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Homologation and Intramolecular Cyclisation Reactions in Aliphatic Deoxyuridine Analogues Series

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The cyanation of 1-(2,3-epoxypropyl)uracil (**VIII**), followed by the ethanolysis of the resulting 3'-cyano compound **VI** (R=H) to 3'-ethoxycarbonyl derivative **VII** (R=H), led to the synthesis of 1-(2,4-dihydroxybutyl)uracil (**II**, R and R^1=H). The oxidation of 1-allyluracil by $KMnO_4$ gave 1-(2,3-dihydroxypropyl)uracil (**I**, R=H) (Scheme 1).

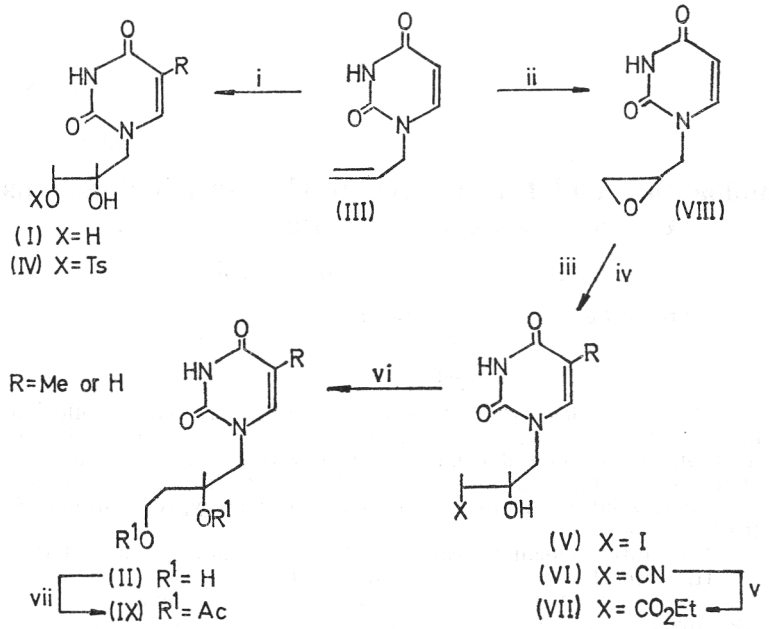
The intramolecular transformations of suitably activated **I** (R=H) were studied and the structures of the resulting 2,3-dihydro-2-hydroxymethyl-7H-oxazolo[3,2-a]pyrimidin-7-one (**X**), 1(2,3--dihydroxypropyl)-2-*O*-methyluracil (**XI**) and their mesyl, azido, and trityl derivatives are descibed (Scheme 2). In addition the 2-azidomethyl- (**XXI**) was converted into 2-aminomethyl- (**XXIII**) 2,3-dihydro-7H-oxazolo[3,2-a]pyrimidin-7-one.

Recently we described the synthesis of 1-(2,3-dihydroxypropyl)uracil (**I**, R=H), 1-(2,3-dihydroxypropyl)thymine[1] (**I**, R=Me), and the homologation of the latter into 1-(2,4-dihydroxybutyl)thymine[2] (**II**, R=Me and R^1=H) as part of our continuing interest in the structural, stereochemical and biochemical features of the dihydroxyalkyl nucleoside analogues and their relations to naturally occuring nucleosides[3–5]. As we discussed in the previous paper[6] the intramolecular transformations of the aliphatic thymidine analogue afforded a number of bicyclic products, which could be related to the behaviour of the natural nucleosides. The present paper deals with the chemistry and intramolecular transformations of the suitably activated 1-(2,3-dihydroxypropyl)uracil (**I**, R=H) (Scheme 1).

Compared with the earlier reported oxidation of 1-allyluracil **III** into 1-(2,3-dihydroxypropyl)uracil[1] (**I**, R=H) by the silver acetate-iodine method[7], a partial oxidation of **III** by $KMnO_4$ in water-acetone[8] under carefully controlled conditions[9,10] gave compound **I** (R=H) in much higher yields.

Although the homologation of 1-(2,3-dihydroxypropyl)- (**I**, R=Me) into 1-(2,4-dihydroxybutyl)-thymine (**II**, R=Me) was described to proceed successfully through the sequence of 3′-*O*-tosyl- (**IV**, R=Me), 3′-iodo- (**V**, R=Me), 3′-cyano- (**VI**, R=Me), and 3′-ethoxycarbonyl- (**VII**, R=Me) derivatives[2], we found it more convenient to prepare 1-(2,4-dihydroxybutyl)uracil (**II**, R=H) via the selective epoxidation[11] of 1-allyluracil (**III**) by *m*-chloroperbenzoic acid[12] in chloroform at 0 °C, followed by the nucleophilic C-3′ cyanation[13]

Scheme 1

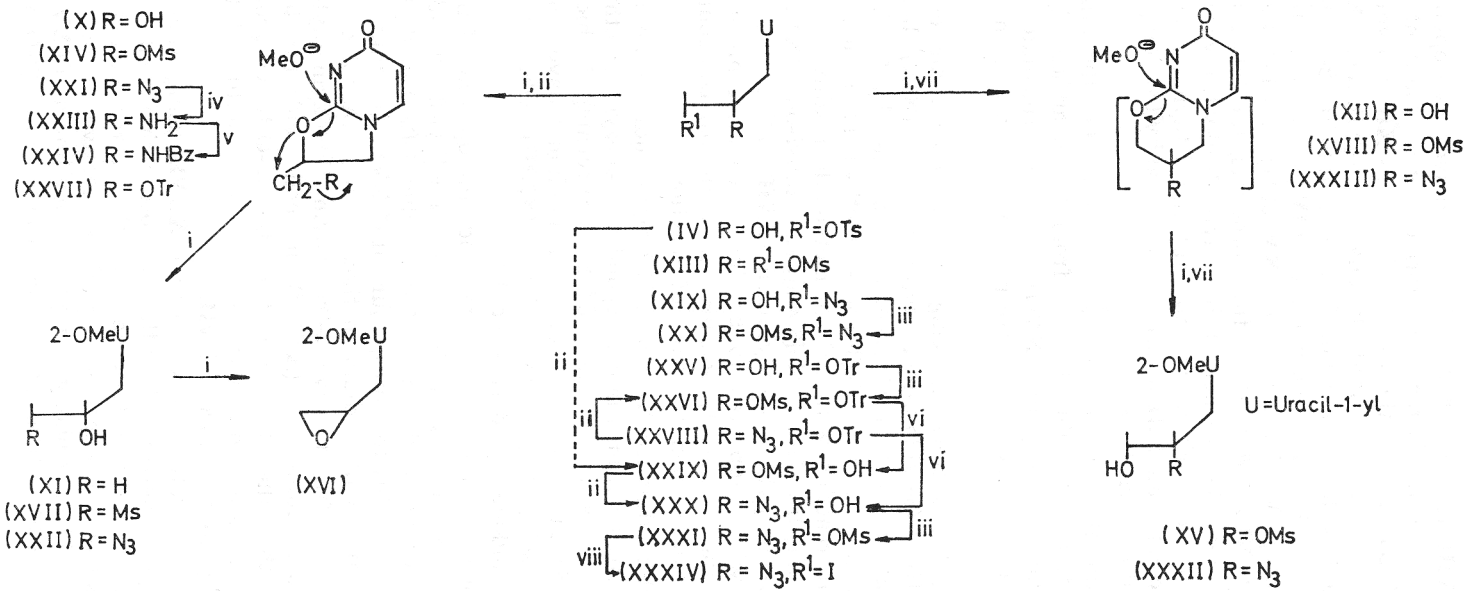


Reagents: *i*, 3.5% $KMnO_4$ in H_2O—Me_2CO at 10—15 °C; *ii*, *m*-Cl—$PhCO_3H$—$CHCl_3$ at 0 °C; *iii*, NaI—EtCOMe—HOAc; *iv*, KCN-50% EtOH; *v*, 6 mol dm^{-3} HCl in EtOH; *vi*, $LiAlH_4$-THF; *vii*, Ac_2O-py.

