Synthesis of Potential Bioactive Novel 7-[2-Hydroxy-3-(1,2,3-triazol-1-yl) propyloxy]-3-alkyl-4-methylcoumarins

Anu Arya,[a] Vinod Kumar,[a] Divya Mathur,[a] Sukhdev Singh,[a] Raju Brahma,[b] Rajpal Singh,[b] Seema Singh,[c] G. L. Sharma,[c] Virinder S. Parmar,[a] and Ashok K. Prasad[a]*

[a]Bioorganic Laboratory, Department of Chemistry, University of Delhi, Delhi 110 007, India
[b]CFEES, Brig. S. K, Mazumdar Road, Timarpur, Delhi 110 054, India
[c]IGIB, Delhi University Campus, Mall Road, Delhi 110 007, India
*E-mail: ashokenzyme@yahoo.com
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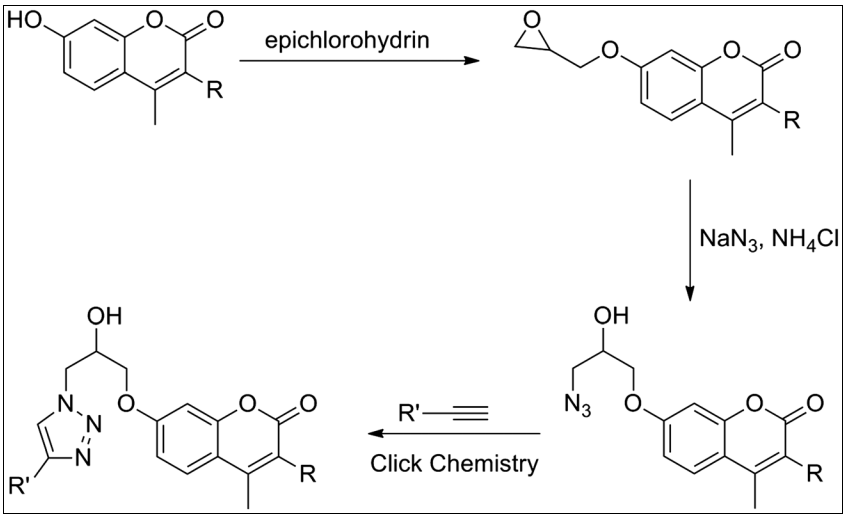


A series of 50 novel 7-[2-hydroxy-3-(1,2,3-triazol-1-yl)propyloxy]-3-alkyl-4-methylcoumarins had been designed and synthesized in good to excellent yields via Cu(I)-catalyzed 1,3-dipolar cycloaddition reaction "click chemistry" of 7-(3-azido-2-hydroxypropyloxy)-3-alkyl-4-methylcoumarins with variety of acetylene derivatives. In turn, the precursor compound, that is, 7-(3-azido-2-hydroxypropyloxy)-3-alkyl-4-methylcoumarin, was synthesized by condensation of epichlorohydrin with 7-hydroxy-3-alkyl-4-methylcoumarins followed by opening of the epoxide ring in the resulted 7-epoxymethoxy-3-alkyl-4-methylcoumarins with sodium azide. All the synthesized compounds were unambiguously identified on the basis of their spectral data analyses (IR, ^{1}H-NMR, ^{13}C-NMR spectra, and HRMS).

INTRODUCTION

Click chemistry has been one of the most advanced approaches for chemical transformation in combinatorial and bioconjugation chemistry. It offers a unique method for the synthesis of 1,2,3-triazole-containing molecules [1]. The compounds with 1,4-disubstituted 1,2,3-triazole moieties are known to display broad spectrum of chemotherapeutic properties such as antimalarial [2], anticonvulsant [3], antibacterial [4], antifungal [5], and anti-HIV agents [6]. Further, coumarins are broadly distributed in the plant kingdom and have evoked a great deal of interest in recent years because of their diverse pharmacological properties [7]. They have shown to be useful as antioxidant [8], inhibitors of platelet aggregation [9], anti-inflammatory [10], anticonvulsant [11], antiviral [12], anti-HIV [13], anticoagulant [14], antibacterial [15], antitubercular [16], and antifungal [17]. Herein, we report synthesis of a small library of triazole-conjugated coumarins, that is, 7-[2-hydroxy-3-(1,2,3-triazol-1-yl)propyloxy]-3-alkyl-4-methylcoumarins via Cu(I)-catalyzed 1,3-dipolar cycloaddition reaction of corresponding azidocoumarin derivatives with different alkynes.

RESULTS AND DISCUSSION

A series of 50 novel 7-[2-hydroxy-3-(1,2,3-triazol-1-yl) propyloxy]-3-ethyl-/hexyl-4-methylcoumarins **11a–d**, **12a–d**, **15a–u**, and **16a–u** were synthesized via Cu(I)-catalyzed click reaction of 7-(3-azido-2-hydroxypropyloxy)-3-ethyl-4-methylcoumarin (**8**) and 7-(3-azido-2-hydroxypropyloxy)-3-hexyl-4-methylcoumarins (**9**) with various alkynes **10a–d** and **14a–u** in 80 to 92% yields. In turn, the synthesis of 7-(3-azido-2-hydroxypropyloxy)-3-ethyl-/hexyl-4-methylcoumarins **8** and **9** were accomplished using a multistep process, starting with the condensation of ethyl 2-ethylacetoacetate

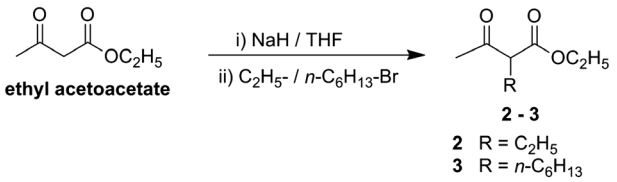
(**2**) and ethyl 2-hexylacetoacetate (**3**) with resorcinol (**1**) to afford 3-ethyl-7-hydroxy-4-methylcoumarin (**4**) and 3-hexyl-7-hydroxy-4-methylcoumarin (**5**) in 80 and 78% yields (Scheme 1). Ethyl 2-ethylacetoacetate/hexylacetoacetate **2/3** was synthesized by alkylation at C-2 of ethyl acetoacetate with ethyl bromide or *n*-hexyl bromide in THF in the presence of NaH (Scheme 2). The epoximethylation of C-7 hydroxyl group in 3-alkylcoumarins **4** and **5** using epichlorohydrin in the presence of base afforded 7-epoxymethoxy-3-ethyl-4-methylcoumarins (**6**) and 7-epoxymethoxy-3-hexyl-4-methylcoumarins (**7**) in 72 and 70% yields. The opening of epoxide ring in coumarins **6** and **7** with sodium azide afforded the desired precursor, that is, azidocoumarins **8** and **9** in 90 and 85% yields (Scheme 1).

Traditionally, the triazole forming 1,3-dipolar cycloaddition reaction between azide and alkyne is performed at high temperature and for long duration that usually results in a mixture of two isomers 1,4-disubstituted and 1,5-disubstituted 1,2,3-triazoles [18]. Sharpless–Meldal 1,3-dipolar cycloaddition reaction to form regioselectively 1,4-disubstituted 1,2,3-triazole bridges is a very popular and useful reaction for the bioconjugation [1a,19]. The reaction is regioselective only in the presence of Cu(I) salts as a catalyst, because Cu(I) as a catalyst strongly activate the terminal acetylenes toward 1,3-dipole in azide to give the desired 1,4-disubstituted 1,2,3-triazole. Thus, Cu(I)-catalyzed 1,3-dipolar cycloaddition reaction of 7-(3-azido-2-hydroxypropyloxy)-3-ethyl-/hexyl-4-methylcoumarins **8** and **9** with commercially available alkynes, such as phenyl acetylene (**10a**), pent-4-ynoic acid (**10b**), 5-chloro-1-pentyne (**10c**), and propargyl alcohol (**10d**), in the presence of catalytic amount of copper sulfate–sodium ascorbate in *t*-BuOH/H_2O/THF (1:1:1) afforded 7-[2-hydroxy-3-(1,2,3-triazol-1-yl)propyloxy]-3-ethyl-/hexyl-4-methylcoumarins **11a–d** and **12a–d** in 80 to 92% yields (Scheme 3).

The synthesis of 7-[2-hydroxy-3-(1,2,3-triazol-1-yl)propyloxy]-3-ethyl-/hexyl-4-methylcoumarins **15a–u** and **16a–u** were achieved by the similar condensation reaction of 7-(3-azido-2-hydroxypropyloxy)-3-ethyl-/hexyl-4-methylcoumarins **8** and **9** with propargyl aryl ethers **14a–u**, which were in turn prepared in excellent yields by heating substituted phenols **13a–u** with propargyl bromide in acetone in the presence of anhydrous K_2CO_3 in 90 to 95% yields (Scheme 4).

Thus, a series of 50 triazole-conjugated coumarins, 7-[2-hydroxy-3-(1,2,3-triazole-1-yl)propyloxy]-3-ethyl-/hexyl-4-methylcoumarins **11a–d**, **12a–d**, **15a–u**, and **16a–u**, have been synthesized together with their precursor coumarins **4** to **9**. The structures of synthesized coumarin derivatives **4** to **9**, **11a–d**, **12a–d**, **15a–u**, and **16a–u** were unambiguously established on the basis of their spectral data analyses (^{1}H-NMR, ^{13}C-NMR, IR, and HRMS spectra). The structure of known coumarins **4** and **5** were further confirmed by comparison of their physical and spectral data with those reported in the literature [20].

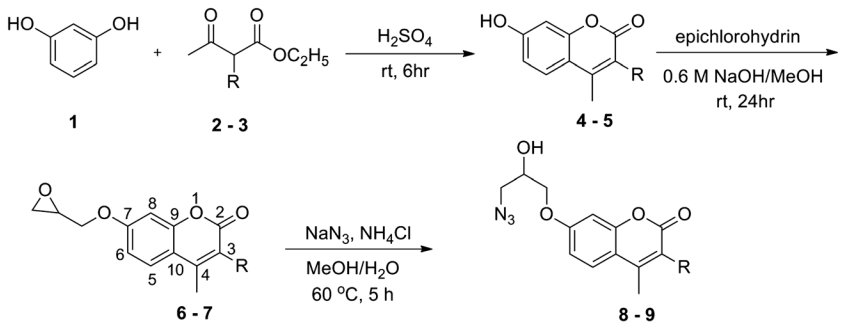
Scheme 2. Alkylation of ethyl acetoacetate.



EXPERIMENTAL

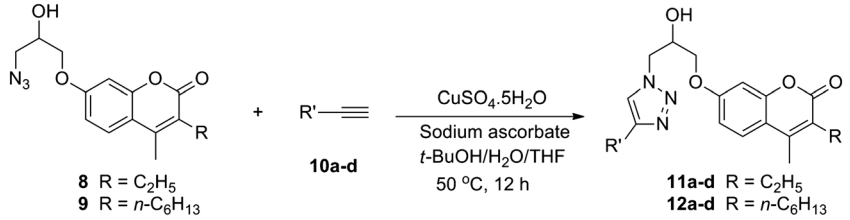
Melting points were determined on Buchi M-560 instrument (Flawil, Switzerland) and are uncorrected. The IR spectra were recorded on a Perkin-Elmer model 2000 FTIR spectrometer (Waltham, MA) by making KBr disc for solid samples and thin film for oils. The ^{1}H-NMR and ^{13}C-NMR spectra were recorded on a JEOL alpha-400 spectrometer (Tokyo, Japan) at 400 and 100.6 MHz, respectively, using TMS as an internal standard. The chemical shift values are on δ scale, and the coupling constants (*J*) are in Hz. Signals due to OH group in ^{1}H-NMR spectra recorded in $CDCl_3$ were verified by removing them by using D_2O exchange

Scheme 1. Synthesis of 7-(3-azido-2-hydroxypropyloxy)-3-ethyl-/hexyl-methylcoumarins.



