

the United States have shown that it has a high sensitivity and specificity in imaging infection especially in patients with AIDS where a sensitivity of 94% and a specificity of 91% was obtained.

Further work has used a shorter lived isotope which gives better technetium-99m (Tc-99m). This was linked to polyclonal IgG using an iminothioline linker. Unfortunately

blood pool activity remains high throughout the test and it has poor results in infections in the chest and abdomen. In the pelvis and limbs however where blood pool activity is less results in identifying infection were similar to those obtained using labelled leucocytes of gallium-67 citrate. In addition it may also be used to identify inflammatory arthritis.

THE HEPATITIS B VIRUS (HBV) INFECTION AND ITS PREVENTION BY A RECOMBINANT-DNA VIRAL SURFACE ANTIGEN (rec-HBsAg) VACCINE

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INTRODUCTION

This paper contains an updated review of the main aspects related to the development and characterization of a yeast-derived rec-HBsAg, which was directly followed by the scale-up production as well as the quality assurance and control of the corresponding vaccine, under GMP* and GLP* standard procedures. Pre-clinical experiences were carried out in animal models (including the HBV-challenging of immunized and control chimpanzees) and clinical trials were performed by (or achieved in agreement with) health authorities in Cuba and several countries. Double-blind controlled three phase protocols, according to strict ethical and methodological guidelines for clinical trials, demonstrated at least a similar and more often a better performance for the Cuban vaccine than parallel immunizations with other commercially available rec-HBsAg vaccines. These results enabled the patent application and sanitary registration followed by commercialization of millions of doses of the product in more than 15 countries since 1990.

Hundreds of thousands of peoples of different ages, sexes and sexual behaviours, geographic areas and nationalities, ethnical groups and occupations, life styles and risk of exposition, social and economical levels, received the Cuban rec-HBsAg vaccine, including controlled studies and vaccination campaigns in Cuba and abroad (see table).

The first vaccination program in America, including the complete populations of newborn and children up to one year old, primary and secondary school children and high infection risk groups, is currently ongoing in Cuba using this vaccine. The program envisages the vaccination of the whole Cuban population under 20 before the year 2 000.

Controlled Studies/	Rt	Age	Vac./ Dose (µg)	N	SRC	GMT	S.E.
Cuban Health workers	IM	20-46	CV10	86	94-100	90-280	*
			CV20	150	94-100	110-520	**
(HW) and patients contacts (PC) 0-1-2 mont s	SC	20-46	SK20	95	87-100	30-60	*
			CV10	43	100	150-350	***
			CV20	43	100	250-400	***
			SK20	46	91-94	20-30	**
Cuban HW and PC 0-1-6 mont s	IM	38	CV10	20	100	2e ³	**
			CV20	15	100	> 1e ⁴	***
			SK20	17	100	1.5e ³	**
HW and PC in 5 countries ^b 0-1-2	IM	adults	CV20	805	97-100	51-98 ^a	**
	ID	23	SK20	59	87	11 ^a	*
			CV2	43	93	39 ^a	*
Idem 0-1-6	IM	adults	CV20	107	100	93-95 ^a	**
			SK20	59	98	48 ^a	**
Children: Havana 0-1-2	IM	0 ^c	CV10	157	92-96	360-440	*
Havana 0-1-6	IM	2-12	SK10	23	89	53	*
			CV10	143	100	5e ³ -17e ³	*
Moscow 0-1-2	IM	0.5-10	CV10	60	95	83 ^a	*
Bogota 0-1-2	IM	1-10	CV10	58	100	100 ^a	n.a.
Aged prs ^d 0-1-6	IM	81	CV20	52	100	78 ^a	**
Soldiers: Cuban 0-1-2	IM	19-26	SK20	63	92-100	90-720	**
			CV20	123	95-100	500-1e ³	**
Russian 0-1-3		20	CV20	146	95	95 ^a	*
African st ^e 0-1-2	IM	14-21	CV20	245	98	96 ^a	*
Indians ^f 0-1-2	IM	adults	CV20	60	93-100	73-75 ^a	n.a.

Rt=Route; IM, SC, ID=Intramuscular, subcutaneous, intradermal; Age=Age in years (mean or range); N=Number of persons; SRC=Seroconversion (%); GMT=Geometric mean or range of titers (IU/L); e³=10³; CV2, 10, 20=Cuban vaccine 2, 10, 20 µg per dose; SK 10, 20=Commercial vaccine 10, 20 µg per dose; S.E.=Side effects: ***20-40%, **10-20%, <10% with symptoms; n.a.=not available; ^a(column 7)=% with titers >99.9 IU/L; ^bColombia, Brazil, Perú, Venezuela and Viet-Nam; ^cNeonates from HBV infected mothers; ^dCubans; ^estudents; ^fand mestizos from South America.

*Good manufacturing and Good Laboratory Practicess