(KCN/50% EtOH) of the thus obtained 1-(2,3-epoxypropyl)uracil (**VIII** and Pinner's ethanolysis[14] (HCl/EtOH) of the resulting 1-(3-cyano-2-hydroxypropyl)uracil (**VI**, R=H) into 1-(3-ethoxycarbonyl-2-hydroxypropyl)uracil (**VII**, R=H) (Scheme 1). The $LiAlH_4$ reduction[15] of the latter afforded the product **II** (R and R^1=H) which was characterized as 1-(2,4-di-*O*-acetil-2,4-dihydroxybutyl)uracil (**IX**, R=H and R^1=Ac). The oxiran **VIII**, obtained in 74% yield, deserves special mention as the crucial intermediate in the shortened homologation sequence, but also as the required starting material for the synthesis of 1-(2-hydroxy-3-iodopropyl)uracil (**V**, R=H), which was earlier prepared[2] from the less accessible 1-(3-*O*-*p*-tolylsulphonyl-2,3-dihydroxypropyl)uracil (**IV**, R=H).

In continuation of our studies on the intramolecular cyclisation reactions in the aliphatic thymidine analogues series[6], treatment of 3'-*O*-tosyl- compound **IV** (R=H) with sodium methoxide effected transformations yielding 2,3-dihydro-2-hydroxymethyl-7H-oxazolo[3,2-a]pyrimidin-7-one [2,2'-anhydro-1-(2,3-dihydroxypropyl)uracil (**X**)] (Scheme 2) (up to 33%). The reaction time was shorter (3 h) than that required for the analogous conversion of the thymine derivative **IV** (R=Me) (30 h; 65% of a single product; cf. ref. 6). This relatively fast transformation of **IV** (R=H) however, enabled us to isolate the inter-

Scheme 2



Reagents: *i*, NaOMe—MeOH; *ii*, NaN_3-DMF; *iii*, MsCl-py; *iv*, H_2—Pd-black--MeOH; *v*, Bz_2O-py; *vi*, 5% HCl—$O(CH_2CH_2)_2O$; *vii*, AgOAc—MeOH; *viii*, NaI—EtCOMe.

mediary oxiran **VIII** (up to 18%) and 1-(2-3-dihydroxypropyl)-2-*O*-methyluracil (**XI**) (up to 16%), the latter being formed by concomitant ring opening of the 2,2'- **X** and, possibly, of the rather labile 2,3'- **XII**- anhydro compound. A similar reaction of 1-(2,3-dimethylsulphonyloxypropyl)uracil (**XIII**) (Scheme 2) with sodium methoxide in methanol yielded 2,3-dihydro-2-methylsulphonyloxymethyl-7H-oxazolo[3,2-a]pyrimidin-7-one (**XIV**, 28%), 1-(2-*O*-metylsulphonyl-2,3-dihydroxypropyl)-2-*O*-methyluracil (**XV**, 33%), and 1-(2,3-epoxypropyl)--2-*O*-methyluracil (**XVI**, 20%) as the final products, the latter being formed from the intermediary 1-(3-*O*-methylsulphonyl-2,3-dihydroxypropyl)-2-*O*-methyluracil [**XVII**]. In comparison with the analogous thymine derivative[6], the 2',3'-dimesyloxy- compound **XIII** afforded the 2,2'-anhydro compound **XIV** in lower yield, but also much faster

ring opening of the thus formed bicyclic structure. On the other hand the 2'-*O*-mesyl derivative **XV**, being formed from the insufficiently stable six--membered 2,3'-anhydro compound **XVIII** as the intermediate, was isolated in higher yields (33%) than the corresponding derivative in the thymine series (16%)[6].

In evaluating the factors inducing the intramolecular cyclisations of compound **I** (R=H), 1-(3-azido-2-hydroxypropyl)uracil (**XIX**), being prepared from **IV** (R=H) according to the procedure described by T. Sasaki et al.[16], was activated in the form of 1-(3-azido-2-methylsulphonyloxypropyl)uracil (**XX**). The latter in reaction with sodium methoxide readily cyclized yielding 2-azidomethyl-2,3-dihydro-7H-oxazolo[3,2-a]pyrimidin-7-one (**XXI**) (18%) and 1-(3-azido-2-hydroxypropyl)2-*O*-methyluracil (**XXII**) (74%). The formation of compound **XXII**, which appeared to be due to concomitant methoxide ion attack at C-2 of the chemically sensitive 2,2'-anhydro compound **XXI** was shown to be dependent upon the time of reaction.

2-Azidomethyl-2,3-dihydro-7H-oxazolo[3,2-a]pyrimidin-7-one (**XXI**) (Scheme 2) was also prepared from the corresponding 2-mesyloxymethyl compound **XIV** by a reaction with sodium azide in DMF[16]. Concerning the bicyclic product **XXI**, a catalytic (Pd-black) hydrogenolysis in methanol gave 2-aminomethyl--2,3-dihydro-7H-oxazolo[3,2-a]-pyrimidin-7-one (**XXIII**), which was characterized as the benzamidomethyl derivative **XXIV**.

In order to shed light on the formation and ring opening of the five-membered 2,2'-anhydro structures, 1-(3-*O*-triphenylmethyl-2,3-dihydroxypropyl)-uracil (**XXV**) was conveniently mesylated to give 1-(2-*O*-methylsulphonyl-3--*O*-triphenylmethyl-2,3-dihydroxypropyl)uracil (**XXVI**). The thus C-2' activated derivative was treated with sodium methoxide in methanol or with sodium azide in DMF (vide infra) to give 2-triphenylmethyloxymethyl-2,3-dihydro--7H-oxazolo[3,2-a]pyrimidin-7-one (**XXVII**) in good yields (up to 67%). This finding indicated that the steric effect of the 3'-*O*-trityl group not only directs the 2,2'- cyclisation, but also increases the stability of the resulting 3'-*O*-trityl-2,2'-anhydro structure **XXVII**.

The observed cyclisation of compound **XXVI**, using sodium azide as reagent, was in good agreement with the observation that under similar conditions, 5'-*O*-acetyl-2'-*O*-tosyluridine gave the corresponding 2,2'-anhydro compound[17] instead of the expected 2'-azido derivative. In our experiments, the expected 1-(2-azido-3-triphenylmethyloxypropyl)uracil (**XXVIII**) was isolated as by-product (33%). It is interesting to note that 1-(2-*O*-methylsulpho-

nyl-2,3-dihydroxypropyl)uracil (**XXIX**), being obtained by the detritylation of compound **XXVI**, afforded 1-(2-azido-3-hydroxypropyl)uracil (**XXX**) as the main reaction product. Compound **XXX** was conveniently converted into 1-(2-azido-3-methylsulphonyloxypropyl)uracil (**XXXI**).