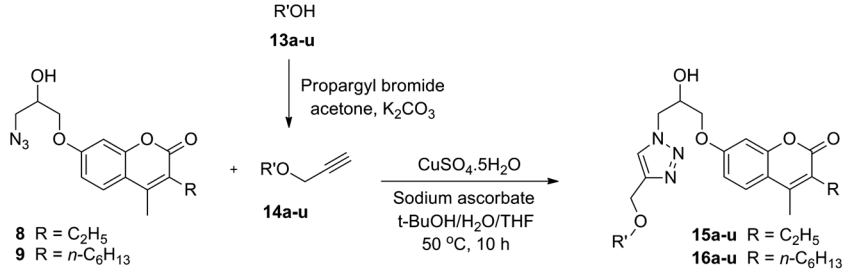
Compds.	2, 4, 6, 8	3, 5, 7, 9
R	C_2H_5	*n*-C_6H_{13}

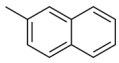
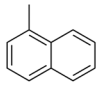
Scheme 3. Synthesis of 7-[2-hydroxy-3(1,2,3-triazol-1-yl)propyloxy]-3-ethyl-/hexyl-4-methylcoumarin.



Compds. **10, 11** and **12**	**a**	**b**	**c**	**d**
R'	Ph	CH_2CH_2COOH	$CH_2CH_2CH_2Cl$	CH_2OH

Scheme 4. Synthesis of 7-[2-hydroxy-3-(1,2,3-triazol-1-yl)propyloxy]-3-ethyl-/hexyl-4-methylcoumarin.



Compds. **13-16**	R'	Compds. **13-16**	R'
a	Ph	**m**	Ph(*o*-OCH_3)
b	Ph(*o*-Cl)	**n**	Ph(*m*-OCH_3)
c	Ph(*m*-Cl)	**o**	Ph(*o*-I)
d	Ph(*p*-Cl)	**p**	Ph(*p*-I)
e	Ph(*o*-Br)	**q**	Ph(*m*-F)
f	Ph(*p*-Br)	**r**	Ph(*p*-F)
g	Ph(*o*-NO_2)	**s**	Ph(*p*-Ph)
h	Ph(*m*-NO_2)	**t**	
i	Ph(*p*-NO_2)		
j	Ph(*o*-CH_3)	**u**	
k	Ph(*m*-CH_3)		
l	Ph(*p*-CH_3)		

method. The mass spectra were recorded on microTOF-Q instrument from Bruker Daltonics, Bremen, Germany, and were run in ESI positive mode. Reactions were conducted under an atmosphere of nitrogen when anhydrous solvents were used. Analytical TLCs were performed on precoated Merck silica gel (Prabhadevi, Mumbai, India) $60F_{254}$ plates; the spots were detected under UV light. Silica gel (100–200 mesh) (S d fine-Chem Limited, Mumbai, India; Sigma-Aldrich, New Delhi, India) was used for column chromatography. Chemicals were obtained from commercial suppliers and were used without any further purification unless otherwise noted.

General procedure for the synthesis of ethyl 2-ethylacetoacetate/hexylacetoacetate 2 and 3. To a stirred solution of ethyl acetoacetate (76.8 mmol) in THF (30 mL) was added sodium hydride (130.6 mmol) in small lots at 0°C. The reaction mixture was heated at 60°C for 2 h after the addition of sodium hydride was completed. The contents of the reaction flask were cooled to 0°C, and then addition of ethyl bromide or 1-bromohexane (80 mmol) dissolved in THF was carried out. The resultant mixture thus obtained was heated at 100°C for 10–12 h. The reaction was monitored by TLC (10% ethyl acetate–petroleum ether). On completion of the reaction, as indicated by TLC examination, unreacted sodium hydride was deactivated by addition of ethyl acetate, and the solution was then filtered to remove sodium bromide formed during the reaction. The solution was washed with water, the organic layer dried over anhydrous sodium sulfate, and the solvent

evaporated. The crude product thus obtained was subjected to column chromatography using silica gel (100–200 mesh), and the desired products, that is, ethyl 2-ethylacetoacetate **2** or ethyl 2-hexylacetoacetate **3**, were eluted with 2% ethyl acetate–petroleum ether as viscous oils. The structures of compounds **2** and **3** were unambiguously established on the basis of their spectral data analysis (IR, ^{1}H-NMR, ^{13}C-NMR spectra, and HRMS) and their comparison with those reported in the literature.[20]

General procedure for the synthesis of 3-alkyl-7-epoxymethoxy-4-methylcoumarins (6 and 7). The titled coumarins were synthesized in two steps. In the first step, concentrated sulfuric acid (5 mL) was added dropwise into a mixture of resorcinol (**1**, 9.0 mmol) and alkylated ethyl acetoacetate (**2/3**, 15.4 mmol) under stirring at 0°C. The mixture was stirred at room temperature for 3 to 4 h. On completion of the reaction after 6 h as indicated by TLC examination, 100 mL ice/water was added to precipitate the compound. The crude solid thus obtained was filtered, washed with water, dried, and crystallized from ethanol to give the 3-ethyl-7-hydroxy-4-methylcoumarin **4** and 3-hexyl-7-hydroxy-4-methylcoumarin **5** in 78 and 80% yields, respectively, as pale yellow colored crystals. In the second step, 3-alkyl-7-hydroxy-4-methylcoumarin (**4/5**, 5.7 mmol) was added into 0.6 *M* NaOH solution (50 mL) in methanol (30 mL) with constant stirring at 0°C followed by dropwise addition of epichlorohydrin (8.52 mmol), and the stirring of the reaction was continued for 24 h at room temperature. After completion of the reaction as indicated by TLC examination, methanol was completely evaporated under reduced pressure, and the residue thus obtained was extracted with chloroform (4×50 mL) and washed with brine (2×20 mL). Organic layer was separated and dried over anhydrous Na_2SO_4. The solvent was removed under reduced pressure, and the crude product thus obtained was purified by column chromatography on silica gel using EtOAc : petroleum ether (2:8) as an eluent to obtain pure epoxymethoxylated coumarins **6** and **7** in 72 and 70% yield, respectively.

7-Epoxymethoxy-3-ethyl-4-methylcoumarins (6). It was obtained as white solid, mp 103–105°C; IR (KBr): 2859, 1720, 1607, 1389, 1281, 1151, 1069, and 841 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.14 (3H, t, $J = 7.3$ Hz, $-CH_2CH_3$), 2.39 (3H, s, C-4 CH_3), 2.66 (2H, q, $J = 7.3$ Hz, $-CH_2CH_3$), 3.52–3.61 (2H, m, $-CH_2$ of epoxide), 4.07–4.27 (3H, m, $-CH$ of epoxide and $-OCH_2$), 6.80 (1H, d, $J = 2.2$ Hz, C-8H), 6.86 (1H, dd, $J = 8.8$ and 2.2 Hz, C-6H), 7.50 (d, 1H, $J = 8.8$ Hz, C-5H); ^{13}C-NMR (100.6 MH_Z, $CDCl_3$): δ 13.03 ($-CH_2CH_3$), 14.49 (C-4 CH_3), 20.74 ($-CH_2CH_3$), 53.27 ($-CH_2$ of epoxide), 68.96 ($-OCH_2$), 69.36 (—CH of epoxide), 101.29 (C-8), 112.06 (C-6), 114.74 (C-10), 125.16 (C-3), 125.47 (C-5), 145.82 (C-9), 153.36 (C-4), 160.07 (C-7), 161.94 (CO); HR-ESI-TOF-MS *m/z* 261.1115 ($[M + H]^+$), calcd for $[C_{15}H_{16}O_4 + H]^+$ 261.1121.

7-Epoxymethoxy-3-hexyl-4-methylcoumarins (7). It was obtained as white solid, mp 104–105°C; IR (KBr): 2851, 1718, 1610, 1389, 1277, 1121, 1060, and 844 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, $J = 7.3$ Hz, $-(CH_2)_5CH_3$), 1.30–1.40 (6H, m, $-CH_2CH_2(CH_2)_3CH_3$), 1.47–1.53 (2H, m, $-CH_2CH_2(CH_2)_3CH_3$), 2.38 (3H, s, C-4 CH_3), 2.63 (2H, t, $J = 7.3$ Hz, $-CH_2(CH_2)_4CH_3$), 3.52–3.60 (2H, m, $-CH_2$ of epoxide), 4.06–4.23 (3H, m, $-CH$ of epoxide and $-OCH_2$), 6.79 (1H, d, $J = 2.2$ Hz, C-8H), 6.86 (1H, dd, $J = 8.8$ and 2.2 Hz, C-6H), 7.51 (d, 1H, $J = 8.8$ Hz, C-5H); ^{13}C-NMR (100.6 MH_Z, $CDCl_3$): δ 14.03 ($-(CH_2)_5CH_3$), 14.79 (C-4 CH_3), 22.57 ($-CH_2(CH_2)_3CH_2CH_3$), 27.47 ($-CH_2CH_2(CH_2)_2CH_3$), 29.31 ($-(CH_2)_2CH_2(CH_2)_2CH_3$), 31.63 ($-(CH_2)_3CH_2CH_2CH_3$), 53.26 ($-CH_2$ of epoxide), 68.97 ($-OCH_2$), 69.35 (—CH of epoxide), 101.28 (C-8), 112.03 (C-6), 114.76 (C-10), 124.06 (C-3), 125.47 (C-5), 145.98 (C-9), 153.36 (C-4), 160.03 (C-7), 162.07 (CO); HR-ESI-TOF-MS *m/z* 317.1743 ($[M + H]^+$), calcd for $[C_{19}H_{24}O_4 + H]^+$ 317.1747.

Synthesis of 7-(3-azido-2-hydroxypropyloxy)-3-ethyl-/hexyl-4-methylcoumarin (8 and 9). Epoxymethoxylated coumarins **6** and **7** (43.1 mmol), sodium azide (215.5 mmol), and ammonium chloride (103.5 mmol) were added to a solution of methanol–water (50 mL, 4:1 v/v). The reaction mixture was carried at 70°C, and the conversion of the starting compound into the product was monitored by TLC. Upon completion of the reaction, methanol was evaporated followed by the addition of water (50 mL) to the residue. The product was extracted with $CHCl_3$ (3×30 mL), and the organic layer was combined, dried over Na_2SO_4, and solvent removed under reduced pressure to afford the crude product. The crude product thus obtained was purified by column chromatography on silica gel using EtOAc : petroleum ether (1:9) as an eluent to obtain pure epoxymethoxylated coumarins **6** and **7**. The alcohols **8** and **9** were purified by column chromatography using EtOAc : petroleum ether (1:9) as an eluting solvent to obtain pure 7-(3-azido-2-hydroxypropyloxy)-3-alkyl-4-methylcoumarins **8** and **9** in 90 and 85% yield, respectively.

