

Molecular Epidemiology of Measles Virus in Kenya

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Measles causes significant morbidity and mortality globally. Many countries have embarked on immunization programs to control and prevent measles outbreaks and eventually to eliminate endemic measles. Kenya is currently in the outbreak control and prevention stage for measles. Measles virus genotyping is important for molecular epidemiological purposes, including the documentation of the elimination of endemic measles virus strains from a country, and mapping of transmission pathways. In this study, we collected clinical specimens from measles outbreak cases in 2002 in Kenya for measles virus genotyping. We were able to isolate and/or detect measles virus in 10 cases from 5 of the 8 provinces in Kenya. All these Kenyan measles strains were determined to be genotype D4 strains when compared to the standard World Health Organization-designated measles virus reference strains. Interestingly, the Kenyan D4 strains clustered into two distinct D4 subgroups. In addition, the inclusion of other published D4 measles strains in this analysis indicated that there are four distinct D4 clusterings, or subgroups: Montreal-like, India-like, Johannesburg-like, and Ethiopia-like. This is the first measles molecular epidemiology study in Kenya and establishes the current endemic measles strain as genotype D4. Importantly, this study shows that the Kenyan D4 strains are distinct from the B3 measles strain found in West Africa and the D4 strains reported in Ethiopia. *J. Med. Virol.* 71:599–604, 2003. © 2003 Wiley-Liss, Inc.

KEY WORDS: genotype; strains; variants; surveillance

INTRODUCTION

Measles is an illness characterized by fever and maculopapular rash, as well as coryza, conjunctivitis, and/or cough. Secondary bacterial pneumonia, which

can be a cause of mortality in malnourished children, and acute postinfectious encephalitis are both serious complications of measles infections. The World Health Organization (WHO) estimates that there were more than 30 million measles cases, resulting in 777,000 deaths in the year 2000 [World Health Organization, 2002]. The Global Measles Strategic Plan, co-sponsored by the WHO and UNICEF, aims to reduce measles mortality by half by 2005, and to interrupt measles transmission in whole regions [World Health Organization, 2002]. Many countries have implemented measles vaccination programs and are working toward the elimination of measles virus.

The Kenya Expanded Program on Immunization (KEPI) was established as a unit within the Ministry of Health in 1980 with the goal of immunizing all children in the country against the six traditional vaccine preventable diseases: tuberculosis, polio, diphtheria, pertussis, tetanus, and measles. Before the establishment of KEPI, immunization in Kenya was given only in some municipalities [Lema, 1975]. Even with the availability of immunization, measles epidemics still occurred in urban areas, and mainly affected children younger than 5 years of age [Hayden, 1974; Muller et al., 1977; Wanyama, 2002]. Kenya started routine single-dose measles vaccinations in children at 9 months of age, throughout the country in 1980, at the inception of KEPI. Measles vaccine coverage was 43% country-wide before 1980, 70% in 1987, and approximately 79% in 1998 [Hjerregaard, 1989; Central Bureau of Statistics, 1998]. From a global perspective of accelerated measles control and elimination, Kenya is still at the measles outbreak-control phase. Morbidity data from the Ministry of Health show that in 1994 alone,

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Xerophthalmia And Measles In Kenya Proefschrift

J. J. Sauter



Xerophthalmia And Measles In Kenya Proefschrift:

The Cornea in Measles N.W.H.M. Dekkers, 2012-12-06 The need to study the corneal complications of measles was not very obvious Everyone knew of the kerato conjunctivitis of measles and considered it to be an innocuous feature of the disease Every medical worker in developing countries knew that measles in under or malnourished children runs a very serious course leading to e g corneal The latter are seen frequently that medical workers in complications developing countries are in the habit of speaking of post measles blind ness The aspect of the cornea in post measles blindness is reminiscent of the keratomalacia in vitamine A deficiency and kwashiorkor It was suggested that in measles the last reserves of vitamine A are exhausted thereby precipitating the keratomalacia The virological origin of measles keratitis has been more or less neglected in literature up till now This study provides clinical and laboratory data concerning the kerato conjunctivitis of measles gathered from a number of hospitalized children in a rural area of Kenya The merits of this monograph is that it gives a careful description of the clinical course of measles keratoconjunctivitis and that it emphasizes the role of the virus infection in addition to protein deficiency and vitamine A deficiency in the etiology of post measles blind ness The possible roles of exposure in semi comatose patients and of the application of traditional autochthone medicine are mentioned Measles is no longer seen in developed countries but will still be encountered in the developing countries **The East**