While the transformations of the 2'-activated derivatives involved already described 2,2'-anhydro compounds and controlled ring opening of the thus formed bicyclic intermediates, 3'-activated mesyl compound **XXXI** afforded 1-(2-azido-3-hydroxypropyl)-2-*O*-methyluracil (**XXXII**) (56%) as the single product (Scheme 2), through the thermodynamically less favoured 2,3'-anhydro intermediate **XXXIII**. The similar conversion of 1-(2-azido-3-iodopropyl)uracil (**XXXIV**) into compound **XXXII** by a treatment with silver acetate in methanol proceeded in 50% yield. The iodo compound **XXXIV** was prepared from 2'-azido-3'-mesyloxypropyl derivative **XXXI** by a treatment with sodium iodide in butan-2-one.

The structures of the 1-(2,3-dihydroxypropyl)uracil derivatives (**XIII—XXXIV**) and of the 2,2'-anhydro compounds (**X—XXVII**) reported here (see Table) were characterized by their NMR spectra. Thus, the vicinal coupling canstants $J_{5,6}$ in the dihydroxypropyl derivatives **XIII—XXXIV** were around 8 Hz[1]. It is interesting to note that the vicinal coupling constants $J_{5,6}$ of the 2,2'-anhydro compounds **X—XXVII** were well defined and never larger than 7.3 Hz. While the C-6 resonances of the dihydroxypropyl compounds **XIII—XXXIV** (solution in DMSO-d_6) consisted of two sharp lines (centred at τ 2.39—2.52), the C-5 protons (centred at τ 4.39—4.49) exhibited doublets (J = 7.6—7.9 Hz) with secondary splittings (1.6—2.1 Hz), as shown in the spectra of the compounds **XIII**, **XXVI**, **XXVIII**, **XXIX**, and **XXXIV**. This finding, in good accordance with an examination of the NMR spectrum of 1-methyluracil[18], arises from the long range interactions of the C-5 protons with the N-3 protons and the a W coupling[19]. It is worth noting that the C-5 proton of the 3'-azido-2'-hydroxypropyl compound **XIX** exhibited an extraordinary upfield shift, appearing as a doublet at τ 5.52 and that the C-6 protons of all anhydro compounds **X—XXVII** reported here showing practically constant chemical shifts at τ 2.26 and 2.28.

The C-1' and C-3' geminal protons, near to the asymmetric C-2' centre, coupled with each other and each gave different coupling with the C-2' vicinal proton. These nonequivalences possibly resulted from unequal populations of conformers. Thus, the C-1' geminal protons of 2',3'-dihydroxypropyl derivatives **XIII—XXXIV** (with the exception of epoxy-compound **VIII** and azido derivatives **XIX**) exhibited two doubled doublets at τ 5.89—6.16 and 6.08—6.37 for 1'-H_a and 1'-H_b, respectively. The 1'-H_a and 1'-H_b protons of the 2,2'-anhydro compounds, however, disclosed doubled doublets at τ 5.95—6.05 and 5.63—5.80, respectively, and smaller coupling constants for the geminal protons (9.5—10.3 Hz) than those of the corresponding protons of the 2',3'-dihydroxypropyl derivatives (13.7—14.7 Hz). As it was expected C-3' and C-2' protons showed marked dependences upon the nature of the C-3' and C-2' substituents. The most pronounced influence, disclosed on the shifts of the protons situated at the α-positions to mesyl groups (downfield) and trityl groups (upfield), were in good accordance with recently reported results[1].

TABLE

NMR Spectra[a,b] *(τ Values)*

Compound	NH-3	H-6(d)	($J_{6,5}$=$J_{6,5}$)	H-5(d)	H-2′(m)	a(dxd) ($J_{1'a,2'}$)
(VII)	—1.23(s)	2.52	(7.8)	4.49	(obs.)*	6.19 (3.8)
(VII)[c,d]	0.89br(s)	2.58	(7.8)	4.20(dxd) (1.9)[e]	(obs.)*	5.86 (2.7)
(VIII)	—1.34(s)	2.46	(7.8)	4.44	6.7—6.8	5.98 3.4
(IX)[c,d]	0.99br	2.86	(7.9)	4.31(dxd) (1.9)[e]	4.61—4.83	5.84 (3.2)
(XIII)	—1.35(dxd) ($J_{NH,5}$ 2.0)	2.45	(7.8)	4.43(dxd) (2.0)[e]	4.82—4.94	5.89 (3.9)
(XV)[f]		2.66	(7.6)	4.22	5.10—5.31	5.86
(XVI)[d,g]		2.84	(7.6)	3.98	6.72—6.82	5.69 (2.4)
(XIX)	—1.19br(s)	2.50	(8.1)	5.52	6.12—6.14	6.2 (3.7)
(XX)	—1.3br(s)	2.45	(8.1)	4.44	4.97—5.12	6.01
(XXV)[d,h]	1.0br(s)	2.86	(7.6)	4.46(dxd) (1.5)[e]	5.87 (m)	5.99
(XXVI)[h]	—1.28(dxd) ($J_{NH,5}$ 1.9)	2.44	(7.6)	4.48(dxd) (1.9)[e]	4.43—4.52	5.97
(XXVIII)[d,h]	1.13br(s)	2.92	(7.9)	4.41(dxd) (1.6)[e]	5.97	
(XXIX)	—1.28br(s)	2.46	(7.9)	4.45(dxd) (1.9)[e]	5.14—5.30	5.96 (3.8)
(XXX)	—1.31br(s)	2.41	(7.9)	4.42	6.09 (m)	
(XXXI)	—1.38br(s)	2.39	(7.9)	4.39	(obs.)*	6.04 (3.4)
(XXXIV)	—1.36br(s)	2.41	(7.9)	4.40(dxd) (2.1)[e]	5.88—5.98	6.04
(X)	A)	2.28	(7.3)	4.23	4.88—5.11 (m)	6.0 (6.6)
(XIV)	A)	2.26	(7.3)	4.18	4.60—4.84	6.01 (6.6)
(XXI)	A)	2.28	(7.3)	4.19	4.71—4.96	6.05 (6.6)
(XXIV)[h,i]	A)	2.28	(7.3)	4.22	4.71—4.96	5.95 (7.1)
(XXVII)[d]	A)	(obs.)*	(7.3)	3.92	4.93—5.07	6.03 (5.6)

[a] See introduction to Experimental. [b] Values for doublets (d), triplets (t), quartets (q) refer to multiplet centres; (m) unresolved multiplets; coupling constants are given in Hz. [c] OEt and OAc protons signals are not recorded. (obs.)* Obscured by those of other protons. [d] Solution

