

Inoculation pinta in chimpanzees⁽¹⁾

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It is generally agreed by students of infectious disease control that the study of pinta has been hindered by failure to establish the disease in laboratory animals. For example, it is not clear if there are distinctive strains of pinta, or if the behaviour of the organism differs according to the geographical region in which it exists.

Recently, treponemes were successfully transferred from a pinta patient in Mexico to a chimpanzee (Kuhn, Varela, Chandler, and Osuna, 1968). In concurrent collaborative studies, other chimpanzees were inoculated with treponemes from pinta patients in Venezuela. We report here a preliminary account of the success of the latter inoculations.

Material and methods

Three male chimpanzees, previously shown to be non-reactive to both treponemal and nontreponemal tests for syphilis, were inoculated at multiple sites with lesion material obtained from two untreated human patients with pinta. The Indian patients were brought to Caracas from the Amazonas Territory of Venezuela for participation in the experiment. Both were in the secondary stage of the disease and had never received treatment.

Clear serum containing *Treponema carateum* was obtained by the abrasion of pinta lesion areas, mixed with sterile normal saline, and injected intradermally or applied to lightly abraded areas of the chimpanzees' skin. The presence of treponemes in the inoculum was verified in each case by darkfield examination.

Results

The Table summarizes the serological changes and the development of lesions during the first 183 days after inoculation.

65 days after exposure one chimpanzee (Jake Barnes) developed a darkfield-positive lesion at the

TABLE *Development of lesions and serological reactivity in three chimpanzees within 183 days after inoculation with Treponema carateum*

Animal	Day after inoculation			
	Darkfield-positive lesion developed	Serological reactivity appeared		
		FTA-ABS	VDRL slide	TPI
Jake Barnes	Site 1— 65 Site 2—121	121	155	N*
Melvin	93	N	N	N
James	†	N	N	N

*N = nonreactive result. By 183 days after inoculation no reactivity had yet appeared.

†No darkfield-positive lesion had developed by 183 days after inoculation.

site of an intradermal inoculation over the right zygoma. The lesion was first noted as a 3-mm. erythematous papule. During the course of its development in the succeeding 118 days, it remained oedematous and erythematous, and at 183 days was a plaque approximately 25 mm. in diameter. Desquamation of the surface of this lesion was not a notable sign, although fine scales were observed from time to time.

Material obtained from the lesion contained motile treponemes as demonstrated by darkfield examination. In a direct fluorescent antibody stain of the lesion material, the treponemes showed affinity for a fluorescein-conjugated antiserum to *Treponema pallidum*.

On the 121st day after inoculation, Jake Barnes developed an additional lesion at another inoculation site: the skin over the lateral surface of the right forearm. The lesion was a 4-mm. erythematous papule surrounded by a ring of desquamation. During the succeeding 62 days it increased to 20 mm. in diameter, while retaining its initial characteristics.

A second animal (Melvin) developed a primary lesion 93 days after intradermal inoculation of the skin on the lateral surface of the right thigh. The lesion was a 3-mm. erythematous papule surrounded

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by desquamation. Treponemes were demonstrated in serous material from the lesion by darkfield examination and by immunofluorescent staining. During the succeeding 90 days, the lesion slowly enlarged to 10 mm. in diameter. The central portion was covered with a light-coloured, tough, pliable crust which, when lifted, revealed 'carpet-tack' projections on the undersurface. The orifices of the corresponding hair follicles were patulous. Bloody serum oozed readily from the follicles when the lesion was squeezed.

A third chimpanzee (James) failed to develop a lesion by 183 days after inoculation.

Reactivity to the fluorescent treponemal antibody-absorption (FTA-ABS) test (U.S. Department of Health, Education, and Welfare, 1969) appeared in the serum of the first animal by the 121st day after inoculation. Reactivity to the VDRL slide test (U.S. Department of Health, Education, and Welfare, 1969) appeared 155 days after inoculation. The second animal to develop a lesion did not become reactive to the FTA-ABS or VDRL slide tests by 183 days. The third animal, which did not develop a lesion, had not become reactive to either of the two tests by this time. None of the animals had developed reactivity to the *Treponema pallidum* immobilization (TPI) test (U.S. Department of Health, Education, and Welfare, 1969) by the 183rd day after inoculation.

Discussion

In two separate geographical areas of the Americas, chimpanzees have now been infected with pinta.

Though no significant differences are yet apparent in the disease picture produced in the two groups of animals, the opportunity presents itself to compare the pathology and kinetics of serological change induced by the two 'strains' of *T. carateum*.

In addition to the continued clinical and serological observations of the infected chimpanzees, attempts are in progress to transfer the infection to other species of laboratory animals.

Summary

A *Treponema carateum* infection has been established in two of three chimpanzees inoculated with material from patients with pinta in Venezuela.

References

- KUHN, U. S. G., III, VARELA, G., CHANDLER, F. W., JR., and OSUNA, G. G. (1968) *J. Amer. med. Ass.*, **206**, 829
- U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (1969) 'Manual of Tests for Syphilis 1969'. PHS Publication No. 411. U.S. Government Printing Office, Washington, D.C. 20402

Inoculation de la pinta aux chimpanzés

SOMMAIRE

On a réussi à créer une infection par *Treponema carateum* chez 3 chimpanzés auxquels on avait inoculé du matériel provenant de malades atteints de pinta, au Vénézuéla