SLOW VIRUS INFECTIONS

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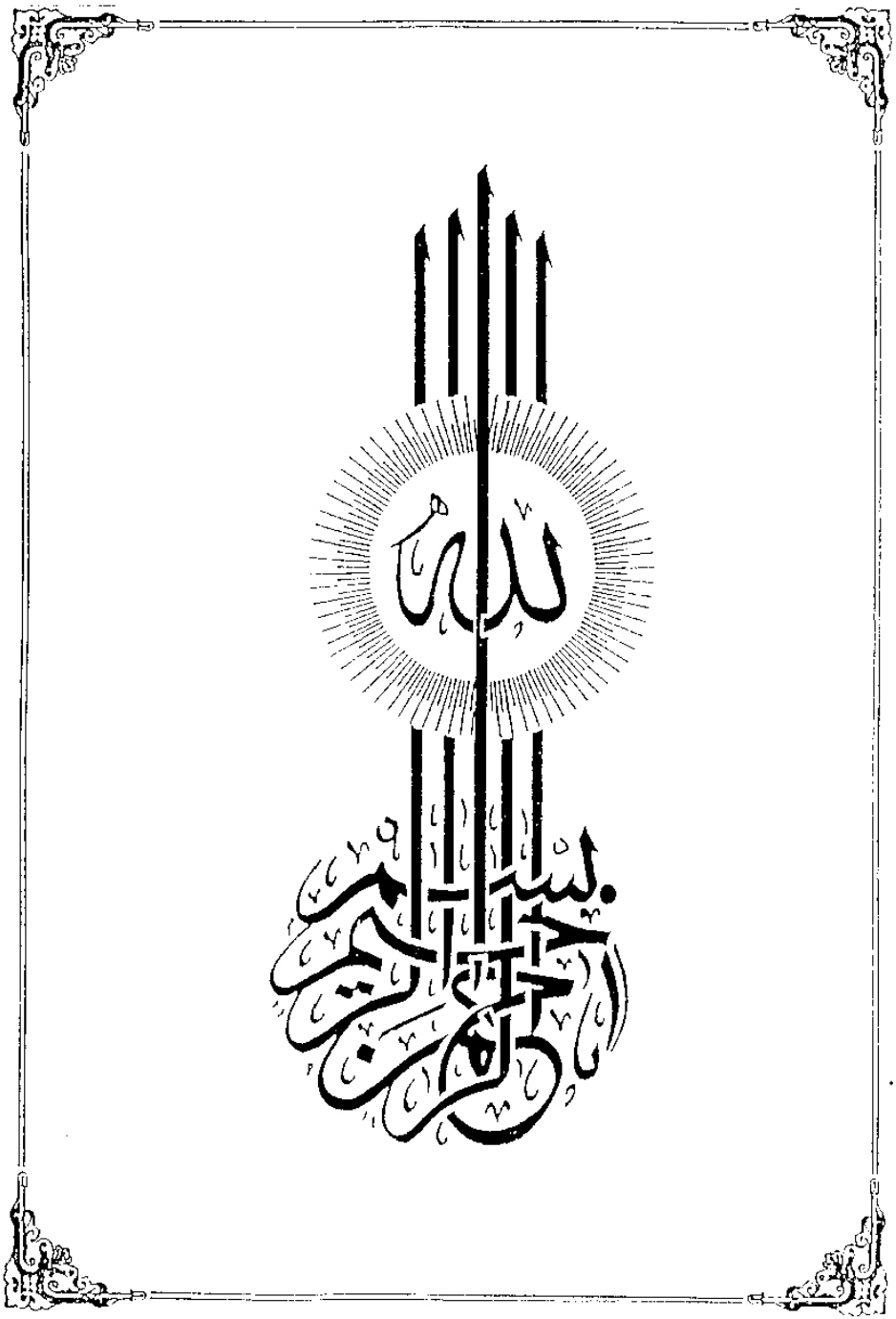

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INTRODUCTION

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The study of slow virus infection is of special value for medicine. The problem of slow virus infections is currently in the focus of attention of neurologists and epidemiologists due to the firmly established infectious nature, the inevitability of a fatal outcome of such diseases and the absence of sufficiently effective means of their control and prevention.

