eponychium - Perionychium - Lunula - Mantle - Cuticle - Nail plate - Nail bed - Nail fold - Matrix - Nail wall • The hair - Keratin - Cuticle - Cortex - Melanin - Medulla - Inner root sheath

		- Huxley's - Henle's - Outer root sheath - Vitreous membrane - Connective tissue - Dermal papilla • Types of hair - Lanugo - Vellus - Terminal
	1.2. Describe the functions of the skin, nails and hair	• The cell - Movement - Respiration - Sensitivity - Growth - Reproduction - Excretion - Metabolism - Cell action potential - Electronically conducted unit - Mitosis ▪ Prophase ▪ Metaphase ▪ Anaphase ▪ Telophase ▪ Interphase - Meiosis • The skin - Secretion - Heat regulation - Absorption - Protection - Elimination - Sensation - Vitamin D production - Epidermis ▪ Barrier function ▪ Natural moisturising factor (NMF) ▪ pH balance

		▪ Microbiomes ▪ Lipid protein “glue” ▪ Keratinisation ▪ Production of: • Melanin • Melanosomes • Tyrosinaise • Tyrosine • Eumelanin • Pheomelanin - Dermis ▪ Papillary dermis • Dermal-epidermal junction (DEJ) • Thermoregulation • Production of collagen, elastin, glycosaminoglycan’s (GAGs) ▪ Reticular dermis • Production of collagen, elastin, glycosaminoglycan’s (GAGs), hyaluronic acid • Matrix metallo proteases (MMPs) • Hyaluronidase • Collagenase • Elastase ▪ Pilosebaceous unit • Production of sebum • Production of eccrine and apocrine sweat • Formation of the acid mantle - Subcutaneous tissue/hypodermis ▪ Insulation ▪ Energy source ▪ Shock absorption • Cells involved in the immune response - Langerhans cells - Keratinocytes - T lymphocytes - Macrophages (histiocytes) - Mast cells

		• Absorption pathways
		  - Appendageal
		  - Transcellular
		  - Intercellular
		• Wound healing
		  - Healing response and blood clotting to include the role of:
		  ▪ Granulocytes
		  ▪ Leukocytes
		  ▪ Thrombocytes
		  ▪ Lymphocytes
		  ▪ Monocytes
		  ▪ Macrophages
		  ▪ Langerhans cells
		  - To include the following stages:
		  ▪ Inflammatory stage
		  ▪ Proliferative phase
		  ▪ Remodelling phase
		  - Wounds to include:
		  ▪ Epithelialisation
		  ▪ Compromised wound healing
		  - Mitotic activity
		  - Scarring
		  ▪ Normal
		  ▪ Abnormal
		  - Hyperplasia
		  - Hypertrophic
		  - Causes of scarring
		  - Post mitotic cells
		  - Angiogenisis
		• The nails
		  - Protection
		  - Manual dexterity
		• The hair
		  - Protection
		  - Temperature control

	1.3. Describe the factors that affect the growth of hair and nails	• Health • Age • Hormones

		• Diet • Medication • Climate • Damage • Lifestyle
	1.4. Describe the factors that cause changes in the appearance of the skin, which are associated with ageing	• Intrinsic ageing – physiological factors • Extrinsic ageing – environmental factors • Diet and gut health • Smoking • Alcohol • Central heating • Air conditioning • Stress • Sleep • Exercise • Fresh air • UV light exposure • Occupation • Lifestyle • Current regime • General health • Hormones • Free radical-molecule • Free radical formation • Causes of free radical activity • Lifestyle • Pollution • Chemicals • Medication • Hormones • Food • Sun • Trauma • Injury • Transepidermal water loss (TEWL) • Natural moisturising factor (NMF) • Free radical effect on living cells, tissue ischemia, injury and ageing

