

BIOLOGICAL ACTIVITY OF ALL-TRANS RETINOL₂, ALL-TRANS RETINENE₂ AND THE
13-CIS AND 9-CIS ISOMERS OF RETINOL₂

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In previous work, the biological activity of retinol₂ from natural sources was found to be 30 - 40 % of that of all-trans retinol₁ (Shantz and Brinkman, 1950; Farrer et al., 1952; Sundaresan and Cama, 1961). All-trans retinol₂, all-trans retinene₂ and isomers of retinol₂ were synthesized by Schwieter et al. (1962). The biopotency of all-trans retinol₂ and all-trans retinene₂ was now compared with that of all-trans retinol₁. In addition, the activity of 13-cis retinol₂ and 9-cis retinol₂ was examined using all-trans retinol₂ as reference substance.

In the vaginal smear assay according to Pugsley et al. (1944), an activity of about 50 % was found for the all-trans retinol₂ as well as for the all-trans retinene₂ (Table 1).

Table 1. Comparative examination of all-trans retinol₁, all-trans retinol₂ and all-trans retinene₂; 13 animals per dose

Substance	dose mcg	mean reac- tion time	rel. activity (equimolar basis)	confid. limits $\bar{X}_L = \bar{C}_M \pm t_{C_{SM}}$
all-trans retinol ₁	36,0	20,53	100	
	54,0	26,00		
	81,0	28,23		
all-trans retinol ₂	46,8	17,30	51,1 \pm 3,8	46,0 - 56,0
	70,2	21,76		
	105,3	24,76		
all-trans retinene ₂	46,8	18,61	57,0 \pm 3,2	52,2 - 61,7
	70,2	23,23		
	105,3	24,92		

With the same method, the relative activity of 13-cis retinol₂ and 9-cis retinol₂ was compared with that of all-trans retinol₂. The results obtained (Table 2) are in good agreement with those of the retinol₁ series (Ames et al., 1955).

Table 2. Comparative examination of all-trans retinol₂, 13-cis and 9-cis retinol₂; 13 animals per dose

Substance	dose mcg	mean reac- tion time	rel. activity (equimolar basis)	confid. limits $\bar{X}_L = \bar{C}_M' \pm t_{CSM}$
all-trans retinol ₂	42,8	11,38	100	
	64,3	15,38		
13-cis retinol ₂	57,1	11,15	69,96	66,4 - 73,6
	85,7	14,07		
9-cis retinol ₂	194,8	11,00	27,68	26,0 - 29,3
	292,2	14,23		

With a modified vaginal smear assay method (Boguth et al., 1960), no difference between all-trans retinol₂, all-trans retinene₂ and all-trans retinol₁ acetate could be found (Table 3).

Table 3. Determination of the biopotency of all-trans retinol₂ and all-trans retinene₂ with a modified vaginal smear assay method

Substances	mean effective dose (I.U.)	relative biological activity
all-trans retinol ₁ - acetate	629,9 x : 1,126	100,0
all-trans retinol ₂	560,6 x : 1,102	112,4
all-trans retinol ₁ - acetate	763,3 x : 1,095	100,0
all-trans retinene ₂	653,3 x : 1,102	116,8

The modified vaginal smear assay method with which the higher values for all-trans retinol₂ were obtained differs from the usual one

inasmuch as the response is measured already two days after the vitamin administration. The lower potency obtained for all-trans retinol₂ with the conventional method may therefore be explained by the lesser storage ability for retinol₂ compared with retinol₁.

R e f e r e n c e s

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