7-(3-Azido-2-hydroxypropyloxy)-3-ethyl-4-methylcoumarin (8). It was obtained as white solid, mp 88–90°C; IR (KBr): 2858, 2113, 1714, 1617, 1392, 1288, 1156, 1078, and 746 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.14 (3H, t, $J = 8.1$ Hz, $-CH_2CH_3$), 2.39 (3H, s, C-4 CH_3), 2.66 (2H, q, $J = 7.3$ Hz, $-CH_2CH_3$), 2.79 (1H, dd, $J = 5.1$ and 2.9 Hz, $-CH_\alpha N$), 2.94 (1H, t, $J = 5.1$ Hz, $-CH_\beta N$), 3.39 (1H, m, —CH), 3.96 (1H, dd, $J = 11$ and 5.9 Hz, $-OCH_\alpha$), 4.33 (1H, dd, $J = 11$ and 2.9 Hz, $-OCH_\beta$), 6.80 (1H, d, $J = 2.2$ Hz, C-8H), 6.89 (1H, dd, $J = 9.5$ and 2.9 Hz, C-6H), 7.51 (1H, d, $J = 8.8$ Hz, C-5H); ^{13}C-NMR (100.6 MH_Z, $CDCl_3$): δ 13.04 ($-CH_2CH_3$), 14.48 (C-4 CH_3), 20.74 ($-CH_2CH_3$), 44.49 ($-CH_2N$), 49.77 (—CH), 69.02 ($-OCH_2$), 101.21 (C-8), 112.23 (C-6), 114.63 (C-10), 125.11 (C-3), 125.43 (C-5), 145.67 (C-9), 153.42 (C-4), 160.21 (C-7), 161.81 (CO); HR-ESI-TOF-MS *m/z* 326.1099 ($[M + Na]^+$), calcd for $[C_{15}H_{17}N_3O_4 + Na]^+$ 326.1111.

7-(3-Azido-2-hydroxypropyloxy)-3-hexyl-4-methylcoumarins (9). It was obtained as white solid, mp 84–86°C; IR (KBr): 2860, 2111, 1710, 1614, 1389, 1279, 1183, 1092, and 747 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.89 (3H, t, $J = 7.3$ Hz, $-(CH_2)_5CH_3$), 1.28–1.41 (6H, m, $-CH_2CH_2(CH_2)_3CH_3$), 1.48–1.55 (2H, m, $-CH_2CH_2(CH_2)_3CH_3$), 2.38 (3H, s, C-4 CH_3), 2.62 (2H, t, $J = 7.3$ Hz, $-CH_2(CH_2)_4CH_3$), 2.79 (1H, dd, $J = 4.4$ and 2.2 Hz, $-CH_\alpha N$), 2.94 (1H, t, $J = 5.1$ Hz, $-CH_\beta N$), 3.39 (1H, m, —CH), 3.96 (1H, dd, $J = 11$ and 5.9 Hz, $-OCH_\alpha$), 4.33 (1H, dd, $J = 10.9$ and 2.9 Hz, $-OCH_\beta$), 6.80 (1H, d, $J = 2.2$ Hz, C-8H), 6.89 (1H, dd, $J = 9.5$ and 2.9 Hz, C-6H), 7.51 (1H, d, $J = 8.8$ Hz, C-5H); ^{13}C-NMR (100.6 MH_Z, $CDCl_3$): δ 14.04 ($-(CH_2)_5CH_3$), 14.79 (C-4CH_3), 22.58 ($-CH_2(CH_2)_3CH_2CH_3$), 27.49 ($-CH_2CH_2(CH_2)_3CH_3$), 28.74 ($-(CH_2)_2CH_2(CH_2)_2CH_3$), 29.33 ($-(CH_2)_3CH_2CH_2CH_3$), 44.51 ($-CH_2$ N), 49.78 (—CH), 69.03 ($-OCH_2$), 101.21 (C-8), 112.24 (C-6), 114.67 (C-10), 124.03 (C-3), 125.44 (C-5), 145.84 (C-4), 153.44 (C-9), 160.19 (C-7), 161.95 (CO); HR-ESI-TOF-MS *m/z* 360.1900 ($[M + Na]^+$), calcd for $[C_{19}H_{25}N_3O_4 + Na]^+$ 360.1918.

General procedure for the synthesis of propargyl ethers 14a–u. To a stirred solution of substituted phenols (**13a–u**, 50.0 mmol) in acetone (80 mL), equimolar amount of propargyl bromide and K_2CO_3 (150.0 mmol) were added. The reaction mixture was refluxed at 60°C for 12 h. On completion of the reaction as indicated by the TLC, the solvent was removed under reduced pressure followed by addition of water (30 mL) to the residue. The compound was extracted with chloroform (3×30 mL), the combined organic solvent was dried over anhydrous Na_2SO_4, and the solvent was evaporated under reduced pressure to afford propargyl ethers **14a–u**, which were used as such for the next reaction.

General procedure for the synthesis of 7-[2-hydroxy-3-(1,2,3-triazol-1-yl)propyloxy]-3-ethyl-/hexyl-4-methylcoumarins 11a–d, 12a–d, 15a–u, and 16a–u. To a solution of 7-(3-azido-2-hydroxypropyloxy)-3-ethyl-/hexyl-4-methylcoumarin (**8/9**, 3.60 mmol) and alkynes (**10a–d** or **14a–u**, 4.3 mmol) in *t*-BuOH/H_2O/THF (3 mL, 1/1/1, v/v/v) were added sodium ascorbate (1.3 mmol) and copper(II) sulfate pentahydrate (0.5 mmol). Thereafter, the reaction mixture was stirred at 60°C, and the reaction was monitored by TLC. On completion of the reaction as indicated by TLC examination, the solvent was evaporated under reduced pressure, and the crude product thus obtained was purified by silica gel column chromatography using methanol/chloroform as eluent to afford the desired products **11a–d**, **12a–d**, **15a–u**, and **16a–u** in moderate to good yields.

3-Ethyl-7-[2-hydroxy-3-(4-phenyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (11a). It was obtained as white solid in 85% yield; mp 140–143°C; IR (KBr): 3386, 2925, 2854, 1708, 1610, 1387, 1253, 1172, 1093, and 766 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 1.04 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.39 (3H, s, C-4 CH_3), 2.57 (2H, q, J = 7.3 Hz, −CH_2CH_3), 4.08–4.16 (2H, m, −CH_2N), 4.31–4.35 (1H, m, −CH), 4.48 (1H, dd, J = 13.3 and 7.3 Hz, −OCH_α), 4.68 (1H, dd, J = 13.9 and 3.7 Hz, −OCH_β), 5.70 (1H, d, J = 5.8 Hz, OH), 6.97–7.00 (2H, m, C-6H and C-8H), 7.31 (1H, t, J = 7.4 Hz, ArH), 7.42–7.47 (2H, m, ArH), 7.71 (1H, d, J = 9.5 Hz, C-5H), 7.85–7.86 (2H, m, ArH), 8.57 (1H, s, triazole H); ^{13}C-NMR (100.6 MH_Z, DMSO-d_6): δ 12.97 (−CH_2CH_3), 14.32 (C-4 CH_3), 20.21 (−CH_2CH_3), 52.71 (−CH_2N), 67.69 (−CH), 70.09 (−OCH_2), 101.06 (C-8), 112.31 (C-6), 113.87 (C-10), 122.45 (C-3), 123.81 (CH═C), 125.10 (2-ArC), 126.32 (C-5), 127.75, 128.88, 130.86 (4-ArC), 146.09 (CH═*C*), 146.39 (C-9), 153.04 (C-4), 160.43 (C-7), 160.75 (CO); HR-ESI-TOF-MS *m*/*z* 406.1751 ($[M + H]^+$), calcd for $[C_{23}H_{23}N_3O_4 + H]^+$ 406.1761.

3-Ethyl-7-[2-hydroxy-3-(4-propylcarboxylicacid)-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (11b). It was obtained as white solid in 80% yield; mp 123–126°C; IR (KBr): 3461, 2920, 2859, 1704, 1617, 1303, 1211, 1159, 1089, and 865 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 1.05 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.39 (3H, s, C-4 CH_3), 2.53–2.60 (4H, m, −CH_2CH_3 and −CH_2CH_2COOH), 2.85 (2H, t, J = 7.3 Hz, −CH_2CH_2COOH), 4.01–4.08 (2H, m, −CH_2N), 4.20–4.26 (1H, m, −CH), 4.39 (1H, dd, J = 13.9 and 7.3 Hz, −OCH_α), 4.55 (1H, dd, J = 13.9 and 3.6 Hz, −OCH_β), 5.61 (1H, brs, OH), 6.95–6.97 (2H, m, C-6H and C-8H), 7.70 (1H, d, J = 8.7 Hz, C-5H), 7.85 (1H, s, triazole H), 12.17 (1H, s, −CH_2CH_2COO*H*); ^{13}C-NMR (100.6 MH_Z, DMSO-d_6): δ 12.89 (−CH_2CH_3), 14.25 (C-4 CH_3), 20.15 (−CH_2CH_3), 20.60 (−CH_2CH_2COOH), 33.09 (−CH_2CH_2COOH), 52.28 (−CH_2N), 67.65 (−CH), 70.00 (−OCH_2), 100.95 (C-8), 112.23 (C-6), 113.79 (C-10), 122.92 (C-3), 123.75 (CH═C), 126.24 (C-5), 145.36 (CH═*C*), 146.33 (C-9), 152.96 (C-4), 160.35 (C-7), 160.69 (CO), 173.58 (COOH); HR-ESI-TOF-MS *m*/*z* 402.1656 ($[M + H]^+$), calcd for $[C_{20}H_{23}N_3O_6 + H]^+$ 402.1660.

3-Ethyl-7-[2-hydrox-3-(4-γ-chloropropyl-1,2,3-triazol-1-yl) propyloxy]-4-methylcoumarin (11c). It was obtained as white solid in 88% yield; mp 104–108°C; IR (KBr): 3398, 2922, 2854, 1713, 1609, 1387, 1281, 1181, 1093, and 822 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 1.05 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.04 (2H, pentate, −$CH_2CH_2CH_2$Cl), 2.39 (3H, s, C-4 CH_3), 2.56 (2H, q, J = 7.3 Hz, −CH_2CH_3), 2.75 (2H, t, J = 7.7 Hz, −$CH_2CH_2CH_2$Cl), 3.67 (2H, t, J = 6.9 Hz, −$CH_2CH_2CH_2$Cl), 4.01–4.07 (2H, m, −CH_2N), 4.21–4.26 (1H, m, −CH), 4.41 (1H, dd, J = 13.9 and 7.4 Hz, −OCH_α), 4.56 (1H, dd, J = 13.9 and 3.6 Hz, −OCH_β), 5.62 (1H, d, J = 5.1 Hz, OH), 6.95–6.98 (2H, m, C-6H and C-8H), 7.70 (1H, d, J = 8.7 Hz, C-5H), 7.89 (1H, s, triazole H); ^{13}C-NMR (100.6 MH_Z, DMSO-d_6): δ 12.96 (−CH_2CH_3), 14.32 (C-4 CH_3), 20.20 (−CH_2CH_3), 22.28 (−$CH_2CH_2CH_2$Cl), 31.79 (−$CH_2CH_2CH_2$Cl), 44.68 (−$CH_2CH_2CH_2$Cl), 52.34 (−CH_2N), 67.68 (−CH), 70.07 (−OCH_2), 101.00 (C-8), 112.29 (C-6), 113.85 (C-10), 123.14 (C-3), 123.80 (CH═C), 126.31 (C-5), 145.17 (CH═*C*), 146.39 (C-9), 153.03 (C-4), 160.42 (C-7), 160.74 (CO); HR-ESI-TOF-MS *m*/*z* 406.1521 ($[M + H]^+$), calcd for $[C_{20}H_{24}ClN_3O_4 + H]^+$ 406.1528.