H-1′ $J_{gem.}$	b(dxd) ($J_{1'b,2'}$)	a(dxd) ($J_{3'a,2'}$)	H-3′ $J_{gem.}$	b(dxd) ($J_{3'b,2'}$)	OH-2′ ($J_{OH,2'}$) or [OMsMe-2′]	O-3′ ($J_{OH,3'}$) or [OMsMe-3′]
	6.55	(obs.)*		7.72	4.69(d)	
13.7	(8.6)		15.4	(8.2)	(5.8)	
	6.28	7.34		7.47		
14.2	(7.8)	(4.1)	16.8	(8.5)		
	6.28	7.18—7.27		(obs.)*		
14.7	(5.7)	(m)				
	6.35		(obs.)*			
14.3	(7.9)					
	6.08	5.46		5.6		
14.7	(7.8)	(3.2)	11.7	(4.4)	[6.78(s)]	[6.71(s)]
——(m)	6.02	6.32	——(m)——	6.44	[6.89(s)]	4.65(t) (5.6)
	6.40	7.10		7.44		
14.7	(6.1)	(4.2)	4.4	(2.7)		
	6.51	6.65		6.81	4.38br(s)	
13.7	(8.6)	(3.7)	12.7	(6.1)		
——(m)——	6.08	6.16		6.40	[6.79(s)]	
		(3.7)	13.6	(5.1)		
	6.37	6.79	——(m)——	6.84	7.05(d)	
14.7	(7.8)				(4.6)	
——(m)——	6.03		(obs.)*			
					[6.91(s)]	
——(m)——	6.48	6.59		6.81		
		(3.5)	10.5	(5.7)		
	6.20	6.30—6.37		6.49	[6.86(s)]	4.71(t)
14.6	(8.9)	(m)	12.7	(5.7)		(5.7)
——————(m)——		——(m)——		6.61		4.76(t) (5.4)
14.0	6.26	5.75—5.78	13.3	5.61		
	(7.2)	(m)		(6.5)		[6.73(s)]
——(m)——	6.12	6.63		6.34		
		(5.5)	14.4	(9.2)		
	5.73	6.26	——(m)——	6.41		4.69(t)
9.8	(9.4)					(5.6)
	5.63	5.42	——(m)——	5.47		
10.3	(9.9)					[6.74(s)]
	5.68	6.18	——(m)——	6.23		
10.3	(9.6)					
10.3	5.66	6.24	——(m)——	6.35		
	(9.5)					
	5.80	6.83		6.29		
9.5	(9.2)	(3.1)	11.0	(3.4)		

in $CDCl_3$. [c] Coupling constant $J_{5,NH}$. [f] τ 6.13(s) and [g] τ 5.94(s) for MeO—2. [h] Aromatic proton signals are not recorded. [i] τ 1.13 (t; J 5.6) for NHCOph. A) Numbering according to the nomenclature for 2,2′-anhydro-structures.

EXPERIMENTAL

Melting points, uncorrected, were taken on a Kofler hot stage. IR spectra were obtained for potassium bromide pellets or liquid films on a Perkin-Elmer 297 spectrophotometer. UV spectra were taken for solution in ethanol with a Perkin-Elmer 124 spectrophotometer. NMR spectra were measured for solutions in DMSO on a »JEOL JNM-FX 100« FT-NNM spectrometer with tetramethylsilane as internal standard, unless otherwise stated. The silica gel (Merck HF_{254}, type 60) for TLC and for preparative TLC was activated at 110 °C for 60 min. The products were developed in CH_2Cl_2—MeOH (9 : 1) and recovered from TLC chromatographic plates with acetone, unless otherwise stated. The products were rendered visible by UV illumination.

1-(2,3-Dihydroxypropyl)uracil (**I**, *R*=*H*)

To a solution of 1-allyluracil[1] (**III**) (1.14 g, 7.5 mmol) in acetone (37 ml), colled at 10—15 °C, 3.5% $KMnO_4$ in water (42 ml) was added dropwise for 5 min and stirred for an additional 5 min. A precipitate was the filtered off and then filtrate evaporated to dryness under reduced pressure. Preparative TLC [in CH_2Cl_2—MeOH (8 : 2)] gave **I** (R=H) (842 mg, 60%), m. p. 142—143 °C (from MeOH), identical (mixed m. p., IR, NMR spectra) with an authentic sample[1].

1-(2,3-Epoxypropyl)uracil (**VIII**)

To a solution of m-chloroperbenzoic acid (207 mg, 1 mmol) in $CHCl_3$ (3 ml), 1-allyluracil[1] (**III**, R=H) (152 mg, 1 mmol) was added at 0 °C and then the mixture was stirred at 3—5 °C for 16 h. The solvent was removed under reduced pressure and the residue washed with *n*-hexane (3 × 10 ml). The product was purified by preparative TLC [in ether and then in acetone-ether (4 : 6)]. Apart from the starting material (79 mg, R_F ca. 0.65), **VIII** (R_F ca. 0.54) was separated in 74% (60 mg) yield (based on the transformed starting material), m. p. 136—137 °C (from acetone-ether).

Anal. $C_7H_8N_2O_3$ (168.15) calc'd: C 50.00; H 4.80; N 16.65%
found: C 50.23; H 4.66; N 16.36%

UV spectrum: λ_{max} 267 nm (log ε 3.80). IR spectrum: ν_{max} 3440br, 3141, 3090, 3041, 2921, 1708br, 1679, and 1657 cm^{-1}.

1-(2-Hydroxy-3-iodopropyl)uracil (**V**, *R*=*H*)

To a solution of 1-(2,3-epoxypropyl)uracil (**VIII**) (33 mg, 0.19 mmol) in butan-2-one (3 ml), glacial acetic acid (0.26 ml) and NaI (77 mg, 0.5 mmol) were added. The mixture was heated under reflux for 2 h and then evaporated to dryness. The residue was dissolved in water and decolourized with 5% aq. solution of sodium thiosulphate. This solution was evaporated to dryness under reduced pressure and the residue triturated with MeOH. A precipitate was filtered off, and the filtrate concentrated to a small volume. Preparative TLC afforded **V** (R=H) (37 mg, 58%), R_F ca. 0.56, m. p. 178—179 °C (from MeOH), identical (mixed m. p., IR, NMR spectra) with an authentic sample[2].

1-(3-Cyano-2-hydroxypropyl)uracil (**VI**, *R*=*H*)

To a solution of 1-(2,3-epoxypropyl)uracil (**VIII**) (55 mg, 0.33 mmol) in 50% ethanol (2 ml) KCN (63 mg, 0.98 mmol) was added and the mixture was stirred at room temperature for 3 h. The solvent was then removed under reduced pressure. Preparative TLC [in CH_2Cl_2—MeOH (8 : 2)] afforded **VI** (R=H) (29 mg, 45.5%), R_F ca. 0.38, m. p. 149—150 °C (from MeOH), identical (mixed m. p., IR and NMR spectra) with an authentic sample[2].

1-(3-Ethoxycarbonyl-2-hydroxypropyl)uracil (**VII**, *R*=*H*)

A solution of 1-(3-cyano-2-hydroxypropyl)uracil (**VI**, R=H) (168 mg, 0.86 mmol) was treated with anhydrous ethanolic 6 mol dm^{-3} HCl (26 ml) and worked up as described for the ethanolysis of the analogous thymine derivative **VI** (R=Me)[2].

