

Human herpesvirus 1

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GENERAL INFORMATION

Human herpesvirus 1

Herpes simplex virus typ 1
Herpes simplex-Virus Typ 1
HHV-1

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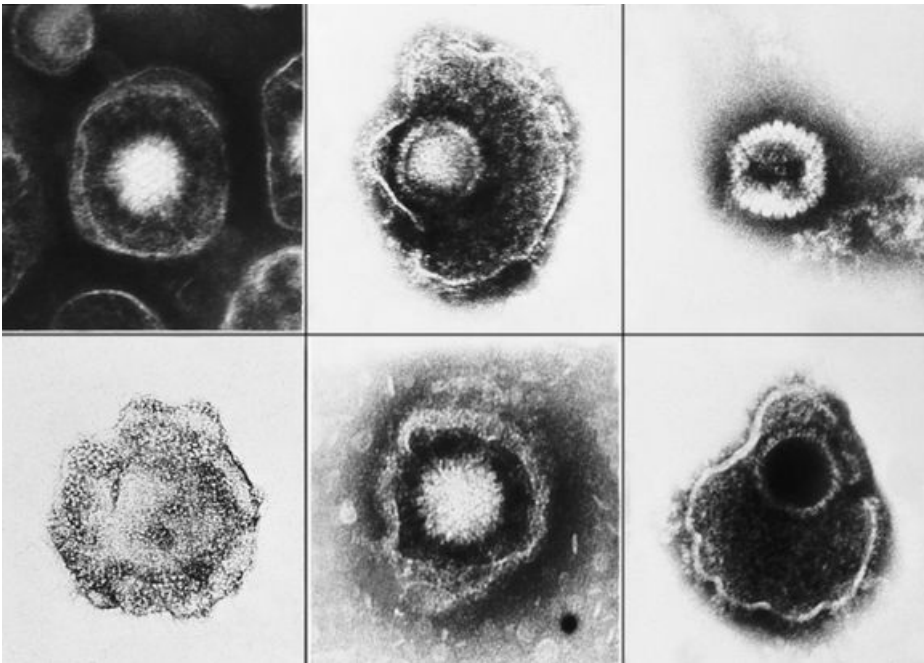
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Category: Virus

Genus: Simplexvirus

Risk group: 2
Biological agents that can cause human disease and might be a hazard to employees; they are unlikely to spread to the community; there is usually effective prophylaxis or treatment available.

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This image is composed of a montage of six transmission electron microscopic (TEM) images of viruses that are members of the Herpesviridae family including the chickenpox varicella zoster virus (VZV), also known as Human herpesvirus 3 (HHV-3), and herpes simplex virus, type 1 and 2 (HSV-1, HSV-2). CDC/ Dr. Erskine Palmer
<https://phil.cdc.gov/QuickSearch.aspx?key=true>

Medical significance

As seen by antibody levels in 70% of the European population, herpes infections are widespread, but usually take a harmless course. In cases in which they result in complications, however, they are serious and in some cases fatal. As a result, herpes viruses must not be underestimated.

Reference: 04033

OCCUPATIONAL SAFETY AND HEALTH

Sector | Activity | Protective measures | Inactivation/Decontamination | Occupational health care

SECTORS

- Health services
- Dental medicine
- Social paedagogy
- Childcare
- Cosmetics
- Laboratories

Reference: [04038 10025](#)

ACTIVITIES

- Work involving contact to the facial regions / mouth regions / saliva
- Increased reactivation risk in work with high stress factors

Reference: [04038 10025](#)

PROTECTIVE MEASURES

The following protective measures apply to specific activities in laboratories, the husbandry of laboratory animals and biotechnological activities. For further information see [TRBA 100](#), [TRBA 120](#), [TRBA 500](#).



Technical measures

Where tasks intentionally involve biomaterials, their identity must be verified and documented routinely.

Areas in which the biomaterial is processed must be isolated from other areas and labelled with the 'Biohazard' warning symbol and protection level 2.

The doors of the area within which the protection level applies must open in the direction of the escape route and be equipped with an inspection window.

Where a health hazard posed by bioaerosols cannot be eliminated, the relevant activities must be performed in a microbiological safety cabinet (MSC). For detailed information on activities in MSCs, see leaflet B 011 of the BG RCI (German Social Accident Insurance Institution for the raw materials and chemical industry).

Wash basins, disinfectant dispensers, disposable towels and hand detergents must be available.

Water faucets and disinfectant dispensers must be operable without the use of the hands.

