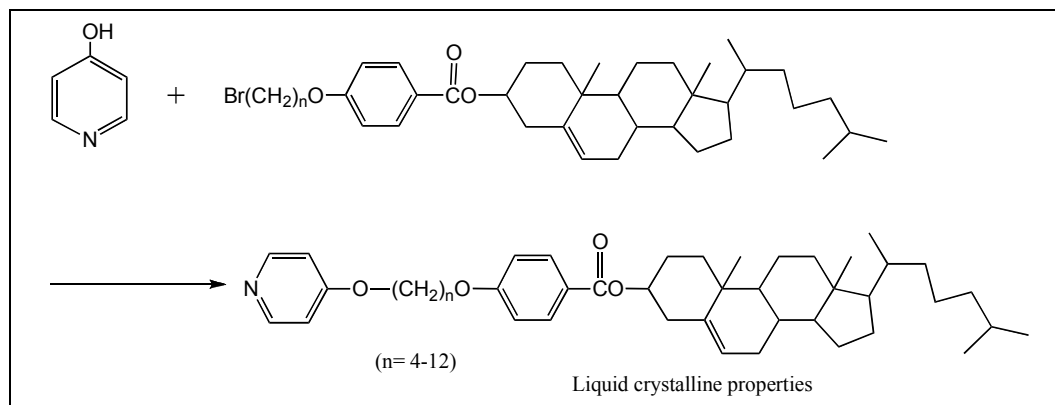


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The treatment of 4-hydroxypyridine with cholestery *p*-(ω -bromoalkoxy)benzoates in *N,N*-dimethylformamide containing K_2CO_3 gave cholestery *p*-[ω -(4-pyridyloxy)alkoxy]benzoates, which exhibited liquid crystalline properties

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INTRODUCTION

The hydrogen-bonded supramolecular liquid crystals containing pyridine derivatives have been extensively studied since the pioneering work of Kato and Frechet [1] and Lehn *et al* [2]. Although various liquid crystalline compounds with pyridine ring have been prepared, little attention has been paid to alkylation of 4-hydroxypyridine as a method for a preparation of liquid crystalline pyridine derivatives. The alkylation of 4-hydroxypyridine results in the alkylation of the phenolic oxygen of 4-hydroxypyridine or the nitrogen of 4-pyridone, but the details of the reaction are still unclear [3-9]. Furthermore, increasing interest is being shown in the tautomeric equilibrium between 4-hydroxypyridine and 4-pyridone in connection with the physiological action of pyridine and pyrimidine derivatives, *e.g.* pyrimidine nucleic acid bases [10-14]. On the other hand, cholestery benzoate is the first liquid crystalline compound [15], and in this

connection, we have studied the reaction of nucleic acid bases with cholestery *p*-(ω -bromoalkoxy)benzoates (**1**) [16,17]. The present paper reports a synthesis of new liquid crystalline compounds with pyridine ring by a treatment of 4-hydroxypyridine with **1**.

RESULTS AND DISCUSSION

The reaction of 4-hydroxypyridine with **1** in *N,N*-dimethylformamide (DMF) in the presence of K_2CO_3 gave the compounds (**2**) as main products and the compounds (**3**) as minor products. Although the 1H -NMR data of **2** and **3** were similar, the aromatic regions were clearly different. The aromatic absorptions of **2** at δ 8.4 (d, 2H, $J=6.0$ Hz) and δ 6.8 (d, 2H, $J=6.0$ Hz) were assigned to the hydrogens of 4-substituted pyridine, while the aromatic absorptions of **3** were found at δ 7.3 (d, 2H, $J=7.6$ Hz) and δ 6.4 (d, 2H, $J=7.6$ Hz). Furthermore, the absorptions of **2** at δ 4.0 (t, 4H, $J=6.0$ Hz) were assigned to the two CH_2-O parts, while the absorptions of **3** at δ 4.0 (t,