This problem is also of particular interest for pediatricians because most of these diseases occur in pediatric age.

AIM OF THE ESSAY

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The aim of the present essay is to throw light on the causative agent, epidemiology, clinical picture and methods of diagnosis of slow virus infections.

HISTORY OF DISCOVERY

History of the discovery of slow virus infections :

The history of the study of slow virus infections as a scientific problem, however actually began in the middle of the 20th century after major successes had been scored in medical virology.

The rapid development of methods of virology researchs including the elaboration of new techniques of tissue and cell cultures, the development of electron-optical examination techniques, the discovery and putting into practice of fluorescent antibody techniques and many other advancements in the instrumental study of viruses promoted much further researchs into viral persistance in the mid-fifties of our century in which the infectious process was studied both in Vitro and in Vivo (Timakov and Zuev 1970).

In March 1954 Professor Sigurdsson delivered three lectures on observations of three slow infections of sheep.

Sigurdsson suggested this type of diseases as " Slow infections " on grounds of the following three main features :

1. A very long primary period of latency lasting from several months to a few years.

2. A prolonged course begining with the manifestations of clinical symptoms and ending in sever disorder or death.

3. Restriction of the infection to one host and development of anatomical lesion in only one organ or one tissue system.

Truely Sigurdsson immediatly made a Substantial reservation, he did not exclude the possiblity that with the accumulation of knowledge on the subject, the above stated characteristics may be subject to change.

The work of Hadlow (1959), who pointed out the great similarity between the neurology, clinical symptoms, and epidemiology of kuru of man and scrapie of sheep, induced Gajdusek and Gibbs (1968) to reconsider their approach to the problem of the infectious aetiology of Kuru in the light of slow virus infections (Gajdusek et al, 1968) .

Toward the begining of the sixties it became clear that viruses not only cause acute infections,

they not only prove capable of maintaining latent infections, but may serve as aetiological agents of slow infections.

The concept of " Slow viruses " which persumed that the causative agents of slow infections, posses special properties was soon undermined by the discovery that the Visna virus is capable of causing a rapidly developing cytopathic effect on infection of a sheep cell culture (Sigurdsson et al, 1960).

At the same time the study of subacute sclerosing panencephalitis confirmed that it is induced by measles virus which is known for many years as a typical causative agent of an acute infectious disease.

The problem of slow virus infections can not be limited to a special group of infectious agents.

Slow infections constitute one of the possible forms of interaction between the virus and the host a form whose development is primarily caused by the persistance of the infectious agents (Timakov and Zuev 1977).

DEFINITION AND ETIOLOGY

Difinition and Aetiology of slow virus infections :

Viruses can either produce acute infections or establish a variety of relationships with their host that result in persistent infections (Hotchin J. 1974).

In acute infection, The virus enters the host, replicates, during a short incubation period with subsequent development of symptoms typical of the given agent, the host immune and non specific defenses act to rid it of the virus.

On the other hand, in persistent infections the viruses are not cleared by the host and may persist for months or years.

Persistent infection, include the following categories :

a) Latent infection, In which the whole virus can not be detected by the conventional diagnostic methods for a period after the intial infection because it can be either in a defective form or be integrated into cell genome. The virus is said to be masked.

Under the effect of some activating agents the virus reproduce and symptoms of acute infection may develop. The most familiar example is Herpes infections.

b) Chronic infections, in which some viruses never completely disappear from the host after the intial infection and establish chronic infection. The most familiar example is viral hepatitis.

c) Slow infections, The term " Slow Virus infection " was first described by Sigurdsson 1954 to mean an infection in which the agent continues to multiply with a very long asymptomatic incubation period of many months to few years followed by slow but consistent development of the symptoms of the disease ending in severe disorder and death (Sigurdsson 1954).

There are a number of subacute and chronic central nervous system diseases in which a virus can reproducibly be isolated from the brain and the preponderance of evidence points to slow virus infections, as the aetiology. These diseases may be classified according to the causative agents as :