3-Ethyl-7-[2-hydroxy-3-(4-hydroxymethyl-1,2,3-triazol-1-yl) propyloxy]-4-methylcoumarin (11d). It was obtained as white solid in 92% yield; mp 101–103°C; IR (KBr): 3305, 2922, 2854, 1676, 1617, 1307, 1230, 1163, 1098, and 828 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 0.96 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.31 (3H, s, C-4 CH_3), 2.47 (2H, q, J = 7.3 Hz, −CH_2CH_3), 3.92–3.99 (2H, m, −CH_2N), 4.13–4.20 (1H, m, −CH), 4.36 (1H, dd, J = 13.9 and 8.1 Hz, −OCH_α), 4.43 (2H, d, J = 5.1 Hz, −CH_2OH), 4.49 (1H, dd, J = 13.9 and 3.7 Hz, −OCH_β), 5.10 (1H, t, J = 5.5 Hz, −CH_2O*H*), 5.54 (1H, d, J = 5.8 Hz, OH), 6.88–6.90 (2H, m, C-6H and C-8H), 7.63 (1H, d, J = 9.6 Hz, C-5H), 7.86 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, DMSO-d_6): δ 12.99 (−CH_2CH_3), 14.36 (C-4 CH_3), 20.24 (−CH_2CH_3), 52.33 (−CH_2N), 55.08 (−CH═C−CH_2), 67.75 (−CH), 70.09 (−OCH_2), 101.04 (C-8),112.33 (C-6), 113.89 (C-10), 123.73 (C-3), 123.84 (−CH═C), 126.36 (C-5), 146.45 (−CH═*C*), 147.75 (C-9), 153.05 (C-4), 160.45 (C-7), 160.79 (CO); HR-ESI-TOF-MS *m*/*z* 382.1365 ($[M + Na]^+$), calcd for $[C_{18}H_{21}N_3O_5 + Na]^+$ 382.1373.

3-Hexyl-7-[2-hydroxy-3-(4-phenyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (12a). It was obtained as white solid in 84% yield; mp 136–139°C; IR (KBr): 3386, 2925, 2854, 1708, 1610, 1387, 1253, 1172, 1093, and 766 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 0.86 (3H, t, J = 7.3 Hz, −$(CH_2)_5CH_3$), 1.27–1.33 (6H, m, −$CH_2CH_2(CH_2)_3CH_3$), 1.39–1.43 (2H, m, −CH_2CH_2 $(CH_2)_3CH_3$), 2.38 (3H, s, C-4 CH_3), 2.53 (2H, q, J = 7.3 Hz, −CH_2 $(CH_2)_4CH_3$), 4.06–4.14 (2H, m, −CH_2N), 4.31–4.35 (1H, m, −CH), 4.50 (1H, dd, J = 13.9 and 8.4 Hz, −OCH_α), 4.68 (1H, dd, J = 13.9 and 3.6 Hz, −OCH_β), 5.70 (1H, d, J = 5.1 Hz, OH), 6.96–6.99 (2H, m, C-6H and C-8H), 7.33 (1H, t, J = 7.4 Hz, ArH), 7.45 (2H, t, J = 7.7 Hz, ArH), 7.70 (1H, d, J = 9.6 Hz, C-5H), 7.86 (2H, d, J = 7.3 Hz, ArH), 8.57 (1H, s, triazole H); ^{13}C-NMR (100.6 MH_Z, DMSO-d_6): δ 13.96 (−$(CH_2)_5CH_3$), 14.63 (C-4 CH_3), 22.70 (−$CH_2(CH_2)_3CH_2CH_3$), 27.40 (−$CH_2CH_2(CH_2)_3CH_3$), 29.4 (−$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.90 (−$(CH_2)_3CH_2CH_2CH_3$), 52.70 (−CH_2N), 67.69 (−CH), 70.09 (−OCH_2), 101.05 (C-8), 112.30 (C-6), 113.86 (C-10), 122.45 (C-3), 123.81 (CH═C), 125.10 (2-ArC), 126.32 (C-5), 127.75,128.87, 130.86 (4-ArC), 146.08 (CH═*C*), 156.39 (C-9), 153.04 (C-4),

160.42 (C-7), 160.75 (CO); HR-ESI-TOF-MS *m/z* 462.2381 ($[M+H]^+$), calcd for $[C_{27}H_{31}N_3O_4+H]^+$ 462.2387.

3-Hexyl-7-[2-hydroxy-3-(4-propylcarboxylicacid-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (12b). It was obtained as white solid in 82% yield; mp 118–120°C; IR (KBr): 3461, 2920, 2859, 1704, 1617, 1303, 1211, 1159, 1084, and 865 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 0.86 (3H, t, J = 7.3 Hz, —$(CH_2)_5CH_3$), 1.24–1.35 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.39–1.43 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.38 (3H, s, C-4 CH_3), 2.53–2.67 (4H, m, —$CH_2(CH_2)_4CH_3$ and —CH_2CH_2COOH), 2.85 (2H, t, J = 7.3 Hz, —CH_2CH_2COOH), 3.99–4.07 (2H, m, —CH_2N), 4.20–4.23 (1H, m, —CH), 4.40 (1H, dd, J = 13.9 and 7.3 Hz, —OCH_α), 4.55 (1H, dd, J = 13.9 and 3.8 Hz, —OCH_β), 5.61 (1H, d, J = 5.1 Hz, OH), 6.95–6.98 (2H, m, C-6H and C-8H), 7.69 (1H, d, J = 9.5 Hz, C-5H), 7.84 (1H, s, triazole H), 12.17 (1H, d, —CH_2CH_2COOH); ^{13}C-NMR (100.6 MHz_Z, DMSO-d_6): δ 13.96 (—$(CH_2)_5CH_3$, C-4 CH_3), 14.63 (—$CH_2(CH_2)_3CH_2CH_3$), 20.69 (—CH_2CH_2COOH), 22.07 (—$CH_2CH_2(CH_2)CH_3$), 28.20 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.12 (—$(CH_2)_3CH_2CH_2CH_3$), 33.17 (—CH_2CH_2COOH), 52.36 (—CH_2N), 67.73 (—CH), 70.09 (—OCH_2), 101.04 (C-8), 112.32 (C-6), 113.87 (C-10), 122.61 (C-3), 123.00 (CH═C), 126.34 (C-5), 145.45 (CH═C), 146.67 (C-9), 153.05 (C-4), 160.44 (C-7), 160.93 (CO), 173.66 (COOH); HR-ESI-TOF-MS *m/z* 458.2284 ($[M+H]^+$), calcd for $[C_{24}H_{31}N_3O_6+H]^+$ 458.2286.

3-Hexyl-7-[2-hydrox-3-(4-γ-chloropropyl-1,2,3-triazol-1-yl) propyloxy]-4-methylcoumarin (12c). It was obtained as white solid in 86% yield; mp 99–102°C; IR (KBr): 3398, 2922, 2854, 1713, 1609, 1387, 1252, 1181, 1093, and 779 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 0.84 (3H, t, J = 6.6 Hz, —$(CH_2)_5CH_3$), 1.23–1.34 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.37–1.44 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.02 (2H, pentate, —$CH_2CH_2CH_2Cl$), 2.36 (3H, s, C-4 CH_3), 2.48–2.52 (2H, m, —$CH_2(CH_2)_4CH_3$), 2.73 (2H, t, J = 7.4 Hz, —$CH_2CH_2CH_2Cl$), 3.65 (2H, t, J = 6.9 Hz, —$CH_2CH_2CH_2Cl$), 3.96–4.05 (2H, m, —CH_2N), 4.20–4.24 (1H, m, —CH), 4.38 (1H, dd, J = 13.9 and 7.6 Hz, —OCH_α), 4.55 (1H, dd, J = 13.9 and 4.4 Hz, —OCH_β), 5.61 (1H, d, J = 5.8 Hz, OH), 6.92–6.95 (2H, m, C-6H and C-8H), 7.67 (1H, d, J = 8.8 Hz, C-5H), 7.87 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz_Z, DMSO-d_6): δ 13.96 (—$(CH_2)_5CH_3$), 14.63 (C-4 CH_3), 22.08 (—$CH_2CH_2(CH_2)_3CH_3$), 22.29 (—$(CH_2)_4CH_2CH_3$), 26.82 (—$CH_2CH_2CH_2Cl$), 28.20 (—$CH_2CH_2(CH_2)_3CH_3$), 28.67 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.13 (—$(CH_2)_3CH_2CH_2CH_3$), 31.82 (—$CH_2CH_2CH_2Cl$), 44.69 (—$CH_2CH_2CH_2Cl$), 52.36 (—CH_2N), 67.71 (—CH), 70.08 (—OCH_2), 101.01 (C-8), 112.29 (C-6), 113.86 (C-10), 122.60 (C-3), 123.16 (CH═C), 126.33 (C-5), 145.20 (CH═C), 146.65 (C-9), 153.04 (C-4), 160.42 (C-7), 160.92 (CO); HR-ESI-TOF-MS *m/z* 462.2157 ($[M+H]^+$), calcd for $[C_{24}H_{32}ClN_3O_4+H]^+$ 462.2154.

3-Hexyl-7-[2-hydroxy-3-(4-hydroxymethyl-1,2,3-triazol-1-yl) propyloxy]-4-methylcoumarin (12d). It was obtained as white solid in 92% yield; mp 106–108°C; IR (KBr): 3305, 2922, 2854, 1676, 1617, 1307, 1230, 1163, 1013, and 828 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 0.86 (3H, t, J = 6.6 Hz, —$(CH_2)_5CH_3$), 1.23–1.36 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.37–1.46 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.39 (3H, s, C-4 CH_3), 2.50–2.55 (2H, m, —$CH_2(CH_2)_4CH_3$), 4.00–4.05 (2H, m, —CH_2N), 4.23–4.26 (1H, m, —CH), 4.44 (1H, dd, J = 13.9 and 7.3 Hz, —OCH_α), 4.52 (2H, d, J = 5.8 Hz, —CH_2OH), 4.58 (1H, dd, J = 13.9 and 3.8 Hz, —OCH_β), 5.18 (1H, t, J = 5.9 Hz, —CH_2OH), 5.62 (1H, d, J = 5.9 Hz, OH), 6.96–6.98 (2H, m, C-6H and C-8H), 7.70 (1H, d, J = 9.5 Hz, C-5H), 7.95 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, DMSO-d_6): δ 12.99 (—$(CH_2)_5CH_3$), 14.36 (C-4 CH_3), 22.50 (—$CH_2(CH_2)_3CH_2CH_3$), 27.40 (—$CH_2CH_2(CH_2)_3CH_3$), 31.90 (—$(CH_2)_3CH_2CH_2CH_3$), 52.33 (—CH_2N), 55.07 (—CH═C—CH_2), 67.75 (—CH), 70.09 (—OCH_2), 101.04 (C-8), 112.33 (C-6), 113.88 (C-10), 123.72 (C-3), 123.84 (—CH═C), 126.36 (C-5), 145.75 (—CH═C), 147.29 (C-9), 153.05 (C-4), 160.45 (C-7), 160.79 (CO); HR-ESI-TOF-MS *m/z* 416.2176 ($[M+H]^+$), calcd for $[C_{22}H_{29}N_3O_5+H]^+$ 416.2180.