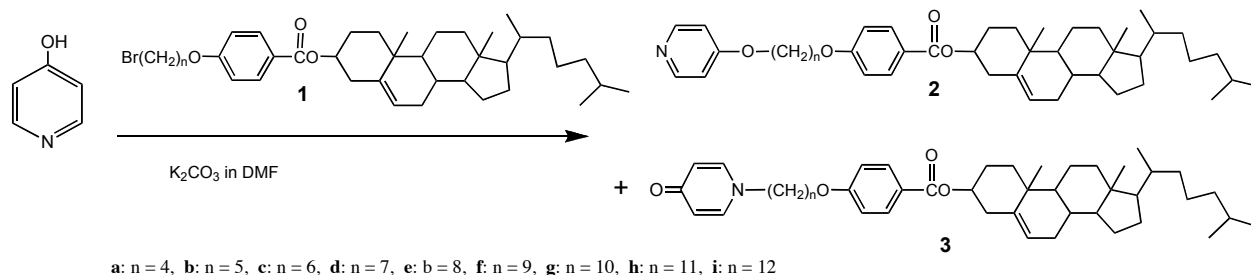


Figure 1

2H, $J=6.0\text{Hz}$) and δ 3.75 (t, 2H, $J=7.0\text{Hz}$) were assigned to one $\text{CH}_2\text{-O}$ part and one $\text{CH}_2\text{-N}$ part, respectively.

The IR spectral data provided further evidence for the structures of **2** and **3**. The IR spectra of **2a** and **3a** are illustrated in Figure 2. The IR spectra of **2a-i** showed one C=O stretching band at 1703 cm^{-1} . On the other hand, two C=O stretching bands were found at 1703 and 1639 cm^{-1} for **3a-i**. On the basis of these $^1\text{H-NMR}$ and IR spectral data, it can be concluded that **2** and **3** are 4-alkyloxypyridines and N-alkyl substituted 4-pyridones, respectively. The structures of **2** and **3** are shown in Figure 1. The yields of **2** and **3** are summarized in Table 1. It can be seen from Table 1 that the ratio of the isolated yields of **2** and **3** is about 10:1. Therefore, the alkylation of 4-hydroxypyridine may be effective for the introduction of pyridine ring into liquid crystalline molecules.

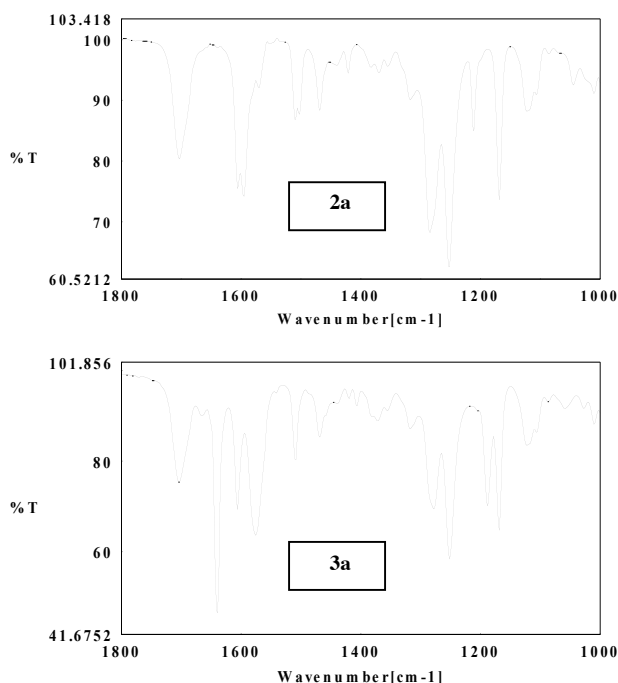


Figure 2. IR spectra of **2a** and **3a** in CDCl_3 .

Table 1

The reaction of 4-hydroxypyridine with **1**

n	Products / Isolated yield (%)
4	2a /44, 3a /4, 1a /12
5	2b /46, 3b /5, 1b /15
6	2c /46, 3c /5, 1c /15
7	2d /41, 3d /5, 1d /12
8	2e /44, 3e /5, 1e /13
9	2f /42, 3f /5, 1f /13
10	2g /42, 3g /4, 1g /14
11	2h /40, 3h /4, 1h /11
12	2i /42, 3i /4, 1i /12

The thermal mesomorphic phases of **2a-i** were analyzed by using the differential scanning calorimeter (DSC) and the polarizing microscope. The polarizing microscopy

observation substantiated the cholesteric liquid crystallinity of **2a-i**. Figure 3 shows the polarizing microscopic image of cholesteric liquid crystal of **2a** at $183\text{ }^\circ\text{C}$ upon heating. The thermodynamic data of **2a-i** are summarized in Table 2. The relationship between the mesomorphic ranges of **2** and the length of the alkyl chain is shown in Figure 4. In spite of a clear odd-even effect of the melting points of **2a-i**, the transition temperature from liquid crystal to isotropic liquid did not show a similar odd-even effect.



Figure 3. The polarizing microscopic image of cholesteric liquid crystal of **2a** at $183\text{ }^\circ\text{C}$ upon heating.

