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Herpes Simplex Virus types 1 and 2.

Herpes simplex virus type 1 (HSV-1) and type 2 (HSV-2), along with Varicella zoster virus (VZV) make up the *Alphaherpesvirinae* subfamily of *herpesviruses* that commonly infect humans.

HSV-1 typically causes herpes labialis (otherwise known as cold sores), and herpes keratitis of the eyes; whilst HSV-2 is often the cause of genital herpes. However, both HSV-1 and HSV-2 can cause disease on the same parts of the body¹. Herpes infection typically results in the presence of one or more blisters that will eventually break to leave painful sores that can sometimes take over a week to heal.

HSV-1 and HSV-2 are both commonly transmitted through contact with lesions, sores, or fluids from an infected individual, and following primary infection the viruses are transported along the sensory neurons where they reside in a period of latency in the trigeminal and sacral ganglia. Throughout an infected individual's life, these viruses can re-emerge causing recurrent symptomatic episodes, although these outbreaks tend to reduce in severity and frequency over time.

HSV-1 is being increasingly found in genital infections, and this is likely to result from both an increase in age at primary infection as well as changes in sexual behaviour². Oral infection with HSV-1 provides a significant level of protection against subsequent genital infection. In the UK, rates of HSV-1 infection in childhood have decreased, with HSV-1 antibody prevalence in 10-14 year olds dropping from 34 % in 1986-7, to just 24 % in 1994-5². This means that an increasing number of adolescents lack any antibody protection against genital HSV-1 infection when they become sexually active.

HSV-1 is almost always the cause of herpetic eye infections, and can result in conjunctivitis, acute retinal necrosis, uveitis and keratitis³. If left untreated these infections can result in serious complications, including blindness. Indeed HSV keratitis is commonly cited as the leading cause of infectious blindness in the developed world³. Although far less common, HSV-2 can also affect the eye, particularly in neonates since the virus can be transmitted from an infected mother during birth⁴⁻⁸.

Other serious complications of HSV infection include disseminated disease, meningitis (more often associated with HSV-2 than HSV-1), and encephalitis (most commonly caused by HSV-1). HSV encephalitis is a relatively rare but very serious condition, and in the absence of effective treatments the mortality rate can be as high as 70 %⁹. Rapid and accurate diagnosis of is therefore essential and PCR is now considered the gold standard for identifying almost all HSV infections, with

remarkably high sensitivity and specificity¹⁰. At Micropathology Ltd, we use PCR for the rapid detection of HSV in a wide range of patient samples.

The most common treatment for HSV infections is the antiviral drug Acyclovir that is generally very effective. Drug resistance amongst immunocompetent patients is rare (<1 %), but can affect between 2.5-11 % of immunocompromised patients¹¹. Micropathology Ltd. offers an additional test to detect acyclovir drug resistance in HSV-1.

References

1. Akhtar J., Shukla D. (2009). Viral entry mechanisms: cellular and viral mediators of herpes simplex entry. *FEBS J*, **276** 7228-7236.
2. Vyse A.J., Gay N.J., Slomka M.J., Gopal R., Gibbs T., Morgan-Capner P., and Brown D.W. (2000). The burden of infection with HSV-1 and HSV-2 in England and Wales: implications for the changing epidemiology of genital herpes. *Sexually Transmitted Infections*, **76** 183-187.
3. Farooq A.V. and Shukla D. (2012). Herpes simplex epithelial and stromal keratitis: an epidemiologic update. *Surv. Ophthalmol.* **57** 448-462.
4. Ganatra J. B., Chandler D., Santos C., Kuppermann B., and Margolis T.P. (2000). Viral causes of acute retinal necrosis syndrome. *Am J Ophthalmol*, **129** 166-172.
5. Van Gelder R.N., Wilig J.L., Holland G.N., and Kaplan H.J. (2001). Herpes simplex virus type 2 as the cause of acute retinal necrosis syndrome in young patients. *Ophthalmology*, **108** 869-876.
6. Rummelt V., Folberg R., Rummelt C., Palay D.A., Mathers W.D., Parys-van Gindereuen R., Krachmer J.H and Yi H. (1995). Bilateral herpes simplex virus type 2 keratitis: A clinicopathologic report with immunohistochemical and ultrastructural observations. *Ger J Ophthalmol*, **4** 116-22.
7. Tran T.H, Stanescu D., Caspers-Velu L., Rozenberg F., Liesnard C., Gaudric A., Lehoang P., Bodaghi B. (2003). Clinical characteristics of acute HSV-2 retinal necrosis. *Am J Ophthalmol*, **137** 872-879.
8. Grose C. (2012). Acute retinal necrosis caused by herpes simplex virus type 2 in children: reactivation of an undiagnosed latent neonatal herpes infection. *Semin Pediatr Neurol*, **19** 115-118.
9. Jouan Y., Grammatico-Guillon L., Espitalier F., Cazals X., Francois P., and Guillon A. (2015). Long-term outcome of severe herpes simplex encephalitis: a population-based observational study. *Crit Care*. **19** 345.
10. Strick L.B. and Wald A. (2006). Diagnostics for herpes simplex viruses: is PCR the new gold standard? *Mol Diagn Ther*, **10** 17-28.

11. Schmidt S., Bohn-Wippert K., Schlattmann P., Zell R., and Sauerbrei A. (2015). Sequence Analysis of Herpes Simplex Virus 1 Thymidine Kinase and DNA polymerase Genes from over 300 Clinical Isolates from 1973 to 2014 Finds Novel Mutations That May Be Relevant for Development of Antiviral Resistance. *Antimicrob agents and chemotherapy*, **59** 4938-4945.