The neurobiology of the meibomian glands.

Cox SM1, Nichols JJ2.

Author information

Abstract

This article compiles research regarding the neuroanatomy of the meibomian glands and their associated blood vessels. After a review of meibomian gland morphology and regulation via hormones, a case for innervation is made based on anatomical findings whereby the nerves lack a myelin sheath and Schwann cells. The localization and co-localization of dopamine beta-hydroxylase, tyrosine hydroxylase, neuropeptide Y, vasoactive intestinal polypeptide, calcitonin gene-related peptide, and substance P are explored with emphasis on differences that exist between species. The presence of the various neuropeptides/neurotransmitters adjacent to themeibomian gland versus the vasculature associated with the meibomian gland is documented so that conclusions can be made with regard to direct and indirect effects. Research regarding the presence of receptors and receptor proteins for these neuropeptides is documented. Evidence supporting the influence of certain neurotransmitters and/or neuropeptides on the meibomian gland is given based on research that correlates changes in meibomian gland morphology and/or tear film with changes in neurotransmitter and/or neuropeptide presence. Conclusions are drawn related to direct and indirect regulation and differences between the various nervous systems.