		• Effects of free radicals on normal skin function • Reducing free radical activity – antioxidants, vitamin C, sunscreen, anti-inflammatories • Skin types - Normal - Dry - Oily - Combination • Skin colour variations (phototypes) • Skin conditions/characteristics - Mature skin - Young skin - Lack of elasticity - Lack of muscle tone - Blemishes/dyschromia - Crow's feet - Broken/dilated capillaries - Open/enlarged pores - Milia - Comedones - Dermatosis papulosa nigra - Pseudo folliculitis - Keloids - Ingrowing hairs - Vitiligo - Albinism - Chloasma - Ephilides - Lentigo - Naevi - Port wine stain - Leukoderma - Scarring - Thin skin - Small moles - Papilloma - Dehydrated - Dull/lifeless skin - Sensitive

		- Reactive skins - Inflammation - Couperose - Telangiectasia - Rosacea - Pustules - Papules - Acne vulgaris - Acne scarring - Hyperpigmentation - Hypopigmentation - Dermal and epidermal pigmentation - Photo damage - Keratosis - Ageing skin • Causes and effects - Dehydrated ▪ Lack of water/sebum ▪ Vascularity ▪ Fine lines ▪ Wrinkles ▪ Compromised skins - Dull/lifeless skin ▪ Irregular epidermal reproduction ▪ Excess keratinisation ▪ Hyper sebaceous activity ▪ Damaged vascular network ▪ Lack of nutrients ▪ Avascular - Reactive skins, couperose, inflammation ▪ Exaggerated response to stimulus ▪ Mast cells ▪ Mediators (histamine) ▪ Internal processes ▪ Over exfoliation ▪ Artificial additive/preservatives ▪ Post laser/IPL ▪ Isotretinoin - Rosacea

		▪ Sebaceous hyperplasia ▪ Connective tissue hypertrophy ▪ Parasite (demodex) ▪ Digestion and gut health ▪ Acidic environment ▪ Inflammation ▪ Stages of rosacea 1–4 ▪ Triggers • Weather • Emotional • Temperature • Physical • Beverages • Food • Medication • Topical skin care • Stress • Hormones - Acne, papules, pustules, acne scarring ▪ Hormones ▪ Sebum stimulation ▪ Juvenile acne ▪ Acne grades I–IV ▪ Conglobata ▪ Nodular ▪ P acnes ▪ Milia ▪ Comedones ▪ Inflammation ▪ Ice pick scarring ▪ Concave scarring ▪ Cosmetics ▪ Make-up ▪ Stress ▪ Diet ▪ Gut health - Hyperpigmentation, hypopigmentation, dermal and epidermal pigmentation, albinism, vitiligo, lamellar ichthyosis, melasma, haemochromatosis, dyschromia

		▪ Hormones ▪ Drugs ▪ Photosensitising agents ▪ Trauma ▪ UV exposure ▪ Free radical damage ▪ Stress - Photo damaged, photo damage/ageing, keratosis ▪ Loss collagen/elastin/GAGs ▪ Increased capillary visibility ▪ Damage of vessels ▪ Irregular epidermis ▪ Slow keratinocyte mitosis ▪ Elastotic changes ▪ Reduced oxygen/nutrients supply - Ageing skin ▪ Thinning epidermis ▪ Thickening of stratum corneum ▪ Reduced melanocyte function ▪ Photosensitivity ▪ Reduced cell turnover ▪ Lack of NMF ▪ Glycation ▪ Fatty acid deficiency ▪ Milia ▪ Rhytids • Static • Dynamic - Hormonal changes - Pregnancy - Perimenopause - Menopause

LO2 Know the diseases and disorders of the skin, hair and nails	2.1.	Describe the signs and causes of non-infectious diseases and disorders of the skin, hair and nails that contra-indicate treatment	• Skin - Contra-indications requiring medical permission ▪ In circumstances where medical permission cannot be obtained clients must sign an informed consent form stating that the treatment and its

