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Demonstration of a new software text for teaching the structure and function of mammalian skin.

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The defence functions of the skin are fundamental to mammalian survival but are not always fully appreciated. The fact that other body organs would simply shrivel and die without the protection of the skin, and that survival of all mammalian young is dependent on the secretion of a specialised skin gland are usually simply taken as read. The skin however, also has a number of physiologically important defence roles worthy of more detailed attention and research. The following is an explanation and guide to a comprehensive review of skin biology, which has been produced in CD format and will be demonstrated at the Meeting. A unique collection of comparative information on skin function is introduced at a basic level suitable for the undergraduate in biology/physiology, medicine, veterinary medicine and nursing. In offering over 1000 references cited in a targeted manner a valuable professional resource for the university teacher and research worker is also provided. The material is provided in 8 sections with a summary, and a quiz to test the knowledge acquired. Illustrations and animations are widely used. The introduction explains the importance of the skin as an organ of defence and identifies the external and internal challenges it faces. It deals with the basis of metabolism and the concepts of homeostasis and core and shell in relation to temperature stability. A section on macrodiversity describes the range of environments that animals inhabit and identifies the external

variations in the skin and specialised regions within individuals. In the next section methods of surface examination and the collection of surface samples are shown and techniques of skin sampling and processing for examination of internal structure by different microscopical procedures are described. The fourth section explains how the skin and coat are used for identification purposes, defines the skin surface and illustrates the appearance of its composite layers. This section also describes what is meant by the skin surface ecosystem and identifies the main components of its climate, chemical composition and inhabitants. It describes desquamation and the probable roles of the little known environment immediately adjacent to the skin. A reference skin is used to describe the basic components of the skin and their embryological origin and this device is extended to reference hair follicle groups. The concept of body skin and specialised regions is identified. A section on microdiversity provides a completely new categorisation of mammalian skin types in relation to the defined reference standards including types of hair emergence and surface clustering patterns and provides a broad understanding of the structures and functions of specialised skin regions. A section on components first defines reference structures for the skin components (by identifying all possible histological features that may be found in each) then describes the variations from each found among mammals. This section also describes the skin immune system, outlines the mechanisms involved in repair of the damaged skin defence barrier, and explains the functions of the skin components (epidermis, dermis, hair, sweat gland, sebaceous gland) including the role of cutaneous nerve endings in reflexes. A section on behaviour identifies strategies (wallowing, hunting reaction, camouflage etc) adopted by mammals to combat climatic stress and biological and physical challenges.