Table 2

Thermal behavior of **2**

Compd.	n	$^\circ\text{C}$ (ΔH : kJ/mol) *
2a	4	C 153 (30.4) N* 214 (0.7) I
2b	5	C 130 (26.5) N* 205 (0.7) I
2c	6	C 148 (30.8) N* 197 (0.8) I
2d	7	C 114 (25.3) N* 190 (0.8) I
2e	8	C 126 (31.8) N* 188 (0.9) I
2f	9	C 93 (26.4) N* 178 (0.8) I
2g	10	C 110 (32.5) N* 174 (1.0) I
2h	11	C 90 (25.1) N* 170 (0.9) I
2i	12	C 111 (35.4) N* 167 (0.9) I

* The thermal mesomorphic ranges were determined by DSC upon heating at a rate of $5\text{ }^\circ\text{C}$. C: Crystal. N*: Cholesteric liquid crystal. I: Isotropic liquid.

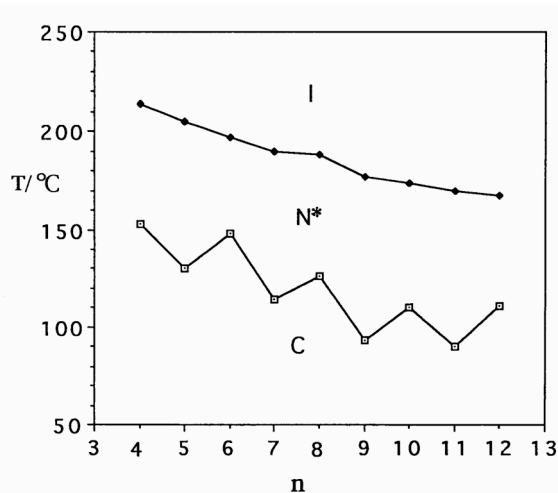


Figure 4. The relationship between the mesomorphic ranges of **2** and the carbon numbers (n) of the alkyl chain.

EXPERIMENTAL

The elemental analyses were performed in the Analytical Center of Kyoto University. The ^1H -NMR spectra (400 MHz) were obtained with a JEOL GSX 400 spectrometer. The chemical shifts (δ -values) were measured in parts per million (ppm) down-field from tetramethylsilane as an internal reference. The IR spectra were recorded with a JASCO FT/IR-420 spectrometer. The measurements in CDCl_3 were made with a 0.1 mm KBr cell. Differential scanning calorimetry (DSC) measurements were carried out with a Shimadzu DSC-60. Microscopy observations were performed under a Nikon Eclipse E600 POL equipped with a hot stage (Linkam LK-600PH). Cholesteryl *p*-(ω -bromoalkyloxy)benzoates (**1**) were prepared by the reaction of cholesteryl *p*-hydroxybenzoate [18] and α,ω -dibromoalkane according to the procedure described before [16,17].

Reaction of 4-hydroxypyridine with cholesteryl *p*-(ω -bromoalkyloxy)benzoates (1**).** A solution of 4-hydroxypyridine (0.5 mmol) and **1** (0.5 mmol) in DMF (50 ml) containing K_2CO_3 (0.5 mmol) was stirred at room temperature for 24 h under nitrogen atmosphere. The reaction mixture was evaporated to give a residue, which was chromatographed on silica gel. By monitoring at 254 nm, elution by chloroform gave **2** together with a small amount of **3**.

Cholesteryl *p*-[(4-(4-pyridyloxy)butoxy)benzoate (2a**).** ^1H -NMR (CDCl_3) δ 8.42(d, 2H, Pyridine, $J=6.0\text{Hz}$), 7.99(d, 2H, Ph, $J=8.8\text{Hz}$), 6.90(d, 2H, Ph, $J=8.8\text{Hz}$), 6.80(d, 2H, Pyridine, $J=6.0\text{Hz}$), 5.41(d, 1H, Chol-6, $J=3.6\text{Hz}$), 4.83(m, Chol-3, 1H), 4.09(broad t, 4H, $J=6.0\text{Hz}$), 2.45(d, 2H, Chol-4, $J=7.6\text{Hz}$), 1.07(s, 3H, Chol-19or18), 0.92(d, 3H, Chol-21, $J=6.4\text{Hz}$), 0.87(dd, 6H, Chol-26,27, $J=6.4, J=1.6\text{Hz}$), 0.69(s, 3H, Chol-18or19), 2.10-0.90(m, 26H). IR (CDCl_3) 2951, 2870, 1703, 1606, 1595, 1510, 1470, 1421, 1369, 1317, 1284, 1252, 1211, 1169, 1122 cm^{-1} . Anal. Calcd for $\text{C}_{43}\text{H}_{61}\text{NO}_4$: C: 78.74; H: 9.37; N: 2.14%. Found: C: 78.75; H: 9.47; N: 2.08%.