Laboratories must offer suitable eyewash facilities.

All surfaces and areas that could come into contact with biological agents must be easy to clean, liquid-tight and resistant to detergents and disinfectants. A seamless wall-floor joint must be effected.

Windows and doors must be kept closed while work is in progress.

Work areas are to be maintained in a clean and tidy state. Only tools and devices that are actually needed may remain on the benches.

Pipettors must be provided and used. Mouth pipetting is not permitted.

If the use of pointed or sharp instruments cannot be avoided, they must be disposed of in suitable containers after use.

The release of biological agents must be minimised during the opening of technical equipment.

Catch basins must be in place to ensure that open sample containers are prevented from turning over during work operations.

Clearly labelled, closed, rigid, liquid-tight and unbreakable vessels that can be disinfected from the outside must be provided and used for the in-house transport of biological agents.

Transport of biological agents outside the plant is subject to the regulations governing hazardous goods (class 6.2).

Suitable containers must be available for the collection of waste that constitutes biological agents.

Organisational measures

The number of staff must be limited to the actual requirements, and access to the area in which the protection level applies must be restricted to authorized persons.

An instruction manual must be prepared. Prior to beginning their activity and subsequently at least once a year, verbal and work-related instruction must be provided to staff members to familiarise them with the hazards and protective measures as laid down in the instruction manual. DGUV Informative Publication 213-016 (BGI/GUV-I 853) contains a prototype instruction manual on 'activities involving biological agents of Risk Group 2' in accordance with the German Ordinance on Biological Substances.

The instruction process must also include advice in occupational medicine and safety.

Restrictions of employment for expectant and nursing mothers must be observed in accordance with the German Maternity Protection Act.

Injuries must be reported immediately to the person in charge.

Personal protection - body protection

Suitable protective clothing must be worn (at least lab coats).

During the processing of infectious tissues, the protective clothing must be complemented by disposable aprons.

Remove protective clothing when leaving the area in which the protection level applies.

Keep protective clothing separate from normal clothing.

Personal protection - hand protection

Depending on the results of the risk assessment, the use of protective gloves may be mandatory for certain activities.

The skin protection plan must be observed.

Personal protection – eye and face protection

Depending on the results of the risk assessment, protective goggles or face protection may be necessary.

Personal protection - respiratory protection

Depending on the results of the risk assessment, a respiratory protection device may be necessary.

Respiratory protection equipment must be worn for only a limited period of time. This period must be defined in the risk assessment.

Occupational hygiene

The consumption and storage of food and alcohol/tobacco in the protection level area is forbidden.

The wearing of jewellery, watches and rings on the hands and the forearms is not permitted.

Fingernails are to be kept short.

Following completion of work and prior to leaving the work area, hands are to be disinfected, washed and re-moisturised according to the skin protection plan.

Skin protection and skin care agents must be made available in contamination-proof containers.

Contaminated protective clothing and shoes are to be collected safely and decontaminated, cleaned and disposed of centrally.

Work clothing must not be cleaned at home.

The cleaning regulations for employees, equipment and workplaces must be defined in a hygiene plan.

Insects and pests in the working area must be regularly controlled.

Vaccination

None available.

Reference: 00001 99999

INACTIVATION / DECONTAMINATION

Disinfection measures must be carried out by proven means and procedures. For detailed information see the following lists: DVG - Animal Husbandry (German Association for Veterinary Medicine, Accommodation and Husbandry of Animals), DVG - Food Area, [VAH](#) and RKI. Officially ordered disinfection measures (decontamination) required by the authorities may be carried out only with disinfection agents included in the [RKI list](#).

Furthermore, the Industrie Association Hygiene and Surface Protection ([HO](#)) supplies lists of statements of companies on the efficacy of different products. The information in this register is based on statements of the respective companies.

Surface disinfection: e.g. with Terralin PAA (8% solution, 60-min exposure time). Hand disinfection: e.g. with Sterillium Virugard (2-min exposure time).

A suitable autoclave must be available in the same building.

Externally contaminated test vessels must be disinfected before opening.

Work areas and working equipment must be decontaminated before the performance of maintenance measures. For further information see [TRBA 100](#) ('Technical Rules for Biological Agents').

Contaminated solid wastes, liquid cultures and suspensions containing pathogens are to be collected in appropriate containers and deactivated.

