Téléphone Central/Switchboard: (+41 22) 791.21.11
Direct: (+41 22) 791.4997
Email: riccardo.wittek@who.ch

In reply please refer to: S2/180/4
Prière de rappeler la référence:

Your reference:
Votre référence:

Dr Stefan Lanka
Ludwig-Pfhustr.1b
70176 Stuttgart
Allemagne

3 December 2001

Dear Dr Lanka,

Thank you for your letter and your interest in smallpox. The demonstration by electron microscopy of orthopoxvirus virions in clinical samples of smallpox patients, and the use of electron microscopy for the diagnosis of smallpox can be found in the following references:

Nagler, FPO and Rake, G (1948) The use of the electron microscope for the diagnosis of variola, vaccinia and varicella. J. Bacteriol., 55: 45-51.
Van Rooyen, CE and Scott, GD (1948) Smallpox diagnosis with special reference to electron microscopy. Canad. J. Publ. Hlth., 39: 467-477.

The development of negative staining by Brenner and Horne in 1959 made electron microscopy more feasible as a regular diagnostic procedure. This was demonstrated by Cruickshank, JG, Hedson, HS and Watson, DG (1966) Electron microscopy in the rapid diagnosis of smallpox. Lancet, 2: 527-530.

In 1971, electron microscopy became an integral part of the diagnostic procedures used by the WHO Collaborating Centres in Atlanta and Moscow.

At the time these reports were published, procedures for the biochemical characterization of variola virus particles, which allowed to distinguish them from other members of the orthopoxviruses were not yet available. These virions were therefore characterized on the basis of biological criteria, such as pock morphology on the chorioallantoic membrane of developing chick embryos, and ceiling temperature. By these criteria, the viruses causing smallpox were shown to have characteristic properties, which distinguished them from other orthopoxviruses.

Before smallpox was eradicated, many clinical specimens were collected and stored in different laboratories. These collections were later transferred to either one of the two WHO Collaborating Centres in Atlanta or Koltsovo, where they are still safely stored. As restriction enzyme analysis and later direct DNA sequencing became available as a means of characterizing viral genomes, several isolates were analyzed by these new techniques.

The results of these studies showed that the viruses isolated from smallpox patients were all very closely related and different from other orthopoxviruses, confirming their classification as a separate species, as initially proposed on the basis of biological criteria.

Yours sincerely,

Dr Guénaël Rodier
Director
Department of Communicable Disease
Surveillance and Response