

# Glanders; a bio weapon

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## ABSTRACT

Glanders, caused by the bacterium *Burkholderia mallei*, is a highly contagious and often fatal disease primarily affecting horses, donkeys, and mules. It can also be transmitted to humans, albeit rarely. This abstract provides a concise overview of glanders, including its clinical manifestations, historical significance, and current challenges in prevention and treatment. Glanders has a long-standing history, with documented evidence dating back to ancient times, and has posed significant threats to both animal and human health throughout the ages. The disease is characterized by respiratory symptoms, skin lesions, lymph node enlargement, and systemic manifestations. Strict biosecurity measures, early detection, appropriate antibiotic therapy, and supportive care form the basis of treatment. Prevention involves implementing robust biosecurity protocols, surveillance programs, and research efforts for vaccines and diagnostics. Understanding the historical context, clinical findings, and strategies for prevention and treatment is crucial for minimizing the impact of glanders and safeguarding both human and animal populations from its devastating consequences.

### Introduction

Etiological agent of Glanders is *Burkholderia mallei* [1]. It is a highly contagious disease of equine family. Mainly it effects horses but also seen in donkeys and mules. It has zoonotic importance so can be transmitted to humans as well. Evidence of Glanders dates back to ancient times proving that this disease is present for a long time. Characteristic sign of this disease is nodule formation in skin of the infected animal and in respiratory system. When the nodules get ruptured, pus filled in it released. This release of pus can be a serious cause of spread of this disease. This disease is of highly zoonotic importance can be used as a bio weapon [2]. In recent years concern to this disease increased rapidly. World Health Organization (WHO) and World Organization for Animal Health (OIE) taking notices of this disease due to the high rate of spreading infection. We are fighting with Glanders with the help of treating the infection, early diagnosis, strict biosecurity cautions and quarantine. Researches are still going on to prevent the disease with the help of vaccination.

### History

The relationship between Equidae family and humans is ages old, So does the history of glanders. The disease has a serious impact on humans as well as animals' health and this has been recognized centuries ago. Hippocrates described a disease whose sign and symptoms resembles just like glanders giving us the proof of presence of this disease. Glanders remained life threatening disease throughout the history. In Europe and North America, glanders has reached endemic level in 19<sup>th</sup> and 20<sup>th</sup> centuries [3]. Most outbreaks occur in the urban areas because horses were widely used for the transportation purpose. in humans which are working to the horses are more likely to get infected including Veterinary doctors, grooms and laboratory workers. Causative agent of glanders was unknown at that time. But later on, *Burkholderia mallei* was discovered. Research workers focused on making vaccine to prevent the disease and to prevent the economic losses. During mid-20<sup>th</sup> century, some antibiotics proved to be useful against the causative bacterium. Contempt of the advancements, glanders still is a global concern, especially in the areas of high horse populations and having low Veterinary infrastructure. There are public health risks and risk for economic losses as well if any case of glanders is reported in the developing countries. In recent years, concern over the misuse of glanders bacterium has been increased as it is used as a bio weapon and unavailability of the vaccine globally

### Clinical findings:

Glanders involves multi-systemic disorders that are mainly depending on the species exaggerated

#### Horses

Respiratory Symptoms involve flu like signs. And glandular infections such as coughing, dyspnea and nasal discharge[4]. It maybe purulent and thick and sometimes blood tinged. Skin Lesions involve ulcers or nodules on the surface of skin. These ulcers are especially present around the limbs, lips and nostrils[5]. From these lesions abscesses may develop that maybe filled with pus and might be painful[6]. Under the jaw area, enlargement and swelling of the lymph nodes is very common in this disease. Swelling might be in the throat latch area. Elevated body temperature proves the Presence of infection. High grade fever is

recorded in horses during the infection. Progressive weight loss occur and loss of appetite. Animal become very weak and lethargic.

#### Humans

Respiratory Symptoms are just like in horses, in humans it mainly cause respiratory problems. Chest pain, persistent cough and dyspnea are some signs seen in human beings. Ulcers or Skin nodules may develop, particularly on the arms and hands of the individuals who contact directly with the infected animals or contaminated fomites[7]. High grade fever also seen in humans with sweating and chills. Swollen lymph nodes present in the groin region and armpits. While other generalized signs involve muscles pain, headache, fatigue, joint pain and symptoms like flu. Prevention and control of glanders needs many aspects to be covered including early detection, suitable medical interventions and proper biosecurity actions.

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