African Medical Journal ,1982 **Vitamin A Deficiency** Alfred Sommer, Keith P. West, 1996 Many studies over the past decade and a half have indicated that vitamin A status is an important determinant of health The World Bank now estimates that vitamin A intervention programs are some of the most cost effective health strategies globally This new book written by leading investigators in the field is the first to synthesize the many important studies to date The authors identify and quantify the biological clinical and public health impact of vitamin A deficiency on childhood growth mortality and morbidity including anemia and blindness They deal with the epidemiologic and biological basis of these findings and with the prevention and treatment of these disorders particularly of measles diarrhea and xerophthalmia Alternative approaches to identifying individuals and populations in need of intervention alternative strategies for improving vitamin A and carotenoids and the relationship between vitamin A and immunity are discussed This comprehensive volume on a critically important and widespread nutritional deficiency will serve as a unique resource for nutritionists physicians public health workers and policy makers and will be especially relevant to clinicians and researchers in international health **Causes of Blindness**

Detected in 19 Schools for the Blind in Tanzania J. J. Sauter, 1978 *Nutrition Abstracts and Reviews* ,1978

Evaluation of Certain Food Additives and Contaminants Joint FAO/WHO Expert Committee on Food Additives, 1982

Characterization of Vitamin A Deficiency and Xerophthalmia in Indonesia, and Design of Effective

Intervention Program Indonesia. Nutritional Blindness Prevention Project, 1980 **Annals of the New York Academy of Sciences** Thomas Lincoln Casey, Gilbert Van Ingen, Charles Lane Poor, Edmund Otis Hovey, Ralph Winfred Tower, 1977

Records of meetings 1808 1916 in v 11 27 **Dissertation Abstracts International** ,1976 Technical Report Series ,1981 **WHO Technical Report Series** ,1950 **Viral Diseases of the Eye** Richard W. Darrell,1985 **Ophthalmic Literature** ,1976 *Papers on Children's Vision* ,1983 *Food and Nutrition in Health and Disease* N. Henry Moss,Jean Mayer,New York Academy of Sciences,1977 *Ophthalmic Paediatrics and Genetics* ,1985 **Tropical Doctor** ,1977

The Retinoids Michael B. Sporn,Anita B. Roberts,DeWitt S. Goodman,1984 The Retinoids Volume 1 covers the chemistry and biology of retinoids with an emphasis on the role of retinoids in nutrition and in vision After briefly discussing the discovery and nomenclature of retinoids this six chapter volume describes the chemical and physical properties of natural and synthetic retinoids as well as the retinoidal benzoic acid derivatives The book goes on describing various reactions with radioisotopes for the synthesis of retinoids and related compounds Considerable chapters explain the chemical physical and biological methodologies for separating and measuring **Nutrition Reviews' Present Knowledge in Nutrition** ,1984 Abstract A basic but comprehensive authoritative and up to date text for dietitians and clinical nutritionists presents 58 overview papers on various areas of modern nutrition prepared by experts in their respective fields The 58 papers of the text are organized among 9 principal themes including energy concepts and related requirements luding obesity and undernutrition macronutrients and metabolism fat soluble and water soluble vitamins macrominerals Ca P Mg Na K microminerals Fe Zn Cu Se Co F Si Mn Cr I nutritional needs in special situations infancy pregnancy longevity malnutrition parenteral feedings immune response nutritional approaches to disease prevention and therapy and the key historical events in nutrition information development wz *Vitamin A Deficiency and Its Control* Jack Christopher Bauernfeind,1986 Abstract A reference text for nutrition researchers clinical nutritionists and other health care professionals provides 19 authoritative reviews by international experts concerning various aspects of the cause symptoms and treatment of vitamin A deficiency Topics focusing on vitamin A deficiency include global incidences the physiologic and metabolic basis of the major symptoms of deficiency nutrient nutrient interactions its pathogenesis and clinical aspects its control by education and public health approaches its control by diet and supplements its control in various regions India Central America the Philippines Indonesia its effect in pregnancy lactation and in the nursing infant and programs for its prevention and treatment Related topics include the effect of vitamin A status on the immune system and on cancer induction The activities of major organizations involved in the eradication of vitamin A deficiency also are discussed

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