Cholesteryl *p*-[(5-(4-pyridyloxy)pentyloxy)benzoate (2b**).** ^1H -NMR (CDCl_3) δ 8.41(d, 2H, Pyridine, $J=6.0\text{Hz}$), 7.99(d, 2H, Ph, $J=8.8\text{Hz}$), 6.90(d, 2H, Ph, $J=8.8\text{Hz}$), 6.79(d, 2H, Pyridine, $J=6.0\text{Hz}$), 5.41(d, 1H, Chol-6, $J=3.6\text{Hz}$), 4.82(m, Chol-3, 1H), 4.04(t, 4H, $J=6.0\text{Hz}$), 2.45(d, 2H, Chol-4, $J=7.6\text{Hz}$), 1.07(s, 3H, Chol-19or18), 0.92(d, 3H, Chol-21, $J=6.4\text{Hz}$), 0.87(dd, 6H, Chol-26,27, $J=6.4, J=1.6\text{Hz}$), 0.69(s, 3H, Chol-18or19), 2.10-0.90(m, 28H). IR (CDCl_3) 2949, 2870, 1703, 1606, 1597, 1508, 1470, 1421, 1371, 1317, 1284, 1254, 1211, 1169, 1122 cm^{-1} . Anal. Calcd for $\text{C}_{44}\text{H}_{63}\text{NO}_4$: C: 78.88; H: 9.48; N: 2.09%. Found: C: 79.10; H: 9.74; N: 2.04%.

Cholesteryl *p*-[(6-(4-pyridyloxy)hexyloxy)benzoate (2c**).** ^1H -NMR (CDCl_3) δ 8.41(d, 2H, Pyridine, $J=6.0\text{Hz}$), 7.99(d, 2H, Ph, $J=8.8\text{Hz}$), 6.89(d, 2H, Ph, $J=8.8\text{Hz}$), 6.79(d, 2H, Pyridine, $J=6.0\text{Hz}$), 5.41(d, 1H, Chol-6, $J=3.6\text{Hz}$), 4.82(m, Chol-3, 1H), 4.02(t, 4H, $J=6.0\text{Hz}$), 2.45(d, 2H, Chol-4, $J=7.6\text{Hz}$), 1.07(s, 3H, Chol-19or18), 0.92(d, 3H, Chol-21, $J=6.4\text{Hz}$), 0.87(dd, 6H, Chol-26,27, $J=6.4, J=1.6\text{Hz}$), 0.69(s, 3H, Chol-18or19), 2.10-0.90(m, 30H). IR (CDCl_3) 2947, 2870, 1703, 1605, 1597, 1510, 1470, 1421, 1369, 1317, 1284, 1254, 1211, 1169, 1122 cm^{-1} . Anal. Calcd for $\text{C}_{45}\text{H}_{65}\text{NO}_4$: C: 79.02; H: 9.58; N: 2.05%. Found: C: 78.89; H: 9.79; N: 2.03%.

Cholesteryl *p*-[(7-(4-pyridyloxy)heptyloxy)benzoate (2d**).** ^1H -NMR (CDCl_3) δ 8.41(d, 2H, Pyridine, $J=6.0\text{Hz}$), 7.98(d, 2H, Ph, $J=8.8\text{Hz}$), 6.89(d, 2H, Ph, $J=8.8\text{Hz}$), 6.79(d, 2H, Pyridine, $J=6.0\text{Hz}$), 5.41(d, 1H, Chol-6, $J=3.6\text{Hz}$), 4.82(m, Chol-3, 1H),

4.01(t, 4H, $J=6.0\text{Hz}$), 2.45(d, 2H, Chol-4, $J=7.6\text{Hz}$), 1.07(s, 3H, Chol-19or18), 0.92(d, 3H, Chol-21, $J=6.4\text{Hz}$), 0.87(dd, 6H, Chol-26,27, $J=6.4, J=1.6\text{Hz}$), 0.69(s, 3H, Chol-18or19), 2.10-0.90(m, 32H). IR (CDCl_3) 2941, 2870, 1703, 1606, 1598, 1510, 1468, 1421, 1371, 1317, 1284, 1254, 1211, 1169, 1121 cm^{-1} . Anal. Calcd for $\text{C}_{46}\text{H}_{67}\text{NO}_4$: C: 79.15; H: 9.67; N: 2.01%. Found: C: 79.48; H: 9.97; N: 1.97%.