		effects have been fully explained to them and confirm that they are willing to proceed without permission from their GP ▪ Medical oedema ▪ Recent facial surgery affecting the area ▪ Diabetes ▪ Skin cancer ▪ Undiagnosed pain ▪ When taking prescribed medication - Contra-indications that restrict treatment ▪ Any known allergies ▪ Eczema ▪ Psoriasis ▪ Dermatitis ▪ Undiagnosed lumps and bumps ▪ Localised swelling ▪ Inflammation ▪ Cuts ▪ Bruises ▪ Abrasions ▪ Scar tissue (2 years for major operations and 6 months for a small scar) ▪ Sunburn ▪ Hormonal implants ▪ Urticaria ▪ Hypersensitive skin ▪ Botox/dermal fillers (1 week following treatment) ▪ Hyperkeratosis ▪ Skin allergies ▪ Trapped/pinched nerve affecting the treatment area ▪ Inflamed nerve • Hair - Contra-indications requiring medical permission ▪ In circumstances where medical permission cannot be obtained clients must sign an informed consent form stating that the treatment and its effects have been fully explained to them and

		confirm that they are willing to proceed without permission from their GP ▪ Alopecia ▪ Trichotillomania • Nails - Contra-indications requiring medical permission ▪ In circumstances where medical permission cannot be obtained clients must sign an informed consent form stating that the treatment and its effects have been fully explained to them and confirm that they are willing to proceed without permission from their GP ▪ Recent operations on the hands ▪ Inflamed nerve ▪ Undiagnosed pain ▪ Acute rheumatism - Contra-indications that restrict treatment ▪ Bruised nails ▪ Loss of skin sensation ▪ Chilblains ▪ Dermatitis ▪ Eczema ▪ Psoriasis ▪ Onychatrophia ▪ Onychauxis ▪ Onychophagy ▪ Severely bitten/damaged nails ▪ Nail separation ▪ Onychomycosis • Contra-indications for facial treatment and chemical peels - Basal cell carcinoma (BCC) - Squamous cell carcinoma (SCC) - Melanomas - Radiotherapy - Chemotherapy - Cystic acne - Actinic keratosis - Solar/actinic keratosis - Diabetes

		- Atopic dermatitis - Eczema - Psoriasis - Seborrhoea - Open or undiagnosed lesions - Sunburn - Vitiligo - Current users of tretinoin - Oral anti-coagulants - Pregnancy or lactation - Injectables (2 weeks prior to treatment) - Dermal fillers (2 weeks prior to treatment) - Recent cosmetic surgery (1 year) - Recent laser treatment (1 year) • Precautions - Acne - Cuts - Abrasions - Electrolysis, waxing or depilatory treatments (2 weeks prior to treatment) - Telangiectasia - Rosacea - History of topical medications e.g. tretinoin - Hormone medication e.g. birth control, HRT - Previous cosmetic or reconstructive surgery - Smoking - Very dehydrated skin - Previous and recent chemical peels - Other procedures e.g. microdermabrasion - Urticaria - Allergic reactions
	2.2. Describe the signs and causes of infectious disorders of the skin, hair and nails that contra-indicate treatment	• Skin - Contra-indications that restrict treatment ▪ Infestations • Scabies • Pediculosis ▪ Bacterial • Acne vulgaris

		• Impetigo • Folliculitis • Boils ▪ Viral • Herpes simplex • Herpes zoster • Warts ▪ Fungal • Tinea corporis • Hair - Contra-indications that restrict treatment ▪ Folliculitis ▪ Pediculosis • Nails - Contra-indications that restrict treatment ▪ Onychia ▪ Onychocryptosis ▪ Onycholysis ▪ Onychomycosis (Tinea ungium) ▪ Onychoptosis ▪ Onychorrhexis ▪ Paronychia (whitlow) ▪ Sepsis • Contra-indications for facial treatments and chemical peels - Bacterial infections ▪ Cellulitis ▪ Impetigo ▪ Folliculitis ▪ Acne (III and IV) - Fungal ▪ Tinea corporis ▪ Yeast infections - candida - Viral ▪ Active herpes simplex ▪ Hepatitis C, A, B ▪ Warts - General ▪ Open lesions and rashes ▪ Isotretinoin users