Reference: [00001 04025](#)

OCCUPATIONAL HEALTH CARE according to [ArbMedVV](#)

Optional health care:

In the case of tasks specifically involving contact and tasks involving incidental contact with biological agents classed as Risk Group 2 under the Biological Agents Ordinance (Biosstoffverordnung, [BioStoffV](#)) or which involve a comparable risk, the employer must offer an optional health care. This does not apply when on account of the risk assessment and on account of the protective measures taken it can be assumed that there is no risk of infection.

An optional health care must also be offered if as a result of the exposure to biological agents

- a serious infectious illness is to be expected and post-exposure prophylactic measures are possible, or
- an infection has resulted.

MORPHOLOGY AND PHYSIOLOGY

MORPHOLOGY

Herpes simplex viruses are enveloped and contain an icosahedral capsid. Their diameter equals 120 - 300 nm.

Reference: [04033](#)

INFORMATION ON MOLECULAR BIOLOGY

Genome

Herpes simplex virus 1 possesses a linear, double-stranded DNA genome with a length of 152 kb.
EMBL-ID: X03839.1:2002

Reference: [04033](#)

OCCURRENCE / NATURAL HABITAT

FREE-LIVING / HOST BOUND

This biological agent is host-dependent parasitical.

Reference: [04033](#)

HOSTS

Humans.

Reference: [04033](#)

GEOGRAPHIC DISTRIBUTION

Worldwide.

In developed countries, 70% of the adult population have antibodies against HSV-1; this figure is 100% in developing countries.

Reference: [04033](#)

PATHOGENICITY / PATHOGENIC PROPERTIES

CHARACTERISTIC OF PATHOGENICITY

Human-pathogenic (causes diseases in humans).

Reference: [04033](#)

ALLERGENICITY / SENSITISING EFFECT

An allergic / sensitising potential is not known.

Reference: [04033](#)

DISEASE

DESCRIPTION

Herpes labialis, eczema herpeticum, herpes encephalitis, herpes retinitis (aka herpetic retinitis), herpes sepsis.

Reference: [04033](#)

ZOONOSIS

Zoonosis (transmission between animals and humans): Yes

Primates as well as rabbits and rodents can be infected, but do not represent a natural reservoir for human herpes viruses.

Reference: [04033](#)

INCUBATION PERIOD

1 - 26 days

Reference: [04033](#)

SYMPTOMS AND COURSE OF DISEASE

Herpes viruses fundamentally cause latent infections; that is, they remain present in the body and may be reactivated and cause disease again when the person is suffering from stress or other illnesses. During this latency period, herpes simplex viruses are in the nerve ganglia and spread via the nerves if reactivated.

Herpes labialis: The initial infection may range from being asymptomatic to an inflammation of the entire oral mucous membranes. Particularly in children, it may be accompanied by fever and a general sensation of illness. Small, liquid-filled blisters on the lips and around the mouth – commonly called "cold sores" – are the most common symptom. The blisters generally heal after eight to ten days without scars if no secondary bacterial infection develops. Herpes labialis may recur throughout a lifetime after the initial infection; a so-called latent infection which is normally quiescent, but may be reactivated by emotional stress or fever, develops.

Eczema herpeticum: Together with chronic skin disease, herpes may occur in the form of so-called herpes eczema covering large areas. The eczema is often accompanied by a strong feeling of illness and should be treated, particularly in children.

Herpes encephalitis: Herpes encephalitis occurs as a complication of eczema herpeticum, but also in initial infections or reactivations. It is a serious central nervous system disorder and is accompanied by central nervous system deficits and oedema. If not treated, it is fatal in approx. 70% of cases.

Herpes retinitis: A disease in which the herpes virus penetrates the retina via the nerve tracts of the eye and causes inflammation there is referred to as herpes retinitis. This often occurs after previous herpes encephalitis (even after years). The retinal inflammation may result in blindness.

Herpes sepsis: So-called herpes sepsis is one of the most serious herpes disorders, even though the term "sepsis" is generally used only for bacterial infection. It is a long-lasting viremia, that is, a condition characterized by the circulation of viruses in the blood.

Reference: [04033](#)

LETHALITY

If not treated, herpes encephalitis is fatal in approx. 70% of cases.

Reference: [04033](#)

THERAPY

Very good and specific antiviral drugs are available against herpes infections, e.g. aciclovir. There are aciclovir-resistant strains which can be treated with foscarnet or ganciclovir.

Reference: [04033](#)

PROPHYLAXIS

Hygiene.

Following exposure to UV radiation or facial surgery, reactivation of herpes labialis can be prevented with aciclovir.