Cholesteryl *p*-[(8-(4-pyridyloxy)octyloxy)benzoate (2e**).** ^1H -NMR (CDCl_3) δ 8.41(d, 2H, Pyridine, $J=6.0\text{Hz}$), 7.98(d, 2H, Ph, $J=8.8\text{Hz}$), 6.89(d, 2H, Ph, $J=8.8\text{Hz}$), 6.79(d, 2H, Pyridine, $J=6.0\text{Hz}$), 5.41(d, 1H, Chol-6, $J=3.6\text{Hz}$), 4.82(m, Chol-3, 1H), 4.00(t, 4H, $J=6.0\text{Hz}$), 2.45(d, 2H, Chol-4, $J=7.6\text{Hz}$), 1.07(s, 3H, Chol-19or18), 0.92(d, 3H, Chol-21, $J=6.4\text{Hz}$), 0.87(dd, 6H, Chol-26,27, $J=6.4, J=1.6\text{Hz}$), 0.69(s, 3H, Chol-18or19), 2.10-0.90(m, 34H). IR (CDCl_3) 2935, 2856, 1703, 1605, 1597, 1510, 1468, 1421, 1369, 1317, 1284, 1254, 1211, 1169, 1121 cm^{-1} . Anal. Calcd for $\text{C}_{47}\text{H}_{69}\text{NO}_4$: C: 79.28; H: 9.77; N: 1.97%. Found: C: 79.26; H: 9.83; N: 1.98%.

Cholesteryl *p*-[(9-(4-pyridyloxy)nonyloxy)benzoate (2f**).** ^1H -NMR (CDCl_3) δ 8.41(d, 2H, Pyridine, $J=6.0\text{Hz}$), 7.98(d, 2H, Ph, $J=8.8\text{Hz}$), 6.89(d, 2H, Ph, $J=8.8\text{Hz}$), 6.79(d, 2H, Pyridine, $J=6.0\text{Hz}$), 5.41(d, 1H, Chol-6, $J=3.6\text{Hz}$), 4.82(m, Chol-3, 1H), 4.00(t, 4H, $J=6.0\text{Hz}$), 2.45(d, 2H, Chol-4, $J=7.6\text{Hz}$), 1.07(s, 3H, Chol-19or18), 0.92(d, 3H, Chol-21, $J=6.4\text{Hz}$), 0.87(dd, 6H, Chol-26,27, $J=6.4, J=1.6\text{Hz}$), 0.69(s, 3H, Chol-18or19), 2.10-0.90(m, 36H). IR (CDCl_3) 2941, 2868, 1703, 1605, 1597, 1510, 1468, 1421, 1371, 1317, 1284, 1254, 1211, 1169, 1119 cm^{-1} . Anal. Calcd for $\text{C}_{48}\text{H}_{71}\text{NO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$: C: 78.42; H: 9.87; N: 1.91%. Found: C: 78.12; H: 9.81; N: 1.90%.

Cholesteryl *p*-[(10-(4-pyridyloxy)decyloxy)benzoate (2g**).** ^1H -NMR (CDCl_3) δ 8.41(d, 2H, Pyridine, $J=6.0\text{Hz}$), 7.98(d, 2H, Ph, $J=8.8\text{Hz}$), 6.89(d, 2H, Ph, $J=8.8\text{Hz}$), 6.79(d, 2H, Pyridine, $J=6.0\text{Hz}$), 5.41(d, 1H, Chol-6, $J=3.6\text{Hz}$), 4.82(m, Chol-3, 1H), 4.00(t, 4H, $J=6.0\text{Hz}$), 2.45(d, 2H, Chol-4, $J=7.6\text{Hz}$), 1.07(s, 3H, Chol-19or18), 0.92(d, 3H, Chol-21, $J=6.4\text{Hz}$), 0.87(dd, 6H, Chol-26,27, $J=6.4, J=1.6\text{Hz}$), 0.69(s, 3H, Chol-18or19), 2.10-0.90(m, 38H). IR (CDCl_3) 2937, 2856, 1703, 1606, 1597, 1510, 1468, 1421, 1369, 1317, 1284, 1254, 1211, 1169, 1121 cm^{-1} . Anal. Calcd for $\text{C}_{49}\text{H}_{73}\text{NO}_4$: C: 79.52; H: 9.94; N: 1.89%. Found: C: 79.35; H: 10.06; N: 1.84%.

