Brown F, Griffiths E, Horaud F, Petricciani JC (eds): Safety of Biological Products Prepared from Mammalian Cell Culture.
Dev Biol Stand. Basel, Karger. 1998, vol 93, pp 97-107

Human Diploid Cell Strains (HDCS) Viral Vaccines

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Key word: Human diploid cell strain (HDCS), **Wi-38,** MRC-5, history, viral vaccines, adverse events.

Abstract Since the development in 1961 by Hayflick and Moorhead of a human diploid cell strain (HDCS) culture system for isolating viruses, HDCS-derived human vaccines have been licensed worldwide for polio IPV and OPV (multiple strains), rabies (Pitrnan-Moore L503 3M strain); rubella (RA27/3 strain): measles (Edmonston-Zagreb strain); varicella-zoster (Oka strain); mumps (Rubini strain) and hepatitis A (HM-175. CR-326-F'. and GBM strains). Many of these widely-used vaccines now have at least a 20-year record of safety after extensive, ongoing pharmacovigilance. Serious vaccine-associaiedevents are rare, and appear to reflect the activity of the live viruses replicated in the HDCS or of the inactivated viruses or other proteins added during manufacture. There is no credible association of reactions lo the HDCS substrate or a hypothetical contaminant derived from it.

HISTORY

Until 1961, virus cultures for the production of licensed vaccines were produced in embryonated eggs or through disaggregation of primary animal tissues, which were used with relatively little passage or subcultivation [1]. This changed when Hayflick and Moorhead published the first description of human diploid cell strains (HDCS), which had finite population doublings and which could be used as a culture system for isolating and growing viruses [2]. The strain that was most characterized, called WI-38, was stocked in low passage for vaccine manufacture. WI-38 was derived from foetal lung, which appears to be the easiest tissue from which to grow HDCS. This human cell culture system for viruses was accepted quickly by medical scientists in many parts of the world, and HDCS vaccines soon went into clinical trials: adenovirus vaccine [3] and oral poliovirus vaccine trials in 1963 [4], measles vaccine clinical trials in 1964 [5], and the first rubella vaccine trials in 1965 [6]. The Cell Culture Committee, Permanent Section For Microbiological Standardization, charged with educating scientists about WI-38, had its first meeting in 1963 (Opatija, former-Yugoslavia), where a system of standardized master cell hanks, working cell banks. and documentation on «Minimum Requirements» for HDCS