Reference: [04033](#)

EPIDEMIOLOGY

TRANSMISSION ROUTES / PORTALS OF ENTRY

Transmission takes place percutaneously (through the skin).

Transmission takes place orally (by ingestion).

Reference: [04033](#)

PATHOGEN RESERVOIR

(A)symptomatic excretors.

Reference: [99999](#)

INCIDENCE

In developed countries, 70% of the adult population have antibodies against HSV-1; this figure is 100% in developing countries.

Reference: [04033](#)

LEGAL PRINCIPLES / REGULATIONS

LAWS AND ORDINANCES

Ordinance on Safety and Health Protection at Workplaces Involving Biological Agents (Biological Agents Ordinance - [BioStoffV](#))

Law for the regulation of genetic engineering (Genetic Engineering Act - [GenTG](#)) and associated regulations (only in German).

Public notice of the list risk-rated donor organisms and recipient organisms for genetic engineering of 5. July 2013

Ordinance on Occupational Health Care ([ArbMedVV](#))

Law for the protection of working mothers ([MuSchG](#)) (only in German)

TECHNICAL RULES AND OTHER REGULATIONS

[TRBA 100](#)

Protective measures for activities involving biological agents in laboratories

[TRBA 250](#)

Biological agents in health care and welfare facilities

[TRBA 400](#)

Guideline for risk assessment and for the instruction of employees in relation to activities with biological agents

[TRBA 450](#)

Criteria for the classification of biological agents

[TRBA 462](#)

Classification of viruses into risk groups (only in German)

[TRBA 500](#)

Basic measures to be taken for activities involving biological agents

LINKS

Public Health Agency of Canada (PHAC)

[Information provided by the Public Health Agency of Canada for this pathogen](#)

German Federal Institute for Occupational Safety and Health (BAuA)

[Epidemiology of work-related infectious diseases \(only in German\)](#)

European Association of Zoo and Wildlife Veterinarians (EAZVV)

[Information provided by the EAZVV \(European Association of Zoo and Wildlife Veterinarians\) for this pathogen](#)

Further Links:

[Information provided by the Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen \(IQWiG\)](#)

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Quelle: 00001

Informationen aus den Technischen Regeln für Biologische Arbeitsstoffe, insbesondere aus:
Information from the technical rules for biological substances, in particular from:

- [TRBA 100](#)

Schutzmaßnahmen für Tätigkeiten mit biologischen Arbeitsstoffen in Laboratorien; Ausgabe:
Oktober 2013, geändert 2014

Protective measures for activities involving biological agents in laboratories; Edition: October 2013,
amended 2014

- [TRBA 120](#)

Versuchstierhaltung; Ausgabe: Juli 2012, geändert 2017

Experimental animal husbandry; Edition July 2012, amended 2017

- [TRBA 500](#)

Grundlegende Maßnahmen bei Tätigkeiten mit biologischen Arbeitsstoffen; Ausgabe: April 2012

Basic measures to be taken for activities involving biological agents; Edition April 2012

Quelle: 01462

[TRBA 462](#)

Einstufung von Viren in Risikogruppen; Ausgabe: April 2012

Classification of viruses in risk groups; Edition April 2012

Quelle: 02014

Verordnung zur arbeitsmedizinischen Vorsorge ([ArbMedVV](#))

Ordinance on Occupational Health Care ([ArbMedVV](#))

Quelle: 04025

Bekanntmachung des Robert Koch-Institutes: „Liste der vom Robert Koch-Institut geprüften und
anerkannten Desinfektionsmittel und -verfahren“, Stand: 31. August 2013

Bundesgesundheitsbl. 2013 • 56:1706–1728

Quelle: 04033

Public Health Agency of Canada: „Herpes simplex virus pathogen Safety data sheet - Infectious
Substances“, 2011.

Quelle: 04038

Deutsche Gesetzliche Unfallversicherung, Bundesverband: „Information: Handlungsanleitung für die
arbeitsmedizinische Vorsorge nach dem Berufsgenossenschaftlichen Grundsatz G 42 „Tätigkeiten
mit Infektionsgefährdung“, 2010

Quelle: 10025

Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (Hrsg.): Forschung Projekt F 5198/A91 (I.
Fischer, St. Schurer, R. Jäckel, M. A. Rieger) Epidemiologie arbeitsbedingter Infektions-krankheiten
(2013). www.baua.de/de/Publikationen/Fachbeitraege/F5198.html

Quelle: 99999

Angabe des Bearbeiters

Indication of the author

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