RABIES VACCINES
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목록요약:
광견병 예방백신의 발달과정 및 종류별 성행에 관하여 종합적으로 고찰하였다. 본문은 사람 및 가축
에 있어서의 예방백신에 관한 고찰과 야생동물에 대한 면역에 관한 사항을 다루었다. 본문의 요지는
한국의광범위한학회 1987년도 총회에서 특집자료로 발표한 바 있다.

RABIES VACCINES FOR MAN AND DOMESTIC ANIMALS

The association of rabies in man with the disease in dogs has been known since ancient times. Carni-
vores generally constitute an enzootic reservoir. Man and all warm-blooded animals are susceptible
to the disease. Natural infection in man is always related to exposure to a rabid animal and the onset
of symptoms may vary from days to many months and possibly years. Variation in the incubation period
depends largely upon the site and severity of injury and the amount of infectious virus transferred at
the time of exposure. Mortality in untreated cases approaches 100% in man and treatment is ineffective
after symptoms have appeared. Rabies vaccine injected before exposure or within a short time after
exposure can prevent the development of disease.

1. Fixed Virus

Rabies virus belongs to the Rhabdo virus group
(Rhābdo-a Greek word meaning “rod”) which
includes approximately 40 different virus spec-
ies. The virus measures about 180 nm in length,
with a diameter of about 75 nm, and is bullet
shaped. The nucleocapsid contains RNA.

Pasteur\textsuperscript{5,26} discovered that rabies virus
always found in the central nervous system of
animals dying of the disease and that it could
be passaged in rabbits with eventual alteration
of its characteristics. This alteration or “fixation”
of wild strains of rabies virus (Street Virus)
shortens the incubation time to a fixed period
of 5 to 8 days. Fixed strains remain neurotropic
and their virulence for the central nervous sys-
tem of animals is often increased but infectivity
by the subcutaneous route is markedly decrea-
sed. This modification of a virus by serial pas-
sage in a different host provided not only the
first rabies vaccine, but also a classical model
for the development of live, attenuated vaccines
for the control of many other infectious diseases.\textsuperscript{50}

2. Vaccines Prepared from Nervous Tissue:

Pasteur’s vaccine\textsuperscript{23,46} consisted of a suspen-
sion of infected rabbit spinal cord that had
undergone slow drying over potassium hydro-

oxide for varying periods of time. Cords dried for 5-6 days were usually non-infective; those treated for shorter periods contained viable virus. With minor modifications, this type of post-exposure treatment was used in man for the next 60 years. (Table 1)

<table>
<thead>
<tr>
<th>Date</th>
<th>Originator</th>
<th>Type of vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1885</td>
<td>Pasteur</td>
<td>Mature CNS : Partly inactivated</td>
</tr>
<tr>
<td>1908</td>
<td>Fermi</td>
<td>Mature CNS : Partly inactivated</td>
</tr>
<tr>
<td>1911</td>
<td>Semple</td>
<td>Mature CNS : Inactivated</td>
</tr>
<tr>
<td>1925</td>
<td>Hempt</td>
<td>Mature CNS : Inactivated</td>
</tr>
<tr>
<td>1955</td>
<td>Fuenzalida and Palacios</td>
<td>Immature CNS : Inactivated</td>
</tr>
<tr>
<td>1965</td>
<td>Svet-Moldavskij and others</td>
<td>Immature CNS : Inactivated</td>
</tr>
<tr>
<td>1965</td>
<td>Gispen and others</td>
<td>Immature CNS : Inactivated</td>
</tr>
</tbody>
</table>

Three vaccines were derived from adult animal brain tissue: those of Fermi, Semple, and Hempt. Fermi-type vaccine is a mixed live, attenuated and killed vaccine. The Hempt vaccine is ether inactivated. A number of workers favoured this method because the ether treatment may remove encephalitogens principally myelin.

Semple-type vaccine is the most widely used in man for post-exposure therapy. This is prepared by inoculating healthy young rabbits or goats with seed virus. The brains are removed from moribund animals and saline suspensions of the brain tissue are inactivated with phenol. The presence of myelins in this mature nervous tissue is associated with a risk of post-vaccination encephalitic reaction in man.

The brains of very young animals are considered to be free from the encephalitogenic factor. In 1955 Fuenzalida and Palacios prepared a vaccine from the brains of infected suckling mice. This type of vaccine is widely used in South America both for post exposure therapy and for pre-exposure vaccination of persons at high risk. Similar vaccines have been prepared in the USSR and South Africa from suckling rat brains and in the Netherlands from suckling rabbit brains. These vaccines, like those prepared in adult brain, are good immunogens and are easily and cheaply prepared. They appear safer than mature brain vaccines but some cases of neurological disorders have been reported.

3. Vaccine Prepared from Avian Tissue:

Because of the problems associated with nervous tissue vaccines, several groups of workers focused their attention on avian embryonic tissue for vaccine preparation, specifically for rabies prophylaxis in animals (Table 2).

<table>
<thead>
<tr>
<th>Date</th>
<th>Originator</th>
<th>Type of vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948</td>
<td>Koprowski and Cox</td>
<td>Chick embryo : Attenuated</td>
</tr>
<tr>
<td>1953</td>
<td>Komarov and Hornstein</td>
<td>Chick embryo : Attenuated</td>
</tr>
<tr>
<td>1956</td>
<td>Peck, Powell and Culbertson</td>
<td>Duck embryo : Inactivated</td>
</tr>
</tbody>
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