Preparative TLC afforded **VII** (R=H) (164 mg, 78.9%), R_F ca. 0.55, m. p. 103—104 °C (from methanol-ether-*n*-hexane).

Anal. $C_{10}H_{14}N_2O_5$ (242.23) calc'd: C 49.58; H 5.83; N 11.57%
found: C 49.59; H 5.82; N 11.62%

UV spectrum: λ_{max} 265 nm (log ε 3.95). IR spectrum: ν_{max} 3451br, 3093, 2981, 1740, 1693, and 1664 cm^{-1}.

1-(2,4-Di-O-acetyl-2,4-dihydroxypropyl)uracil (**IX**, *R=H*)

To a suspension of $LiAlH_4$ (102 mg, 2.7 mmol) in anhydrous THF (13.5 ml) a solution of the 3'-ethoxycarbonyl derivative **VII** (R=H) (219 mg, 0.9 mmol) in anhydrous THF (13.5 ml) was added dropwise. The suspension was then stirred at room temperature for 2 h and worked up as for the preparation of 1-(2,4-dihydroxybutyl(thymine[2] (**II**, R=Me). The residue, containing the 2',4'-dihydroxybutyl homologue (**II**, R=H) as raw material, was suspended in pyridine (20 ml) and treated with acetic acid anhydride (2 ml). The mixture was set aside at room temperature for 16 h and then evaporated to dryness. Preparative TLC [two developments in CH_2Cl_2—MeOH (95 : 5)] gave **IX** (R=H) (87 mg, 34%), R_F ca. 0.5, m. p. 95—96 °C (from methanol-ether-*n*-hexane).

Anal. $C_{12}H_{16}N_2O_6$ (284.26) calc'd: C 50.57; H 5.67; N 9.86%
found: C 50.48; H 5.79; N 9.89%

UV spectrum: λ_{max} 264 nm (log ε 3.98). IR spectrum: ν_{max} 3576, 3516, 3156, 3096, 3048, 2976, 1752, 1726, 1708, 1686, 1656, and 1602 cm^{-1}.

2,3-Dihydro-2-hydroxymethyl-7H-oxazolo[3,2-a]pyrimidin-7-one (**X**)

A suspension of 1-(3-*O*-*p*-tolylsulphonyl-2,3-dihydroxypropyl)uracil[1] (**IV**, R=H) (140 mg, 0.41 mmol) in anhydrous MeOH (2 ml) was treated with methanolic 0.1 mol dm^{-3} sodium methoxide (4.94 ml, 0.49 mmol), stirred at room temperature for 3 h and then evaporated to dryness under reduced pressure. The residue was triturated with CH_2Cl_2. A precipitate was filtered off and the filtrate concentrated to a small volume which was subjected to preparative TLC [development in Me_2CO—MeOH (8 : 2)]. It gave the product **X** at R_F ca. 0.27, (23 mg, 33.2%), 1-(2,3-dihydroxypropyl)-2-*O*-methyluracil (**XI**) at R_F ca. 0.38 (13.0 mg, 15.9%), and 1-(2,3-epoxypropyl-uracil (**VIII**) at R_F ca. 0.79 (12.5 mg, 18%).

Data of **X**. M. p. 189—191 °C (from methanol-ether-*n*-hexane).

Anal. $C_7H_8N_2O_3$ (168.15) calc'd: C 50.00; H 4.80; N 16.55%
found: C 50.22; H 5.02; N 16.39%

UV spectrum: λ_{max} 227 and 259 nm (log ε 3.92 and 3.85). IR spectrum: λ_{max} 3200br, 3080, 2930, 1680sh, 1661, 1572, and 1551 cm^{-1}.

Data of **VIII**. M. p. 135—137 °C (from acetone-ether), identical (mixed m. p., IR and NMR spectra) with that obtained from 1-allyluracil (**III**).

Data of **XI**. An unstable oil. NMR spectrum: τ 2.51 (1H, d, 6-H; $J_{6,5}$ 7.6 Hz), 4.25 (1H, d, 5-H; $J_{5,6}$ 7.6 Hz), 4.92 (1H, d, 2'-OH; $J_{OH,2'}$ 4.9 Hz), 5.20 (1H, t, 3'-OH; $J_{OH,3'}$ 5.4 Hz), 6.13 (3H, s, 2-OMe).

1-(2,3-Dimethylsulphonyloxypropyl)uracil (**XIII**)

To a solution of 1-(2,3-dihydroxypropyl)uracil (**I**, R=H) (610 mg, 3.28 mmol) in freshly distilled and at 5 °C cooled pyridine (10 ml), methanesulphonylchloride (0.6 ml, 7.94 mmol) was added and then stirred at 3—5 °C for 16 h. The mixture was then evaporated to dryness and the residue on trituration with MeOH (15 ml) gave a crystalline product (940 mg, 83.9%), R_F ca. 0.43, m. p. 158—159 °C (from H_2O).

Anal. $C_9H_{14}N_2O_8S_2$ (342.35) calc'd: C 31.57; H 4.12; N 8.18%
found: C 31.43; H 4.19; N 8.35%

UV spectrum: λ_{max} 262 nm (log ε 3.91). IR spectrum: ν_{max} 3440br, 3022, 3002, 2923, 1703, 1692, and 1675 inf. cm^{-1}.

Treatment of 1-(2,3-Dimethylsulphonyloxypropyl)uracil (**XIII**) *with Sodium Methoxide*

A suspension of 2',3'-dimesyloxy-derivative **XIII** (171 mg, 0.5 mmol) in anhydrous MeOH (60 ml) was heated under reflux and then treated with methanolic 0.1 mol dm^{-3} sodium methoxide (5.5 ml, 0.55 mmol). The mixture was stirred at room temperature for 3 h and evaporated to dryness. The residue was triturated with CH_2Cl_2 (4 × 10 ml). A precipitate was filtered off and the filtrate evaporated to dryness. Preparative TLC (two developments) separated the starting material at R_F ca. 0.43 (17 mg), 2,3-dihydro-2-methylsulphonyloxymethyl-7H-oxazolo-[3,2-a]pyrimidin-7-one (**XIV**) at R_F ca. 0.16 (31 mg, 28%), 1-(2-*O*-methylsulphonyl-2,3-dihydroxypropyl)-2-*O*-methyluracil (**XV**) at R_F ca. 0.28 (42 mg, 33.6%), and 1-(2,3-epoxypropyl)-2-*O*-methyluracil (**XVI**) at R_F ca. 0.45 (18 mg, 22%). The yields are based on the transformed starting material.

Data of **XIV**. M. p. 173—174 °C [from MeOH—H_2O (9 : 1)] and then from ether.

Anal. $C_8H_{10}N_2O_5S$ (246.24) calc'd: C 39.01; H 4.09; N 11.37%
found: C 39.25; H 4.27; N 11.60%

UV spectrum: λ_{max} 227 and 257 nm (log ε 3.70 and 3.62), λ_{min} 241 nm (log ε 3.50). IR spectrum: ν_{max} 3435br, 3088, 3025, 2960, 2935, 1697, 1663, 1660, 1653, 1635br, 1594, 1550, and 1527br cm^{-1}.

Data of **XV**. M. p. 154—155 °C (from MeOH-ether).