Cholesteryl *p*-[(11-(4-pyridyloxy)undecyloxy)benzoate (2h**).** ^1H -NMR (CDCl_3) δ 8.40(d, 2H, Pyridine, $J=6.0\text{Hz}$), 7.98(d, 2H, Ph, $J=8.8\text{Hz}$), 6.89(d, 2H, Ph, $J=8.8\text{Hz}$), 6.79(d, 2H, Pyridine, $J=6.0\text{Hz}$), 5.41(d, 1H, Chol-6, $J=3.6\text{Hz}$), 4.82(m, Chol-3, 1H), 4.00(t, 4H, $J=6.0\text{Hz}$), 2.45(d, 2H, Chol-4, $J=7.6\text{Hz}$), 1.07(s, 3H, Chol-19or18), 0.92(d, 3H, Chol-21, $J=6.4\text{Hz}$), 0.87(dd, 6H, Chol-26,27, $J=6.4, J=1.6\text{Hz}$), 0.69(s, 3H, Chol-18or19), 2.10-0.90(m, 40H). IR (CDCl_3) 2943, 2870, 1703, 1605, 1597, 1508, 1468, 1421, 1371, 1317, 1284, 1254, 1211, 1169, 1122 cm^{-1} . Anal. Calcd for $\text{C}_{50}\text{H}_{75}\text{NO}_4$: C: 79.63; H: 10.02; N: 1.86%. Found: C: 79.40; H: 10.13; N: 1.89%.

Cholesteryl *p*-[(12-(4-pyridyloxy)dodecyloxy)benzoate (2i**).** ^1H -NMR (CDCl_3) δ 8.40(d, 2H, Pyridine, $J=6.0\text{Hz}$), 7.98(d, 2H, Ph, $J=8.8\text{Hz}$), 6.89(d, 2H, Ph, $J=8.8\text{Hz}$), 6.79(d, 2H, Pyridine, $J=6.0\text{Hz}$), 5.41(d, 1H, Chol-6, $J=3.6\text{Hz}$), 4.82(m, Chol-3, 1H), 4.00(t, 4H, $J=6.0\text{Hz}$), 2.45(d, 2H, Chol-4, $J=7.6\text{Hz}$), 1.07(s, 3H, Chol-19or18), 0.92(d, 3H, Chol-21, $J=6.4\text{Hz}$), 0.87(dd, 6H, Chol-26,27, $J=6.4, J=1.6\text{Hz}$), 0.69(s, 3H, Chol-18or19), 2.10-0.90(m, 42H). IR (CDCl_3) 2935, 2856, 1703, 1605, 1597, 1508, 1468, 1421, 1371, 1317, 1284, 1254, 1211, 1169, 1120 cm^{-1} . Anal. Calcd for $\text{C}_{51}\text{H}_{77}\text{NO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$: C: 78.82; H: 10.12; N: 1.82%. Found: C: 78.75; H: 10.07; N: 1.80%.

Cholestery *p*-[4-(4-pyridon-1-yl)butoxy]benzoate (3a). ¹H-NMR (CDCl₃) δ8.00(d, 2H, Ph, J=8.8Hz), 7.30(d, 2H, Pyridone, J=7.6Hz), 6.88(d, 2H, Ph, J=8.8Hz), 6.41(d, 2H, Pyridone, J=7.6Hz), 5.42(d, 1H, Chol-6, J=3.6Hz), 4.83(m, Chol-3, 1H), 4.06(t, 2H, J=6.0 Hz), 3.87(t, 2H, J=7.0 Hz), 2.45(d, 2H, Chol-4, J=7.6Hz), 1.07 (s, 3H, Chol-19or18), 0.92 (d, 3H, Chol-21, J=6.4 Hz), 0.87 (dd, 6H, Chol-26,27, J=6.4, J=1.6 Hz), 0.69 (s, 3H, Chol-18or19), 2.10-0.90 (m, 26H). IR (CDCl₃) 2951, 2870, 1703, 1639, 1606, 1576, 1510, 1470, 1371, 1317, 1278, 1252, 1169, 1122 cm⁻¹.