		▪ Immediate post-operative: • Facelifts • Rhinoplasty • Blepharoplasty • Neck lifts • Autoimmune disorders e.g. HIV, Lupus • Precautions for chemical peels - Previous but not active herpes simplex - Medications - High Fitzpatrick 3-6 - Hyperpigmented skin

LO3 Be able to prepare for the culturing of bacteria	3.1. Prepare self and the work area for the culturing of bacteria	• Personal protective equipment i.e. gloves, laboratory coat, protective eyewear • Aseptic techniques • Methods of sterilisation • Methods of minimising cross-contamination • Management of working area
	3.2. Select materials, tools and equipment needed to culture bacteria	• Inoculating loop, swab or needle • Inoculated agar plate • Petri dishes • Culture media • Agar • Tape • Self-seal plastic bags • Incubator • Methods of disposal
	3.3. Devise an experiment to culture bacteria	• Hypothesis • Experiment to test hypothesis • Variables • Control • Analysis of results • Conclusion
	3.4. Describe the laboratory requirements for preparing self and the work area for culturing bacteria	• Aseptic techniques • Personal protective equipment • Health and safety procedures

	3.5. Explain how to select materials, tools and equipment needed to culture bacteria	• Inoculating loop, swab or needle • Inoculated agar plate • Petri dishes • Culture media • Agar • Tape • Self-seal plastic bags • Incubator • Methods of disposal
	3.6. Describe the process of culturing bacteria	• Purpose • Preparation of petri dishes • Culture media • Bacteria collection • Bacteria transfer • Seal Petri dishes • Incubation – location, period and temperatures • Monitoring bacterial growth • Analysis of results • Conclusion • Disposal of Petri dishes and bacterial samples

LO4 Be able to investigate the conditions required for the successful growth of bacteria and relate this to salon hygiene	4.1. Follow health and safety working practices when investigating the culturing of bacteria	• Risk assessment • Current legislation i.e. Control of Substances Hazardous to Health (COSHH), the Management of Health and Safety at Work Regulations, etc. • Workplace health and safety procedures/practices • Personal Protective Equipment (PPE)
	4.2. Carry out tests to investigate the conditions required for the successful growth of bacteria	• Identification of: - Required nutrients - Temperature - pH scale - Light levels - Atmospheric conditions
	4.3. Explain how to follow health and safety working practices when investigating the culturing of bacteria	• Compliance with current legislation

	4.4. Describe the conditions required to successfully cultivate bacteria	• Temperature • pH balance • Energy source • Nutrients • Moisture • Lack of light
	4.5. Describe the structure, lifecycle and transmission of micro-organisms	• Single cell micro-organisms • Prokaryotes • Pathogenic • Non-pathogenic • Nucleoid • DNA • Ribosomes • Cytoplasm • Storage granules • Plasmid • Endospore • Cell wall • Plasma membrane • Outer membrane • Capsule • Flagella • Pili • Round – cocci • Rod shaped – bacilli • Spiral – spirilla • Binary fission • Lag phase • Log phase • Stationary phase • Death phase • Contact transmission – direct and indirect • Droplet transmission • Airborne transmission • Contamination – food/water • Vector borne

	4.6. Describe hygiene procedures that can be used to reduce the risk of cross-contamination in the salon	• Sterilisation • Sanitisation • Hygienic working practices • Identification of contra-indications • Referral

Assessment	
Portfolio of evidence containing: • Assignment MCQ	All learners will be assessed via an assignment and a multiple choice theory paper for this unit. For details please see www.itecworld.co.uk Assignment guidance and assessment forms may be downloaded from www.itecworld.co.uk

Guide to taught content
The content contained within the unit specification is not prescriptive or exhaustive but is intended to provide helpful guidance to teachers and learners with the key areas that will be covered within the unit, and, relating to the kinds of evidence that should be provided for each assessment objective specific to the unit learning outcomes.

Document History

Version	Issue Date	Changes	Role
v1	17/09/2019	First published	Qualifications and Regulation Co-ordinator
v2	16/01/2020	Amended typographical error	Qualifications and Regulation Co-ordinator