Anal. $C_9H_{14}N_2O_6S$ (278.28) calc'd: C 38.84; H 5.07; N 10.07%
found: C 39.00; H 5.21; N 9.96%

UV spectrum: λ_{max} 233 and 255 nm (log ε 3.90 and 3.81), λ_{min} 244 nm (log ε 3.79). IR spectrum: ν_{max} 3392br, 3260br, 3020, 3008, 2963, 2923, 1656, 1650, 1610br, and 1522br cm^{-1}.

Data of **XVI**. M. p. 86—88 °C (from CH_2Cl_2-*n*-hexane).

Anal. $C_8H_{10}N_2O_3$ (182.18) calc'd: C 50.70; H 5.67; N 9.86%
found: C 50.48; H 5.79; N 9.89%

UV spectrum: λ_{max} 233 and 255 nm (log ε 3.90 and 3.81), λ_{min} 244 nm (log ε 3.79). IR spectrum ν_{max} 3456br, 3076, 3002, 2976, 1654, 1646, 1626, and 1561 cm^{-1}.

1-(3-Azido-2-hydroxypropyl)uracil (**XIX**)

A solution of 1-(3-*O*-*p*-tolylsulphonyl-2,3-dihydroxypropyl)uracil[1] (**IV**, R=H) (170 mg, 0.5 mmol) in DMF (4 ml) was treated with NaN_3 (97 mg, 1.5 mmol) according to the procedure described by T. Sasaki et al.[16]. The mixture was stirred and heated at 90 °C for 1 h, and then evaporated to dryness under reduced pressure. Preparative TLC afforded **XIX** (90 mg, 85.3%), R_F ca. 0.31 m. p. 135—137 °C (from methanol--ether-*n*-hexane).

Anal. $C_7H_9N_5O_3$ (211.18) calc'd: C 39.81; H 4.30; N 33.17%
found: C 39.91; H 4.59; N 33.39%

UV spectrum: λ_{max} 266 nm (log ε 3.95). IR spectrum: ν_{max} 3306br, 3160br, 3028br, 2918, 2180, 2124, 2100, 1689br, 1675br, and 1624 cm^{-1}.

1-(3-Azido-2-methylsulphonyloxypropyl)uracil (**XX**)

To a solution of 1-(3-azido-2-hydroxypropyl)uracil (**XIX**) (167 mg, 0.8 mmol) in pyridine (2.4 ml), cooled at 3—5 °C, methanesulphonylchloride (0.08 ml, 1.04 mmol) was added. The mixture was stirred for 16 h and then the solvent removed under reduced pressure. The residue on trituration with MeOH (2 × 5 ml) and ether (2 × 5 ml) afforded a raw product (208 mg). It crystallized from water to give **XX** (149 mg, 65.4%), R_F ca. 0.56, m. p. 158—159 °C.

Anal. $C_8H_{11}N_5O_5S$ (289.27) calc'd: C 33.21; H 3.83; N 24.21%
found: C 33.50; H 3.99; N 24.52%

UV spectrum: λ_{max} 264 nm (log ε 3.97). IR spectrum: ν_{max} 3420br, 3150, 3100, 3021, 2936, 2880, 2830, 2172, 2100, 1710br, 1662br, and 1620 cm^{-1}.

2-Azidomethyl-2,3-dihydro-7H-oxazolo[3,2-a]pyrimidin-7-one (**XXI**)

A solution of 2,3-dihydro-2-methylsulphonyloxymethyl-7H-oxazolo[3,2-a]pyrimidin-7-one (**XIV**) (96 mg, 0.5 mmol) in DMF (6.2 ml) was treated with NaN_3[16] (80 mg, 1.23 mmol). The mixture was stirred and heated at 90 °C for 1 h. The solvent was removed under reduced pressure and the residue triturated with CH_2Cl_2. The methylene chloride solution was evaporated to dryness and the residue subjected to preparative TLC [CH_2Cl_2—MeOH (8 : 2)] to give **XXI** (61 mg, 75.3%), R_F ca. 0.23, m. p. 131—132 °C (from MeOH-ether).

Anal. $C_7H_7N_5O_2$ (193.17) calc'd: C 43.52; H 3.65; N 36.26%
found: C 43.43; H 3.91; N 36.08%

UV spectrum: λ_{max} 227 and 258 nm (log ε 3.85 and 3.77), λ_{min} 241 nm (log ε 3.65). IR spectrum: ν_{max} 3440br, 3018, 2935br, 2100br, 1661, 1656, 1648sh, 1630br, and 1520 cm^{-1}.

Treatment of 1-(3-Azido-2-methylsulphonyloxypropyl)-uracil (**XX**) *with Sodium Methoxide*

a) A suspension of 3'-azido-2'-*O*-mesyl compound (**XX**) (33 mg, 0.11 mmol) in anhydrous MeOH was heated under reflux and then treated with methanolic 0.1 mol dm^{-3} sodium methoxide (1.2 ml, 0.12 mmol.) The solution was then stirred at room temperature for 70 h and evaporated to dryness. Preparative TLC separated 1-(2-azidomethyl-2,3-dihydro-7H-oxazolo[3,2-a]pyrimidin-7-one (**XXI**) at R_F ca. 0.23 (4 mg, 18.2%), m. p. 130—132 °C, identical (mixed m. p., IR and NMR spectra) with an authentic sample. An oily and unstable fraction at R_F ca. 0.29 was identified as 1-(3-azido-2-hydroxypropyl)-2-*O*-methyluracil (**XXII**) (19 mg, 73.9%). IR spectrum: ν_{max} 3304br, 3024, 2964, 2104 br, 1669, 1652, 1629br, and 1514 cm^{-1}. NMR spectrum (in $CDCl_3$): τ 2.74 (1H, d, 6-H; $J_{6,5}$ 7.8 Hz), 4.26 (1H, d, 5-H; $J_{5,6}$ 7.8 Hz), 4.97—5.18 (1H, m, 2'-OH, dissappearing in D_2O), 6.02 (3H, s, 2-OMe).

b) According to the procedure described under a) the suspension of 1-(3-azido--2-methylsulphonyloxypropyl)-uracil (33 mg, 0.11 mmol) in anhydrous methanol was heated under reflux and treated with 0.1 mol dm^{-3} sodium methoxide (1.2 ml, 0.12 mmol) for 30 min. It afforded the crystalline 2-azidomethyl-2,3-dihydro-7H-oxazolo--[3,2-a]pyrimidin-7-one (**XXI**) (9.5 mg, 43.1%), R_F ca. 0.23, m. p. 130—132 °C and the oily 1-(2-hydroxy-3-azidopropyl)-2-*O*-methyluracil (**XXII**) (7.5 mg, 29.2%), R_F ca. 0.25, both identical (IR and NMR spectra) with that obtained under a).