Cholestery *p*-[5-(4-pyridon-1-yl)pentloxy]benzoate (3b). ¹H-NMR (CDCl₃) δ7.99(d, 2H, Ph, J=8.8Hz), 7.26(d, 2H, Pyridone, J=7.6Hz), 6.88(d, 2H, Ph, J=8.8Hz), 6.40(d, 2H, Pyridone, J=7.6Hz), 5.42(d, 1H, Chol-6, J=3.6Hz), 4.82(m, Chol-3, 1H), 4.02(t, 2H, J=6.0Hz), 3.80(t, 2H, J=7.0Hz), 2.45(d, 2H, Chol-4, J=7.6Hz), 1.07 (s, 3H, Chol-19or18), 0.92 (d, 3H, Chol-21, J=6.4 Hz), 0.87 (dd, 6H, Chol-26,27, J=6.4, J=1.6 Hz), 0.69 (s, 3H, Chol-18or19), 2.10-0.90 (m, 28H). IR (CDCl₃) 2949, 2870, 1703, 1639, 1606, 1576, 1510, 1468, 1371, 1317, 1279, 1252, 1169, 1122 cm⁻¹.

Cholestery *p*-[6-(4-pyridon-1-yl)hexyloxy]benzoate (3c). ¹H-NMR (CDCl₃) δ7.99(d, 2H, Ph, J=8.8Hz), 7.26(d, 2H, Pyridone, J=7.6Hz), 6.89(d, 2H, Ph, J=8.8Hz), 6.40(d, 2H, Pyridone, J=7.6Hz), 5.42(d, 1H, Chol-6, J=3.6Hz), 4.82(m, Chol-3, 1H), 4.00(t, 2H, J=6.0Hz), 3.77(t, 2H, J=7.0Hz), 2.45(d, 2H, Chol-4, J=7.6Hz), 1.07 (s, 3H, Chol-19or18), 0.92 (d, 3H, Chol-21, J=6.4 Hz), 0.87 (dd, 6H, Chol-26,27, J=6.4, J=1.6 Hz), 0.69 (s, 3H, Chol-18or19), 2.10-0.90 (m, 30H). IR (CDCl₃) 2944, 2868, 1703, 1639, 1606, 1576, 1510, 1468, 1371, 1317, 1279, 1254, 1169, 1122 cm⁻¹.

Cholestery *p*-[7-(4-pyridon-1-yl)heptyloxy]benzoate (3d). ¹H-NMR (CDCl₃) δ7.98(d, 2H, Ph, J=8.8Hz), 7.26(d, 2H, Pyridone, J=7.6Hz), 6.89(d, 2H, Ph, J=8.8Hz), 6.40(d, 2H, Pyridone, J=7.6Hz), 5.42(d, 1H, Chol-6, J=3.6Hz), 4.82(m, Chol-3, 1H), 4.00(t, 2H, J=6.0Hz), 3.75(t, 2H, J=7.0Hz), 2.45(d, 2H, Chol-4, J=7.6Hz), 1.07 (s, 3H, Chol-19or18), 0.92 (d, 3H, Chol-21, J=6.4 Hz), 0.87 (dd, 6H, Chol-26,27, J=6.4, J=1.6 Hz), 0.69 (s, 3H, Chol-18or19), 2.10-0.90 (m, 32H). IR (CDCl₃) 2944, 2868, 1703, 1639, 1606, 1576, 1510, 1468, 1371, 1317, 1279, 1254, 1169, 1122 cm⁻¹.

Cholestery *p*-[8-(4-pyridon-1-yl)oxyloxy]benzoate (3e). ¹H-NMR (CDCl₃) δ7.98(d, 2H, Ph, J=8.8Hz), 7.26(d, 2H, Pyridone, J=7.6Hz), 6.89(d, 2H, Ph, J=8.8Hz), 6.40(d, 2H, Pyridone, J=7.6Hz), 5.42(d, 1H, Chol-6, J=3.6Hz), 4.82(m, Chol-3, 1H), 4.00(t, 2H, J=6.0Hz), 3.75(t, 2H, J=7.0Hz), 2.45(d, 2H, Chol-4, J=7.6Hz), 1.07 (s, 3H, Chol-19or18), 0.92 (d, 3H, Chol-21, J=6.4 Hz), 0.87 (dd, 6H, Chol-26,27, J=6.4, J=1.6 Hz), 0.69 (s, 3H, Chol-18or19), 2.10-0.90 (m, 34H). IR (CDCl₃) 2937, 2868, 1703, 1639, 1606, 1576, 1510, 1468, 1369, 1317, 1279, 1254, 1169, 1121 cm⁻¹.