3-Ethyl-7-[2-hydroxy-3-(4-phenoxymethyl-1,2,3-triazol-1-yl) propyloxy]-4-methylcoumarin (15a). It was obtained as white solid in 85% yield; mp 128–130°C; IR (KBr): 3386, 2925, 2854, 1717, 1610, 1387, 1253, 1172, 1093, and 766 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.10 (3H, t, J = 7.1 Hz, —CH_2CH_3), 2.34 (3H, s, C-4 CH_3), 2.62 (2H, q, J = 7.3 Hz, —CH_2CH_3), 3.45 (1H, brs, OH), 4.01–4.05 (2H, m, —CH_2N), 4.47–4.56 (2H, m, —CH and —OCH_α), 4.69 (1H, dd, J = 13.9 and 3.8 Hz, —OCH_β), 5.14 (2H, s, —CH_2OPh), 6.72–6.73 (1H, m, C-8H), 6.80 (1H, dd, J = 8.7 and 2.3 Hz, C-6H), 6.90–6.94 (3H, m, ArH), 7.24 (2H, t, J = 7.3 Hz, ArH), 7.44 (1H, d, J = 8.8 Hz, C-5H), 7.78 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.03 (—CH_2CH_3), 14.48 (C-4 CH_3), 20.72 (—CH_2CH_3), 52.99 (—CH_2N), 61.59 (—OCH_2Ph), 68.29 (—CH), 69.25 (—OCH_2), 101.28 (C-8), 112.15 (C-6), 114.60 (C-10), 114.71 (2-ArC), 121.21 (C-3), 124.59 (CH═C), 125.05 (ArC), 125.48 (C-5), 129.46 (2-ArC), 143.88 (CH═C), 145.91 (C-9), 153.26 (C-4), 158.02 (C-7), 159.93 (ArC), 161.95 (CO); HR-ESI-TOF-MS *m/z* 436.1858 ($[M+H]^+$), calcd for $[C_{24}H_{25}N_3O_5+H]^+$ 436.1867.

3-Ethyl-7-[2-hydroxy-3-(4-o-chlorophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15b). It was obtained as white solid in 92% yield; mp 136–139°C; IR (KBr): 3392, 2926, 2367, 1718, 1617, 1458, 1251, 1170, 1087, and 759 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.13 (3H, t, J = 7.7 Hz, —CH_2CH_3), 2.37 (3H, s, C-4 CH_3), 2.65 (2H, q, J = 7.3 Hz, —CH_2CH_3), 3.81 (1H, brs, OH), 4.03–4.09 (2H, m, —CH_2N), 4.53–4.61 (2H, m, —CH and —OCH_α), 4.74 (1H, dd, J = 13.2 and 2.2 Hz, —OCH_β), 5.25 (2H, s, —CH_2OPh), 6.76 (1H, d, J = 2.9 Hz, C-8H), 6.83 (1H, dd, J = 5.8 and 2.9 Hz, C-6H), 6.87–6.91 (1H, m, ArH), 7.05–7.07 (1H, m, ArH), 7.17–7.21 (1H, m, ArH), 7.31–7.33 (1H, m, ArH), 7.48 (1H, d, J = 9.5 Hz, C-5H), 7.86 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.03 (—CH_2CH_3), 14.48 (C-4CH_3), 20.73 (—CH_2CH_3), 53.02 (—CH_2N), 62.97 (—OCH_2Ph), 68.30 (—CH), 69.24 (—OCH_2), 101.24 (C-8), 112.16 (C-6), 114.06 (C-3), 114.71 (C-10), 122.02 (2-ArC), 122.91 (CH═C), 124.69 (ArC), 125.06 (C-5), 127.74, 130.24 (2-ArC), 143.62 (CH═C), 145.91 (C-9), 153.27 (C-4), 153.54 (C-7), 159.92 (ArC), 161.95 (CO); HR-ESI-TOF-MS *m/z* 470.1477 ($[M+H]^+$), calcd for $[C_{24}H_{24}ClN_3O_5+H]^+$ 470.1477.

3-Ethyl-7-[2-hydroxy-3-(4-m-chlorophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15c). It was obtained as white solid in 85% yield; mp 111–113°C; IR (KBr): 3392, 2954, 2853, 1718, 1611, 1493, 1387, 1285, 1169, 1091, and 825 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.08 (3H, t, J = 7.3 Hz, —CH_2CH_3), 2.35 (3H, s, C-4 CH_3), 2.62 (2H, q, J = 7.4 Hz, —CH_2CH_3), 3.76 (1H, brs, OH), 4.01–4.06 (2H, m, —CH_2N), 4.50–4.60 (2H, m, —CH and —OCH_α), 4.71 (1H, dd, J = 13.9 and 3.8 Hz, —OCH_β), 5.13 (2H, s, —CH_2OPh), 6.74–6.93 (5H, m, C-6H, C-8H, and 3 × ArH), 7.15 (1H, t, J = 8.1 Hz, ArH), 7.45 (1H, d, J = 8.8 Hz, C-5H), 7.79 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.03 (—CH_2CH_3), 14.50 (C-4 CH_3), 20.74 (—CH_2CH_3), 53.00 (—CH_2N), 61.87 (—OCH_2Ph), 68.32 (—CH), 69.26 (—OCH_2), 101.29 (C-8), 112.13 (C-6), 112.96 (C-3), 114.77 (C-10), 115.22 (2-ArC), 121.41 (CH═C), 124.69

(ArC), 125.12 (C-5), 125.51, 130.25 (2-ArC), 143.34 (CH═*C*), 145.89 (C-9), 153.28 (C-4), 158.74 (C-7), 159.90 (ArC), 161.94 (CO); HR-ESI-TOF-MS *m/z* 470.1480 ([M + H]$^+$), calcd for [$C_{24}H_{24}ClN_3O_5$ + H]$^+$ 470.1477.

3-Ethyl-7-[2-hydroxy-3-(4-p-chlorophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15d). It was obtained as white solid in 81% yield; mp 127–129°C; IR (KBr): 3392, 2927, 2859, 1718, 1607, 1389, 1281, 1151, 1069, and 841 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.13 (3H, t, *J* = 7.7 Hz, ─CH_2CH_3), 2.36 (3H, s, C-4 CH_3), 2.64 (2H, q, *J* = 7.3 Hz, ─CH_2CH_3), 3.94 (1H, brs, OH), 4.03–4.11 (2H, m, ─CH_2N), 4.51–4.60 (2H, m, ─C*H* and ─OCH_α), 4.74 (1H, dd, *J* = 13.9 and 2.2 Hz, ─OCH_β), 5.14 (2H, s, ─CH_2OPh), 6.74 (1H, d, *J* = 2.9 Hz, C-8H), 6.81 (1H, dd, *J* = 9.5 and 2.9 Hz, C-6H), 6.85–6.88 (2H, m, ArH), 7.17–7.21 (2H, m, ArH), 7.46 (1H, d, *J* = 8.8 Hz, C-5H), 7.82 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.02 (─CH_2CH_3), 14.49 (C-4 CH_3), 20.73 (─CH_2CH_3), 53.00 (─CH_2N), 61.89 (─OCH_2Ph), 68.28 (─CH), 69.27 (─OCH_2), 101.23 (C-8), 112.16 (C-6), 114.71 (C-10), 115.94 (2-ArC), 124.70 (C-3), 125.06 (*C*H═C), 125.49 (ArC), 126.07 (C-5), 129.28 (2-ArC), 143.45 (CH═*C*), 145.95 (C-9), 153.23 (C-4), 156.59 (C-7), 159.89 (ArC), 161.95 (CO); HR-ESI-TOF-MS *m/z* 470.1474 ([M + H]$^+$), calcd for [$C_{24}H_{24}ClN_3O_5$ + H]$^+$ 470.1477.

3-Ethyl-7-[2-hydroxy-3-(4-o-bromophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15e). It was obtained as white solid in 91% yield; mp 132–136°C; IR (KBr): 3246, 2931, 2859, 1710, 1618, 1479, 1384, 1297, 1156, 1069, and 759 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.14 (3H, t, *J* = 7.3 Hz, ─CH_2CH_3), 2.37 (3H, s, C-4 CH_3), 2.65 (2H, q, *J* = 8.1 Hz, ─CH_2CH_3), 3.72 (1H, brs, OH), 4.03–4.09 (2H, m, ─CH_2N), 4.51–4.61 (2H, m, ─C*H* and ─OCH_α), 4.73 (1H, dd, *J* = 13.2 and 2.9 Hz, ─OCH_β), 5.26 (2H, s, ─CH_2OPh), 6.77 (1H, d, *J* = 2.9 Hz, C-8H), 6.81–6.86 (2H, m, C-6H and ArH), 7.03 (1H, dd, *J* = 8.1 and 1.8 Hz, ArH), 7.21–7.27 (1H, m, ArH), 7.47–7.51 (2H, m, ArH and C-5H), 7.86 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.08 (─CH_2CH_3), 14.55 (C-4CH_3), 20.79 (─CH_2CH_3), 52.94 (─CH_2N), 63.25 (─OCH_2Ph), 68.48 (─CH), 69.13 (─OCH_2), 101.39 (C-8), 112.26 (C-6), 113.92 (C-3), 114.91 (C-10), 122.57 (2-ArC), 124.55 (*C*H═C), 125.30 (ArC), 125.57 (C-5), 128.55, 133.36 (2-ArC), 143.85 (CH═*C*), 145.76 (C-9), 153.38 (C-4), 154.43 (C-7), 159.85 (ArC), 161.89 (CO); HR-ESI-TOF-MS *m/z* 514.0982 ([M + H]$^+$), calcd for [$C_{24}H_{24}BrN_3O_5$ + H]$^+$ 514.0972.

3-Ethyl-7-[2-hydroxy-3-(4-p-bromophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15f). It was obtained as white solid in 85% yield; mp 100–102°C; IR (KBr): 3402, 2922, 2859, 1717, 1610, 1490, 1387, 1251, 1171, 1091, and 823 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.13 (3H, t, *J* = 7.7 Hz, ─CH_2CH_3), 2.37 (3H, s, C-4 CH_3), 2.65 (2H, q, *J* = 7.3 Hz, ─CH_2CH_3), 3.88 (1H, brs, OH), 4.03–4.10 (2H, m, ─CH_2N), 4.51–4.60 (2H, m, ─C*H* and ─OCH_α), 4.74 (1H, dd, *J* = 13.9 and 2.9 Hz, ─OCH_β), 5.14 (2H, s, ─CH_2OPh), 6.75 (1H, d, *J* = 2.9 Hz, C-8H), 6.80–6.84 (3H, m, C-6H and ArH), 7.32–7.35 (2H, m, ArH), 7.47 (1H, d, *J* = 8.8 Hz, C-5H), 7.82 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.03 (─CH_2CH_3), 14.51 (C-4 CH_3), 20.74 (─CH_2CH_3), 53.00 (─CH_2N), 61.82 (─OCH_2Ph), 68.29 (─CH), 69.26 (─OCH_2), 101.24 (C-8), 112.14 (C-6), 113.41 (C-3), 114.73 (C-10), 116.45 (2-ArC), 124.70 (*C*H═C), 125.08 (ArC), 125.50 (C-5), 132.22 (2-ArC), 143.42 (CH═*C*), 145.93 (C-9), 153.24 (C-4), 157.10 (C-7), 159.88 (ArC), 161.94 (CO); HR-ESI-TOF-MS *m/z* 514.0965 ([M + H]$^+$), calcd for [$C_{24}H_{24}BrN_3O_5$ + H]$^+$ 514.0972.