2-Benzamidomethyl-2,3-dihydro-7H-oxazolo[3,2-a]pyrimidin-7-one (**XXIV**)

A solution of 2-azidomethyl-2,3-dihydro-7H-oxazolo[3,2-a]pyrimidin-7-one (**XXI**) (123 mg, 0.64 mmol) in MeOH (33 ml) was stirred in atmosphere of hydrogen (0.36 MPa) in presence of Pd-black (33 mg) for 3 h. The catalyst was filtered off through a short Celite column. The filtrate was evaporated to an oily residue which, as suspension in freshly distilled pyridine (5.8 ml), was treated with benzoic anhydride (157 mg, 0.69 mmol). The mixture was stirred at room temperature for 24 h. The solvent was removed under reduced pressure and the residue on trituration with ether (3 × 15 ml) afforded a product which was purified by preparative TLC (recovery with MeOH). Yield 85 mg **XXIV** (49.2%), R_F ca. 0.11, m. p. 155—156 °C (from MeOH).

Anal. $C_{14}H_{13}N_3O_3$ (271.27) calc'd: C 61.98: H 4.83; N 15.49%
found: C 61.76; H 4.83; N 15.19%

UV spectrum: λ_{max} 227 and 255 inf. nm (log ε 4.22 and 3.87). IR spectrum: λ_{max} 3258br, 3065, 3020, 2930, 1667, 1655, 1649, 1620, 1602, 1578, 1562, 1558, 1523, 1512, 753, 707, and 688 cm^{-1}.

1-(3-O-Triphenylmethyl-2,3-dihydroxypropyl)uracil (**XXV**)

To a solution of 1-(2,3-dihydroxypropyl)uracil[1] (**I**, R=H) (293 mg, 1.58 mmol) in anhydrous and freshly distilled pyridine (9 ml) chlorotriphenylmethane[20] (536 mg, 1.93 mmol) was added. The mixture was stirred at 100 °C for 3 h, and then the solvent was azeotropically removed under reduced pressure in the presence of toluene. The residue was dissolved in chloroform and chromatographed through a silica gel (20 g) column. $CHCl_3$—MeOH (98 : 2) eluted **XXV** (621 mg, 91.8%), R_F ca. 0.21 [in CH_2Cl_2-ether (3 : 1)], m. p. 109—110 °C (from MeOH).

Anal. $C_{26}H_{24}N_2O_4 \cdot H_2O$ (446.48) calc'd: C 69.95; H 5.87; N 6.27%
found: C 70.30; H 5.65; N 6.21%

UV spectrum: λ_{inf} 233 and λ_{max} 265 nm (log ε 3.97 and 4.02), λ_{min} 243 nm (log ε 3.70). IR spectrum: ν_{max} 3500br, 3231br, 3055, 3030, 2960, 2920, 1705, 1690, 1677br, 1667, 1635, 1603, 750, 704, and 696 cm^{-1}.

1-(2-O-methylsulphonyl-3-O-triphenylmethyl-2,3-dihydroxypropyl)uracil (**XXVI**)

To a solution of 1-(3-O-trityl-2,3-dihydroxypropyl)uracil (**XXV**) (286 mg, 0.67 mmol) in anhydrous and freshly distilled pyridine (3 ml) methanesulphonylchloride (0.08 ml, 1.1 mmol) was added. The mixture was stirred at room temperature for 4.5 h. The solvent was then azeotropically removed under reduced pressure in the presence of toluene. The residue was dissolved in methylene chloride and chromatoraphed through a silica gel (10 g) column. Methylene chloride eluate afforded **XXVI** (313 mg, 92.6%), R_F ca. 0.67, m. p. 180—181 °C (from MeOH).

Anal. $C_{27}H_{26}N_2O_6S$ (506.56) calc'd: C 64.01; H 5.17; N 5.53%
found: C 63.80; H 5.10; N 5.37%

UV spectrum: λ_{inf} 233 and λ_{max} 262 nm (log ε 3.99 and 4.06), λ_{min} 242 nm (log ε 3.80). IR spectrum: ν_{max} 3420br, 3157, 3052, 3020br, 2997, 2927, 1718, 1671, 1622, 748, 727, 703, and 692 cm^{-1}.

2,3-Dihydro-2-triphenylmethyloxymethyl-7H-oxazolo[3,2-a]-pyrimidin-7-one (**XXVII**)

To a suspension of 1-(2-mesyloxy-3-trityloxypropyl)-uracil (**XXVI**) (63 mg, 0.12 mmol) in anhydrous MeOH (1 ml) methanolic 0.1 mol dm^{-3} sodium methoxide (1.7 ml, 0.17 mmol) was added and stirred at room temperature for 24 h. The solvent was then removed under reduced pressure and the residue triturated with CH_2Cl_2 (4 × 5 ml). The precipitate was filtered off and the filtrate evaporated to dryness. Preparative TLC [in CH_2Cl_2-ether (1 : 1)] afforded **XXVII** (34 mg, 66.7%), R_F ca. 0.60, m. p. 113—115 °C (from MeOH).

Anal. $C_{26}H_{22}N_2O_3 \cdot 0.5\,H_2O$ (419.45) calc'd: C 74.46; H 5.53; N 6.68%
found: C 73.99; H 5.51; N 6.56%

UV spectrum: λ_{inf} 221 and λ_{max} 258 nm (log ε 4.24 and 3.84), λ_{min} 245 nm (log ε 3.74). IR spectrum ν_{max} 3416br, 3058, 3036, 2924, 1656br, 1646, 1626, 1616, 1596, 746, 709, and 696 cm^{-1}.

Treatment of 1-(2-O-Mesyl-3-O-trityl-2,3-dihydroxypropyl)uracil (**XXVI**) *with Sodium Azide*

To a solution of 2'-O-mesyl-3'-O-trityl derivative **XXVI** (180 mg, 0.36 mmol) in DMF (6 ml) NaN_3 (46 mg, 0.72 mmol) was added and worked up as described for 3'-azido-2'-O-mesyl compound **XX**. The preparative TLC [two developments in CH_2Cl_2—MeOH (95 : 5)] separated an oily product at R_F ca. 0.75 (52 mg, 32.5%), which was rechromatographed on preparative TLC plates and identified as 1-(2--azido-3-triphenylmethyloxypropyl)uracil (**XXVIII**).

Anal. $C_{26}H_{23}N_5O_3$ (453.38) calc'd: C 68.86; H 5.11; N 15.45%
found: C 68.57; H 5.20; N 15.46%

UV spectrum: λ_{inf} 233 and λ_{max} 264 nm (log ε 3.87 and 3.92), λ_{min} 243 nm (log ε 3.60). IR spectrum: ν_{max} 3176br, 3090, 3056, 3028, 2122, 2100, 1710, 1686br, 1652, 1626, 750, 741, 702, and 696 cm^{-1}.

The fraction, R_F ca. 0.60, was identified as 2,3-dihydro-2-triphenylmethyloxymethyl-7H-oxazolo[3,2-a]pyrimidin-7-one (**XXVII**) (92 mg, 62.7%), m. p. 113—115 °C, identical (mixed m. p., IR and NMR spectra) with an authentic sample.

1-(2-O-Methylsulphonyl-2,3-dihydroxypropyl)uracil (**XXIX**)

A solution of 1-(2-O-mesyl-3-O-trityl-2,3-dihydroxypropyl)uracil (**XXVI**) (998 mg, 1.95 mmol) in dioxan (19 ml) was treated with 5% HCl (15.8 ml). The mixture was stirred and heated at 70 °C for 1 h. The solvent was removed under reduced pressure and the residue on trituration with CH_2Cl_2 afforded **XXIX** which crystallized from MeOH. Yield 449 mg (90.2%), R_F ca. 0.32, m. p. 151—152 °C (from MeOH).