Cholestery *p*-[9-(4-pyridon-1-yl)nonyloxy]benzoate (3f). ¹H-NMR (CDCl₃) δ7.98(d, 2H, Ph, J=8.8Hz), 7.26(d, 2H, Pyridone, J=7.6Hz), 6.89(d, 2H, Ph, J=8.8Hz), 6.40(d, 2H, Pyridone, J=7.6Hz), 5.42(d, 1H, Chol-6, J=3.6Hz), 4.82(m, Chol-3, 1H), 4.00(t, 2H, J=6.0Hz), 3.75(t, 2H, J=7.0Hz), 2.45(d, 2H, Chol-4, J=7.6Hz), 1.07 (s, 3H, Chol-19or18), 0.92 (d, 3H, Chol-21, J=6.4 Hz), 0.87 (dd, 6H, Chol-26,27, J=6.4, J=1.6 Hz), 0.69 (s, 3H, Chol-18or19), 2.10-0.90 (m, 36H). IR (CDCl₃) 2935, 2856, 1703, 1639, 1606, 1574, 1510, 1468, 1371, 1317, 1279, 1254 1169, 1122 cm⁻¹.

Cholestery *p*-[10-(4-pyridon-1-yl)decyloxy]benzoate (3g). ¹H-NMR (CDCl₃) δ7.98(d, 2H, Ph, J=8.8Hz), 7.26(d, 2H, Pyridone, J=7.6Hz), 6.89(d, 2H, Ph, J=8.8Hz), 6.40(d, 2H, Pyridone, J=7.6Hz), 5.42(d, 1H, Chol-6, J=3.6Hz), 4.82(m, Chol-3, 1H), 4.00(t, 2H, J=6.0Hz), 3.75(t, 2H, J=7.0Hz), 2.45(d, 2H, Chol-4, J=7.6Hz), 1.07 (s, 3H, Chol-19or18), 0.92 (d, 3H, Chol-21, J=6.4 Hz), 0.87 (dd, 6H, Chol-26,27, J=6.4, J=1.6 Hz), 0.69 (s, 3H, Chol-18or19), 2.10-0.90 (m, 38H). IR (CDCl₃) 2931, 2856, 1703, 1639, 1606, 1576, 1510, 1468, 1371, 1315, 1277, 1254, 1169, 1119 cm⁻¹.

Cholestery *p*-[11-(4-pyridon-1-yl)undecyloxy]benzoate (3h). ¹H-NMR (CDCl₃) δ7.98(d, 2H, Ph, J=8.8Hz), 7.26(d, 2H, Pyridone, J=7.6Hz), 6.89(d, 2H, Ph, J=8.8Hz), 6.40(d, 2H, Pyridone, J=7.6Hz), 5.42(d, 1H, Chol-6, J=3.6Hz), 4.82(m, Chol-3, 1H), 4.00(t, 2H, J=6.0Hz), 3.75(t, 2H, J=7.0Hz), 2.45(d, 2H, Chol-4, J=7.6Hz), 1.07 (s, 3H, Chol-19or18), 0.92 (d, 3H, Chol-21, J=6.4 Hz), 0.87 (dd, 6H, Chol-26,27, J=6.4, J=1.6 Hz), 0.69 (s, 3H, Chol-18or19), 2.10-0.90 (m, 40H). IR (CDCl₃) 2935, 2856, 1703, 1639, 1606, 1574, 1510, 1468, 1371, 1317, 1279, 1254 1169, 1122 cm⁻¹.

Cholestery *p*-[12-(4-pyridon-1-yl)dodecyloxy]benzoate (3i). ¹H-NMR (CDCl₃) δ7.98(d, 2H, Ph, J=8.8Hz), 7.26(d, 2H, Pyridone, J=7.6Hz), 6.89(d, 2H, Ph, J=8.8Hz), 6.40(d, 2H, Pyridone, J=7.6Hz), 5.42(d, 1H, Chol-6, J=3.6Hz), 4.82(m, Chol-3, 1H), 4.00(t, 2H, J=6.0Hz), 3.75(t, 2H, J=7.0Hz), 2.45(d, 2H, Chol-4, J=7.6Hz), 1.07 (s, 3H, Chol-19or18), 0.92 (d, 3H, Chol-21, J=6.4 Hz), 0.87 (dd, 6H, Chol-26,27, J=6.4, J=1.6 Hz), 0.69 (s, 3H, Chol-18or19), 2.10-0.90 (m, 42H). IR (CDCl₃) 2933, 2856, 1703, 1639, 1606, 1576, 1510, 1468, 1371, 1317, 1277, 1254, 1169, 1120 cm⁻¹.

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