3-Ethyl-7-[2-hydroxy-3-(4-o-nitrophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15g). It was obtained as white solid in 85% yield; mp 136–139°C; IR (KBr): 3419, 2924, 2856, 1689, 1612, 1523, 1466, 1347, 1255, 1163, 1090, and 739 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 1.05 (3H, t, *J* = 7.3 Hz, ─CH_2CH_3), 2.39 (3H, s, C-4 CH_3), 2.57 (2H, q, *J* = 7.2 Hz, ─CH_2CH_3), 4.01–4.10 (2H, m, ─CH_2N), 4.22–4.28 (1H, m, ─C*H*), 4.48 (1H, dd, *J* = 13.9 and 7.3 Hz, ─OCH_α), 4.62 (1H, dd, *J* = 13.9 and 3.8 Hz, ─OCH_β), 5.36 (2H, s, ─CH_2OPh), 5.64 (1H, d, *J* = 5.1 Hz, OH), 6.94–6.97 (2H, m, C-6H and C-8H), 7.11–7.15 (1H, m, ArH), 7.59–7.72 (3H, m, ArH), 7.85 (1H, d, *J* = 8.4 Hz, C-5H), 8.22 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, DMSO-d_6): δ 12.89 (─CH_2CH_3), 14.25 (C-4 CH_3), 20.14 (─CH_2CH_3), 52.49 (─CH_2N), 62.48 (─OCH_2Ph), 67.53 (─CH), 69.98 (─OCH_2), 100.93 (C-8), 112.24 (C-6), 113.80 (C-10), 115.50 (2-ArC), 120.81 (*C*H═C), 123.75 (C-3), 124.85 (ArC), 125.84 (C-5), 126.25, 134.21 (2-ArC), 139.66 (CH═*C*), 146.34 (C-9), 150.54 (C-4), 152.96 (C-7), 160.32 (ArC), 160.69 (CO); HR-ESI-TOF-MS *m/z* 481.1711 ([M + H]$^+$), calcd for [$C_{24}H_{24}N_4O_7$ + H]$^+$ 481.1718.

3-Ethyl-7-[2-hydroxy-3-(4-m-nitrophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15h). It was obtained as white solid in 88% yield; mp 136–140°C; IR (KBr): 3210, 2929, 2869, 1716, 1618, 1527, 1350, 1251, 1163, 1062, and 829 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.14 (3H, t, *J* = 7.3 Hz, ─CH_2CH_3), 2.38 (3H, s, C-4 CH_3), 2.66 (2H, q, *J* = 7.3 Hz, ─CH_2CH_3), 3.35 (1H, brs, OH), 4.00–4.10 (2H, m, ─CH_2N), 4.50–4.62 (2H, m, ─C*H* and ─OCH_α), 4.75 (1H, dd, *J* = 13.8 and 3.2 Hz, ─OCH_β), 5.28 (2H, s, ─CH_2OPh), 6.76 (1H, d, *J* = 2.9 Hz, C-8H), 6.84 (1H, dd, *J* = 8.7 and 2.8 Hz, C-6H), 7.30–7.51 (3H, m, ArH), 7.81–7.86 (3H, m, ArH, C-5H and triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.05 (─CH_2CH_3), 14.52 (C-4 CH_3), 20.77 (─CH_2CH_3), 52.99 (─CH_2N), 63.39 (─OCH_2Ph), 68.39 (─CH), 69.19 (─OCH_2), 101.36 (C-8), 112.13 (C-6), 112.74 (C-10), 114.81 (2-ArC), 123.18 (*C*H═C and C-3), 124.63 (ArC), 125.54 (C-5), 129.55 (2-ArC), 139.38 (CH═*C*), 145.83 (C-9), 153.33 (C-4), 156.59 (C-7), 159.92 (ArC), 161.92 (CO); HR-ESI-TOF-MS *m/z* 481.1710 ([M + H]$^+$), calcd for [$C_{24}H_{24}N_4O_7$ + H]$^+$ 481.1718.

3-Ethyl-7-[2-hydroxy-3-(4-p-nitrophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15i). It was obtained as white solid in 86% yield; mp 148–150°C; IR (KBr): 3367, 2929, 2856, 1699, 1610, 1510, 1332, 1256, 1173, 1086, and 834 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 1.04 (3H, t, *J* = 7.3 Hz, ─CH_2CH_3), 2.39 (3H, s, C-4 CH_3), 2.55 (2H, q, *J* = 7.3 Hz, ─CH_2CH_3), 4.00–4.10 (2H, m, ─CH_2N), 4.22–4.29 (1H, m, ─C*H*), 4.48 (1H, dd, *J* = 13.9 and 7.3 Hz, ─OCH_α), 4.63 (1H, dd, *J* = 13.9 and 3.8 Hz, ─OCH_β), 5.33 (2H, s, ─CH_2OPh), 5.65 (1H, d, *J* = 5.1 Hz, OH), 6.95–6.97 (2H, m, C-6H and C-8H), 7.26–7.28 (2H, m, ArH), 7.70 (1H, d, *J* = 8.8 Hz, C-5H), 8.18–8.23 (2H, m, ArH), 8.27 (1H, s, triazole H); ^{13}C-NMR (100 MHz, DMSO-d_6): δ 12.88 (─CH_2CH_3), 14.24 (C-4 CH_3), 20.15 (─CH_2CH_3), 52.51 (─CH_2N), 61.83 (─OCH_2Ph), 67.54 (─CH), 69.99 (─OCH_2), 100.95 (C-8), 112.20 (C-6), 113.80 (C-10), 115.21 (2-ArC), 123.77 (C-3) (*C*H═C), 125.75, 125.99 (3-ArC), 126.23 (C-5), 141.35 (CH═*C*), 146.32 (C-9), 152.95 (C-4), 160.30 (C-7), 160.68 (ArC), 163.23 (CO); HR-ESI-TOF-MS *m/z* 481.1703 ([M + H]$^+$), calcd for [$C_{24}H_{24}N_4O_7$ + H]$^+$ 481.1718.

3-Ethyl-7-[2-hydroxy-3-(4-o-tolyloxymethyl-1,2,3-triazol-1-yl) propyloxy]-4-methylcoumarin (15j). It was obtained as white solid in 83% yield; mp 123–126°C; IR (KBr): 3385, 2922, 2852,

1716, 1611, 1387, 1250, 1121, 1025, and 748 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.12 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.28 (3H, s, Ph-CH_3), 2.35 (3H, s, C-4 CH_3), 2.63 (2H, q, J = 7.3 Hz, −CH_2CH_3), 3.85 (1H, d, J = 5.1 Hz, OH), 4.03–4.6 (2H, m, −CH_2N), 4.47–4.57 (2H, m, −C*H* and −OCH_α), 4.70 (1H, dd, J = 13.9 and 3.8 Hz, −OCH_β), 5.14 (2H, s, −CH_2OPh), 6.72–6.85 (5H, m, C-6H, C-8H, and 3-ArH), 7.13 (1H, m, ArH), 7.46 (1H, d, J = 8.7 Hz, C-5H), 7.77 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.02 (−CH_2CH_3), 14.48 (Ph-CH_3), 16.17 (C-4 CH_3), 20.73 (−CH_2CH_3), 52.94 (−CH_2N), 61.99 (−OCH_2Ph), 68.32 (−CH), 69.24 (−OCH_2), 101.29 (C-8), 111.35 (C-6), 112.11 (ArC), 114.74 (C-10), 120.93 (ArC and CH=C), 124.30 (ArC), 125.10 (C-3), 125.49 (ArC), 126.84 (C-5), 130.72 (ArC), 144.43 (CH=*C*), 145.87 (C-9), 153.29 (C-4), 156.20 (C-7), 159.94 (ArC), 161.93 (CO); HR-ESI-TOF-MS *m/z* 450.2010 ($[M+H]^+$), calcd for $[C_{25}H_{27}N_3O_5+H]^+$ 450.2023.

3-Ethyl-7-[2-hydroxy-3-(4-m-tolyloxymethyl-1,2,3-triazol-1-yl) propyloxy]-4-methylcoumarin (15k). It was obtained as white solid in 86% yield; mp 121–124°C; IR (KBr): 3511, 2924, 2852, 1718, 1610, 1458, 1259, 1173, 1085, and 777 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.13 (3H, t, J = 7.4 Hz, −CH_2CH_3), 2.17 (3H, s, Ph-CH_3), 2.36 (3H, s, C-4 CH_3), 2.64 (2H, q, J = 8.1 Hz, −CH_2CH_3), 3.57 (d, 1H, J = 5.1 Hz, OH), 4.00–4.08 (2H, m, −CH_2N), 4.48–4.60 (2H, m, −C*H* and −OCH_α), 4.72 (1H, dd, J = 13.9 and 3.7 Hz, −OCH_β), 5.18 (2H, s, −CH_2OPh), 6.76–6.92 (4H, m, C-6H, C-8H, and ArH), 7.09–7.14 (2H, m, ArH), 7.47 (1H, d, J = 8.7 Hz, C-5H), 7.75 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.02 (−CH_2CH_3), 14.48 (C-4 CH_3), 20.72 (−CH_2CH_3), 21.42 (Ph-CH_3), 53.00 (−CH_2N), 61.58 (−OCH_2Ph), 68.31 (−CH), 69.27 (−OCH_2), 101.28 (C-8), 111.43 (C-6), 112.13 (C-3 and ArC), 114.71 (C-10), 115.46 (ArC), 122.05 (CH=C), 124.53, 125.06 (2-ArC), 129.17 (C-5), 139.52 (ArC), 143.99 (CH=*C*), 145.88 (C-9), 153.28 (C-4), 158.05 (C-7), 159.95 (ArC), 161.93 (CO); HR-ESI-TOF-MS *m/z* 450.2023 ($[M+H]^+$), calcd for $[C_{25}H_{27}N_3O_5+H]^+$ 450.2023.

3-Ethyl-7-[2-hydroxy-3-(4-p-tolyloxymethyl-1,2,3-triazol-1-yl) propyloxy]-4-methylcoumarin (15l). It was obtained as white solid in 84% yield; mp 127–130°C; IR (KBr): 3386, 2920, 2852, 1721, 1610, 1510, 1383, 1247, 1176, 1089, and 831 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.12 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.26 (3H, s, Ph-CH_3), 2.36 (3H, s, C-4 CH_3), 2.64 (2H, q, J = 7.3 Hz, −CH_2CH_3), 3.78 (1H, d, J = 5.1 Hz, OH), 4.01–4.08 (2H, m, −CH_2N), 4.51–4.57 (2H, m, −C*H* and −OCH_α), 4.72 (1H, dd, J = 13.9 and 3.7 Hz, −OCH_β), 5.13 (2H, s, −CH_2OPh), 6.75–6.85 (4H, m, C-6H, C-8H, and ArH), 7.03–7.06 (2H, m, ArH), 7.46 (1H, d, J = 8.7 Hz, C-5H), 7.78 (1H, s, triazole H); ^{13}C-NMR (100.6 MHZ, $CDCl_3$): δ 13.08 (−CH_2CH_3), 14.55 (C-4 CH_3), 20.45 (−CH_2CH_3), 20.79 (Ph-CH_3), 52.91 (−CH_2N), 61.89 (−OCH_2Ph), 68.51 (−CH), 69.17 (−OCH_2), 101.46 (C-8), 111.97 (C-6), 114.54 (C-3 and ArC), 114.91 (C-10), 124.44 (ArC), 125.31 (CH=C), 125.57, 129.95 (3-ArC), 130.56 (C-5), 144.30 (CH=*C*), 145.76 (C-9), 153.38 (C-4), 155.96 (C-7), 159.86 (ArC), 161.91 (CO); HR-ESI-TOF-MS *m/z* 450.2023 ($[M+H]^+$), calcd for $[C_{25}H_{27}N_3O_5+H]^+$ 450.2026.