Anal. $C_8H_{12}N_2O_6S$ (264.26) calc'd: C 36.36; H 4.58; N 10.60%
found: C 36.48; H 4.77; N 10.54%

UV spectrum: λ_{max} 263 nm (log ε 4.02). IR spectrum: ν_{max} 3447br, 3182, 3103, 3057, 3015, 2937, 1704, 1690br, 1653, and 1627 cm^{-1}.

1-(2-Azido-3-hydroxypropyl)uracil (**XXX**)

a) A solution of 1-(2-O-mesyl-2,3-dihydroxypropyl)-uracil (**XXIX**) (90 mg, 0.34 mmol) in DMF 53 ml) was treated with NaN_3[16] (66 mg, 1.02 mmol). The mixture was stirred and heated at 90 °C for 2.5 h. A precipitate was filtered off and washed with CH_2Cl_2. The filtrate and CH_2Cl_2 washings were evaporated to dryness under reduced pressure. Preparative TLC afforded the oily product **XXX** (35.2 mg, 49.2%), which was rechromatographed as analytical sample, R_F ca. 0.44.

Anal. $C_7H_9N_5O_3$ (211.18) calc'd: C 39.81; H 4.30; N 33.17%
found: C 39.50; H 4.50; N 32.94%

UV spectrum: λ_{max} 264 nm (log ε 4.12). IR spectrum: ν_{max} 3436br, 2107, and 1683br cm^{-1}.

b) A solution of 1-(2-azido-3-trityloxypropyl)uracil (**XXVII**) (84 mg, 0.18 mmol) in dioxan (2 ml) was treated with 5% HCl (1.5 ml). The mixture was stirred and heated at 60 °C for 30 min and evaporated to dryness under reduced pressure. Preparative TLC afforded **XXX** (36 mg, 92%), R_F ca. 0.44, identical (IR and NMR spectra) with that obtained under a).

1-(2-Azido-3-methylsulphonyloxypropyl)uracil (**XXXI**)

To a solution of 1-(2-azido-3-hydroxypropyl)uracil (**XXX**) (178 mg, 0.85 mmol) in anhydrous and freshly distilled pyridine (4 ml) methanesulphonylchloride (0.1 ml, 1.39 mmol) was added. The mixture was stirred at 3—5 °C for 16 h and worked up as already described. Preparative TLC (two developments) gave **XXXI** (209 mg, 85.5%), R_F ca. 0.63, m. p. 115—116 °C (from MeOH).

Anal. $C_8H_{11}N_5O_5S$ (289.27) calc'd: C 33.21; H 3.83; N 24.21%
found: C 33.52; H 3.94; N 24.16%

UV spectrum: λ_{max} 263 nm (log ε 4.00). IR spectrum: ν_{max} 3242, 3050, 3032, 2967, 2947, 2137, 2100sh, 1715, 1687br, and 1640 cm^{-1}.

1-(2-Azido-3-hydroxypropyl)-2-O-methyluracil (**XXXII**)

a) A solution of 1-(2-azido-3-mesyloxypropyl)uracil (**XXXI**) (78 mg, 0.27 mmol) in anhydrous MeOH (1.2 ml) was treated with methanolic 0.1 mol dm^{-3} sodium methoxide (2.83 ml, 0.28 mmol). The mixture was stirred at room temperature for

30 min and then evaporated to dryness. Preparative TLC afforded **XXXII** (34 mg, 56%), R_F ca. 0.29, m. p. 97—99 °C (from methanol-ether-*n*-hexane).

Anal. $C_8H_{11}N_5O_3$ (225.21) calc'd: C 42.66; H 4.92; N 31.10%
found: C 42.84; H 4.90; N 31.06%

UV spectrum: λ_{max} 228 and 251 nm (log ε 4.05 and 3.97), λ_{min} 241 nm (log ε 3.94). IR spectrum: ν_{max} 3146br, 3015, 2961, 2937, 2134, 2085, 1654br, and 1617 cm^{-1}. NMR spectrum: τ 2.42 (1H, d, 6-H; $J_{6,5}$ 7.8 Hz), 4.18 (1H, d, 5-H; $J_{5,6}$ 7.8 Hz), 4.68 (1H, t, 3'-OH; $J_{OH,3'}$ 5.4 Hz), 6.11 (3H, s, 2-OMe).

b) A solution of 1-(2-azido-3-iodopropyl)uracil (**XXXIV**) (65 mg, 0.29 mmol) in anhydrous methanol was treated with AgOAc (137 mg, 0.81 mmol), stirred, and heated under reflux for 15 min. A precipitate was filtered off and the excess of Ag ion removed from the filtrate by precipitation with H_2S and then filtered through a short Celite column. The thus obtained filtrate was concentrated. Preparative TLC separated **XXXII** (22.5 mg, 49.4%), R_F ca. 0.29, m. p. 97—99 °C, identical (mixed m. p., IR and NMR spectra) with that obtained under a).

1-(2-Azido-3-iodopropyl)uracil (**XXXIV**)

To a solution of 1-(2-azido-3-mesyloxypropyl)uracil (**XXXI**) (78 mg, 0.27 mmol) in butan-2-one (12 ml) NaI (188 mg, 1.26 mmol) was added. The mixture was stirred and heated under reflux for 2.5 h. A precipitate was filtered off on a short Celite column and the filtrate evaporated to dryness under reduced pressure. Preparative TLC afforded **XXXIV** (70 mg, 80.8%), R_F ca. 0.65, m. p. 138—139 °C (from MeOH).

Anal. $C_7H_8IN_5O_2$ (321.09) calc'd: C 26.18; H 2.51; N 21.81%
found: C 26.30; H 2.63; N 21.48%

UV spectrum: λ_{max} 264 nm (log ε 4.01). IR spectrum: ν_{max} 3418br, 3158, 3103, 3032br, 2966, 2938, 2120, 2094, 2078, 1722, 1657br, and 1610 cm^{-1}.

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SAŽETAK

Homologizacija i intramolekularne ciklizacije u seriji alifatskih analoga deoksiuridina

Vinko Škarić i Milan Jokić

Cijanizacija 1-(2,3-epoksipropil)uracila (**VIII**) i etanoliza nastalog 3'-cijano spoja **VI** (R=H) do 3'-etoksikarbonil derivata **VII** (R=H) vodi sintezi 1-(2,4-dihidroksibutil)-uracila (**II**, R i R^1=H). Oksidacija 1-aliluracila sa $KMnO_4$ daje 1-(2,3-dihidroksipropil)uracil (**I**, R=H) (Shema 1).

Opisane su intramolekulske transformacije prikladno aktiviranog **I** (R=H) kao i tako nastale strukture 2,3-dihidro-2-hidroksimetil-7H-oksazolo[3,2-a]pirimidin-7-ona (**X**), 1-(2,3-dihidroksipropil)-2-*O*-metiluracila (**XI**), te njihovih mezil-, azido- i tritil-derivata (Shema 2). 2-Azidometil-(**XXI**) uspješno je preveden u 2-aminometil-(**XXIII**) 2,3-dihidro-7H-oksazolo[3,2-a]pirimidin-7-on.