3-Ethyl-7-[2-hydroxy-3-(4-o-methoxyphenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15m). It was obtained as white solid in 83% yield; mp 130–132°C; IR (KBr): 3401, 2963, 2859, 1674, 1605, 1508, 1387, 1254, 1122, 1030, and 735 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.11 (3H, t, J = 7.7 Hz, −CH_2CH_3), 2.35 (3H, s, C-4 CH_3), 2.62 (2H, q, J = 8.1 Hz, −CH_2CH_3), 3.80 (4H, m, Ph-OCH_3 and OH), 4.01–4.05 (2H, m, −CH_2N), 4.45–4.54 (2H, m, −C*H* and −OCH_α), 4.68 (1H, dd, J = 11.9 and 2.9 Hz, −OCH_β), 5.23 (2H, s, −CH_2OPh), 6.74 (1H, d, J = 2.9 Hz, C-8H), 6.79–6.94 (4H, m, C-6H and ArH), 6.98–7.00 (1H, m, ArH), 7.45 (1H, d, J = 8.8 Hz, C-5H), 7.80 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.03 (−CH_2CH_3), 14.49 (C-4 CH_3), 20.74 (−CH_2CH_3), 52.94 (−CH_2N), 55.72 (Ph-OCH_3), 62.82 (−OCH_2Ph), 68.36 (−CH), 69.22 (−OCH_2), 101.32 (C-8), 111.77 (C-6), 112.07 (C-3), 114.27 (ArC), 114.75 (C-10), 120.78 (ArC), 121.88 (CH=C), 124.78, 125.12 (2-ArC), 125.48 (C-5), 144.02 (ArC), 145.81 (CH=*C*), 147.42 (C-9), 149.49 (C-4), 153.31 (C-7), 159.92 (ArC), 161.91 (CO); HR-ESI-TOF-MS *m/z* 466.1978 ($[M+H]^+$), calcd for $[C_{25}H_{27}N_3O_6+H]^+$ 466.1973.

3-Ethyl-7-[2-hydroxy-3-(4-m-methoxyphenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15n). It was obtained as white solid in 86% yield; mp 90–93°C; IR (KBr): 3228, 2938, 2859, 1708, 1617, 1458, 1295, 1155, 1057, and 841 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.14 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.37 (3H, s, C-4 CH_3), 2.65 (2H, q, J = 7.3 Hz, −CH_2CH_3), 3.71 (1H, brs, OH), 3.77 (1H, s, Ph-OCH_3), 4.03–4.10 (2H, m, −CH_2N), 4.50–4.59 (2H, m, −C*H* and −OCH_α), 4.72 (1H, dd, J = 12.4 and 2.2 Hz, −OCH_β), 5.16 (2H, s, −CH_2OPh), 6.51–6.57 (3H, m, C-6H, C-8H, and ArH), 6.77–6.85 (2H, m, ArH), 7.14–7.19 (1H, m, ArH), 7.48 (1H, d, J = 8.8 Hz, C-5H), 7.80 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.04 (−CH_2CH_3), 14.49 (C-4 CH_3), 20.75 (−CH_2CH_3), 52.98 (−CH_2N), 55.21 (Ph-OCH_3), 61.76 (−OCH_2Ph), 68.36 (−CH), 69.25 (−OCH_2), 101.19 (C-8), 106.65 (C-6), 106.84 (C-3 and ArC), 112.11 (C-10), 114.77 (ArC), 124.58 (CH=C), 125.13, 125.51 (2-ArC), 129.92 (C-5), 143.84 (ArC), 145.87 (CH=*C*), 153.31 (C-9), 159.29 (C-4), 159.92 (C-7), 160.74 (ArC), 161.94 (CO); HR-ESI-TOF-MS *m/z* 466.1975 ($[M+H]^+$), calcd for $[C_{25}H_{27}N_3O_6+H]^+$ 466.1973.

3-Ethyl-7-[2-hydroxy-3-(4-o-iodophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15o). It was obtained as white solid in 83% yield; mp 172–174°C; IR (KBr): 3273, 2932, 2873, 1711, 1617, 1439, 1297, 1155, 1061, and 760; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.13 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.37 (3H, s, C-4 CH_3), 2.66 (2H, q, J = 7.3 Hz, −CH_2CH_3), 3.70 (1H, d, J = 5.2 Hz, OH), 4.03–4.08 (2H, m, −CH_2N), 4.52–4.63 (1H, m, −C*H* and −OCH_α), 4.74 (1H, dd, J = 13.2 and 2.9 Hz, −OCH_β), 5.25 (2H, s, −CH_2OPh), 6.69–6.96 (4H, m, C-6H, C-8H, and ArH), 7.25–7.30 (1H, m, ArH), 7.48 (1H, d, J = 8.8 Hz, C-5H), 7.72–7.74 (1H, m, ArH), 7.89 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.02 (−CH_2CH_3), 14.48 (C-4 CH_3), 20.74 (−CH_2CH_3), 52.98 (−CH_2N), 62.31 (−OCH_2Ph), 68.33 (−CH), 69.28 (−OCH_2), 101.28 (C-8), 115.70 (C-6), 115.74 (C-10), 115.93 (2-ArC), 125.13 (C-3), 125.50 (CH=C), 143.72 (ArC), 145.91 (C-5), 153.28 (2-ArC and CH=*C*), 154.13 (C-9), 156.23 (C-4), 158.62 (C-7), 159.92 (ArC), 161.95 (CO); HR-ESI-TOF-MS *m/z* 562.0839 ($[M+H]^+$), calcd for $[C_{24}H_{24}IN_3O_5+H]^+$ 562.0833.

3-Ethyl-7-[2-hydroxy-3-(4-p-iodophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15p). It was obtained as white solid in 85% yield; mp 162–165°C; IR (KBr): 3384, 2922, 2852, 1715, 1611, 1487, 1386, 1249, 1175, 1096, and 824 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.11 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.35 (3H, s, C-4 CH_3), 2.62 (2H, q, J = 7.3 Hz, −CH_2CH_3), 3.78 (1H, brs, OH), 4.00–4.08 (2H, m, −CH_2N), 4.49–4.57 (2H, m, −C*H* and −OCH_α), 4.71 (1H, dd, J = 13.2 and 3.7 Hz, −OCH_β), 5.11 (2H, s, −CH_2OPh), 6.68–6.82 (4H, m, C-6H, C-8H, and ArH), 7.44–7.51 (3H, m, ArH and C-5H), 7.78 (1H, s, triazole H);

^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.05 (−CH_2CH_3), 14.55 (C-4 CH_3), 20.76 (−CH_2CH_3), 53.00 (−CH_2N), 61.72 (−OCH_2Ph), 68.32 (−CH), 69.27 (−OCH_2), 101.28 (C-8), 112.13 (C-6), 114.78 (C-10), 117.05 (2-ArC and C-3), 124.69 (CH=C), 125.14 (ArC), 125.52 (C-5), 138.20 (2-ArC and CH=C), 145.91 (C-9), 153.27 (C-4), 157.89 (C-7), 159.87 (ArC), 161.94 (CO); HR-ESI-TOF-MS *m/z* 562.0839 ([M + H]$^+$), calcd for $[C_{24}H_{24}IN_3O_5 + H]^+$ 562.0833.

3-Ethyl-7-[2-hydroxy-3-(4-m-fluorophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15q). It was obtained as white solid in 87% yield; mp 120–122°C; IR (KBr): 3392, 2935, 2875, 1706, 1616, 1490, 1298, 1160, 1070, and 840 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.11 (3H, t, J = 7.7 Hz, −CH_2CH_3), 2.35 (3H, s, C-4 CH_3), 2.62 (2H, q, J = 7.3 Hz, −CH_2CH_3), 3.64 (1H, d, J = 5.1 Hz, OH), 4.00–4.07 (2H, m, −CH_2N), 4.48–4.58 (2H, m, −CH and −OCH_α), 4.71 (1H, dd, J = 13.2 and 2.9 Hz, −OCH_β), 5.14 (2H, s, −CH_2OPh), 6.62–6.70 (2H, m, C-6H and C-8H), 6.71–6.82 (3H, m, ArH), 7.16–7.21 (1H, m, ArH), 7.46 (1H, d, J = 8.8 Hz, C-5H), 7.79 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.02 (−CH_2CH_3), 14.48 (C-4 CH_3), 20.73 (−CH_2CH_3), 53.01 (−CH_2N), 61.89 (−OCH_2Ph), 68.31 (−CH), 69.27 (−OCH_2), 101.27 (C-8), 102.41 (C-6), 102.66 (C-3), 107.96 (C-10), 108.17, 110.26 (2-ArC), 112.16 (CH=C), 114.74 (ArC), 124.71 (C-5), 125.50, 130.21 (2-ArC), 145.95 (CH=C), 153.26 (C-9), 159.30 (C-4), 159.92 (C-7), 161.97 (ArC), 164.65 (CO); HR-ESI-TOF-MS *m/z* 454.1773 ([M + H]$^+$), calcd for $[C_{24}H_{24}FN_3O_5 + H]^+$ 454.1773.

3-Ethyl-7-[2-hydroxy-3-(4-p-fluorophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15r). It was obtained as white solid in 85% yield; mp 126–129°C; IR (KBr): 3384, 2963, 2873, 1705, 1616, 1510, 1298, 1159, 1095, and 822 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.13 (3H, t, J = 7.4 Hz, −CH_2CH_3), 2.37 (3H, s, C-4 CH_3), 2.65 (2H, q, J = 7.4 Hz, −CH_2CH_3), 3.67 (1H, d, J = 4.4 Hz, OH), 4.02–4.10 (2H, m, −CH_2N), 4.52–4.60 (2H, m, −CH and −OCH_α), 4.74 (1H, dd, J = 13.2 and 2.9 Hz, −OCH_β), 5.15 (2H, s, −CH_2OPh), 6.76 (1H, d, J = 2.2 Hz, C-8H), 6.83 (1H, dd, J = 2.9 and 8.8 Hz, C-6H), 6.87–6.97 (4H, m, ArH), 7.48 (1H, d, J = 8.8 Hz, C-5H), 7.80 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.02 (−CH_2CH_3), 14.81 (C-4 CH_3), 20.74 (−CH_2CH_3), 52.98 (−CH_2N), 62.31 (−OCH_2Ph), 68.33 (−CH), 69.28 (−OCH_2), 101.29 (C-8), 112.15 (C-6), 114.77 (C-3), 115.70 (C-10), 115.74, 115.82 (2-ArC), 115.93 (CH=C), 125.13 (ArC), 125.50 (C-5), 143.72, 145.91 (2-ArC), 153.28 (CH=C), 154.13 (C-9), 156.23 (C-4), 158.62 (C-7), 159.91 (ArC), 161.95 (CO); HR-ESI-TOF-MS *m/z* 454.1783 ([M + H]$^+$), calcd for $[C_{24}H_{24}FN_3O_5 + H]^+$ 454.1773.

3-Ethyl-7-[2-hydroxy-3-(4-(4-phenylphenoxymethyl)-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15s). It was obtained as white solid in 89% yield; mp 128–131°C; IR (KBr): 3421, 2925, 2856, 1707, 1609, 1387, 1251, 1177, 1085, and 761 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.10 (3H, t, J = 7.6 Hz, −CH_2CH_3), 2.33 (3H, s, C-4 CH_3), 2.62 (2H, q, J = 7.3 Hz, −CH_2CH_3), 3.61 (1H, d, J = 4.5 Hz, OH), 4.00–4.08 (2H, m, −CH_2N), 4.50–4.58 (2H, m, −CH and −OCH_α), 4.70 (1H, dd, J = 13.7 and 2.8 Hz, −OCH_β), 5.21 (2H, s, −CH_2OPh), 6.75 (1H, d, J = 2.3 Hz, C-8H), 6.80 (1H, dd, J = 2.8 and 8.7 Hz, C-6H), 6.99–7.02 (2H, m, ArH), 7.26–7.52 (8H, m, C-5H and ArH), 7.80 (1H, s, triazole H); ^{13}C-NMR (100.6 MH_Z, $CDCl_3$): δ 13.02 (−CH_2CH_3), 14.45 (C-4 CH_3), 20.72 (−CH_2CH_3), 53.03 (−CH_2N), 61.75 (−OCH_2Ph), 68.31 (−CH), 69.28 (−OCH_2), 101.28 (C-8), 112.11 (C-6), 114.71 (C-10), 114.93 (2-ArC), 124.66 (C-3), 125.47 (CH=C), 126.57 (C-5), 126.70 (3-ArC), 128.05 (3-ArC), 128.67 (2-ArC), 140.39 (ArC), 143.79 (CH=C), 145.89 (C-9), 153.26 (C-4), 157.58 (C-7), 159.91 (ArC), 161.93 (CO); HR-ESI-TOF-MS *m/z* 512.2171 ([M + H]$^+$), calcd for $[C_{30}H_{29}N_3O_5 + H]^+$ 512.2180.

3-Ethyl-7-[2-hydroxy-3-(4-(naphthalen-2-loxymethyl)-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15t). It was obtained as white solid in 89% yield; mp 142–146°C; IR (KBr): 3161, 2925, 2856, 1718, 1621, 1466, 1294, 1182, 1084, and 845 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.11 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.33 (3H, s, C-4 CH_3), 2.62 (2H, q, J = 7.3 Hz, −CH_2CH_3), 3.62 (1H, d, J = 5.12 Hz, OH), 4.00–4.07 (2H, m, −CH_2N), 4.48–4.57 (2H, m, −CH and −OCH_α), 4.70 (1H, dd, J = 13.7 and 2.8 Hz, −OCH_β), 5.28 (2H, s, −CH_2OPh), 6.74 (1H, d, J = 2.2 Hz, C-8H), 6.79 (1H, dd, J = 2.2 and 8.8 Hz, C-6H), 7.10–7.22 (2H, m, ArH), 7.29–7.44 (3H, m, ArH), 7.68–7.73 (3H, m, C-5H and ArH), 7.81 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.02 (−CH_2CH_3), 14.43 (C-4 CH_3), 20.72 (−CH_2CH_3), 53.03 (−CH_2N), 61.66 (−OCH_2Ph), 68.31 (−CH), 69.27 (−OCH_2), 101.24 (C-8), 107.02 (ArC), 112.08 (C-6), 114.67 (C-10), 118.59 (ArC), 123.82 (C-3), 124.70 (ArC), 125.44 (CH=C), 127.52 (ArC), 129.46 (ArC), 143.71 (ArC), 145.88 (CH=C), 153.23 (C-4), 155.94 (C-9), 159.89 (C-7), 161.93 (CO); HR-ESI-TOF-MS *m/z* 486.2021 ([M + H]$^+$), calcd for $[C_{28}H_{27}N_3O_5 + H]^+$ 486.2023.

3-Ethyl-7-[2-hydroxy-3-(4-(naphthalen-1-loxymethyl)-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (15u). It was obtained as white solid in 90% yield; mp 110–113°C; IR (KBr): 3374, 2932, 2872, 1698, 1608, 1389, 1268, 1151, 1097, and 771 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 1.11 (3H, t, J = 7.3 Hz, −CH_2CH_3), 2.31 (3H, s, C-4 CH_3), 2.62 (2H, q, J = 7.3 Hz, −CH_2CH_3), 3.76 (1H, brs, OH), 3.99–4.06 (2H, m, −CH_2N), 4.52–4.58 (1H, m, −CH and −OCH_α), 4.70 (1H, dd, J = 13.9 and 3.7 Hz, −OCH_β), 5.34 (2H, s, −CH_2OPh), 6.72 (1H, d, J = 2.9 Hz, C-8H), 6.78 (1H, dd, J = 2.2 and 8.8 Hz, C-6H), 6.89 (1H, d, J = 7.3 Hz, ArH), 7.28–7.46 (5H, m, ArH), 7.75 (1H, d, J = 8.1 Hz, C-5H), 7.83 (1H, s, triazole), 8.15 (1H, d, J = 8.8 Hz, ArH); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 13.02 (−CH_2CH_3), 14.43 (C-4 CH_3), 20.72 (−CH_2CH_3), 53.01 (−CH_2N), 62.07 (−CH), 68.32 (−OCH_2), 69.25 (−OCH_2Ph), 101.23 (C-8), 105.20 (ArC), 112.08 (C-6), 114.68 (C-10), 120.79 (C-3), 121.81, 124.56, 125.04 (3-ArC), 125.18 (C-5), 125.45, 125.69 (3-ArC), 126.38 (CH=C), 127.39, 134.38 (2-ArC), 143.99 (CH=C), 145.89 (C-4), 153.23 (C-9), 153.72 (ArC), 159.88 (C-7), 161.95 (CO); HR-ESI-TOF-MS *m/z* 486.2018 ([M + H]$^+$), calcd for $[C_{28}H_{27}N_3O_5 + H]^+$ 486.2023.

3-Hexyl-7-[2-hydroxy-3-(4-phenoxymethyl-1,2,3-triazol-1-yl) propyloxy]-4-methylcoumarin (16a). It was obtained as white solid in 85% yield; mp 101–104°C; IR (KBr): 3385, 2920, 2851, 1717, 1611, 1387, 1260, 1172, 1026, and 770 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.89 (3H, t, J = 7.0 Hz, −$(CH_2)_5CH_3$), 1.25–1.40 (6H, m, −$CH_2CH_2(CH_2)_3CH_3$), 1.46–1.52 (2H, m, −$CH_2CH_2(CH_2)_3CH_3$), 2.37 (3H, s, C-4 CH_3), 2.61 (2H, t, J = 7.3 Hz, −$CH_2(CH_2)_4CH_3$), 4.02–4.09 (2H, m, −CH_2N), 4.47–4.59 (2H, m, −CH and −OCH_α), 4.72 (1H, dd, J = 13.9 and 3.7 Hz, −OCH_β), 5.19 (2H, s, −CH_2OPh), 6.78 (1H, d, J = 2.9 Hz, C-8H), 6.83 (1H, dd, J = 8.8 and 1.5 Hz, C-6H), 6.94–6.96 (3H, m, ArH), 7.25–7.30 (2H, t, J = 8.8 Hz, ArH), 7.47 (1H, d, J = 8.7 Hz, C-5H), 7.79 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.05 (−$(CH_2)_5CH_3$), 14.79 (C-4 CH_3), 16.19 (−$CH_2(CH_2)_3CH_2CH_3$), 22.59 (−$CH_2(CH_2)_3CH_2CH_3$), 27.49 (−$CH_2CH_2(CH_2)_3CH_3$), 29.34 (−$CH_2CH_2(CH_2)_3CH_3$), 31.65 (−$(CH_2)_3CH_2CH_2CH_3$), 52.94 (−CH_2N), 62.03 (−CH), 68.38 (−OCH_2),

69.24 (—O*C*H$_2$Ph), 101.33 (C-8), 111.39 (C-6 and C-10), 112.06 (2-ArC), 114.82 (ArC), 120.95 (C-3), 124.09 (C-5), 126.78 (*C*H═C), 126.86, 130.75 (2-ArC), 144.49 (CH═*C*), 146.00 (C-4), 153.33 (C-9), 156.22 (ArC), 159.89 (C-7), 162.06 (CO); HR-ESI-TOF-MS *m/z* 492.2493 ([M + H]$^+$), calcd for [$C_{28}H_{33}N_3O_5$ + H]$^+$ 492.2493.

3-Hexyl-7-[2-hydroxy-3-(4-o-chlorophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16b). It was obtained as white solid in 92% yield; mp 134–138°C; IR (KBr): 3392, 2926, 2872, 1718, 1617, 1458, 1280, 1170, 1087, and 759 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.89 (3H, t, *J* = 7.3 Hz, —(CH$_2$)$_5$C*H*$_3$), 1.25–1.40 (6H, m, —CH$_2$CH$_2$(C*H*$_2$)$_3$CH$_3$), 1.45–1.54 (2H, m, —CH$_2$C*H*$_2$(CH$_2$)$_3$CH$_3$), 2.36 (3H, s, C-4 C*H*$_3$), 2.61 (2H, d, *J* = 7.3 Hz, —C*H*$_2$(CH$_2$)$_4$CH$_3$), 3.75 (1H, brs, OH), 4.04–4.09 (2H, m, —C*H*$_2$N), 4.53–4.60 (2H, m, —C*H* and —OC*H*$_\alpha$), 4.74 (1H, dd, *J* = 13.2 and 2.9 Hz, —OC*H*$_\beta$), 5.26 (2H, s, —C*H*$_2$OPh), 6.76 (1H, d, *J* = 2.9 Hz, C-8H), 6.84 (1H, dd, *J* = 8.8 and 2.2 Hz, C-6H), 6.87–7.34 (4H, m, ArH), 7.47 (1H, d, *J* = 8.8 Hz, C-5H), 7.85 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.03 (—(CH$_2$)$_5$C*H*$_3$), 14.77 (C-4 *C*H$_3$), 22.57 (—CH$_2$(CH$_2$)$_3$*C*H$_2$CH$_3$), 27.46 (—*C*H$_2$(CH$_2$)$_3$CH$_2$CH$_3$), 28.69 (—CH$_2$*C*H$_2$(CH$_2$)$_3$CH$_3$), 29.32 (—(CH$_2$)$_2$*C*H$_2$(CH$_2$)$_2$CH$_3$), 31.62 (—(CH$_2$)$_3$*C*H$_2$CH$_2$CH$_3$), 53.03 (—*C*H$_2$N), 62.97 (—CH), 68.29 (—OCH$_2$), 69.23 (—O*C*H$_2$Ph), 101.23 (C-8), 112.13 (C-6), 114.07 (C-10), 114.73, 122.03, 122.92 (3-ArC), 123.97 (C-3), 124.70 (C-5), 125.48 (*C*H═C), 127.74 (2-ArC), 130.24 (CH═*C*), 146.06 (C-4), 153.27 (C-9), 153.54 (ArC), 159.89 (C-7), 162.07 (CO); HR-ESI-TOF-MS *m/z* 526.2109 ([M + H]$^+$), calcd for [$C_{28}H_{32}ClN_3O_5$ + H]$^+$ 526.2103.

3-Hexyl-7-[2-hydroxy-3-(4-m-chlorophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16c). It was obtained as white solid in 85% yield; mp 100–102°C; IR (KBr): 3393, 2927, 2855, 1705, 1616, 1383, 1298, 1159, 1087, and 768 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.89 (3H, t, *J* = 6.6 Hz, —(CH$_2$)$_5$C*H*$_3$), 1.26–1.38 (6H, m, —CH$_2$CH$_2$(C*H*$_2$)$_3$CH$_3$), 1.46–1.52 (2H, m, —CH$_2$C*H*$_2$(CH$_2$)$_3$CH$_3$), 2.37 (3H, s, C-4 C*H*$_3$), 2.61 (2H, d, *J* = 7.7 Hz, —C*H*$_2$(CH$_2$)$_4$CH$_3$), 3.75 (1H, brs, OH), 4.03–4.09 (2H, m, —C*H*$_2$N), 4.53–4.60 (2H, m, —C*H* and —OC*H*$_\alpha$), 4.73 (1H, dd, *J* = 13.9 and 3.7 Hz, —OC*H*$_\beta$), 5.16 (2H, s, —C*H*$_2$OPh), 6.76–6.95 (5H, m, C-6H, C-8H, and ArH), 7.15 (1H, t, *J* = 8.1 Hz, ArH), 7.48 (1H, d, *J* = 8.8 Hz, C-5H), 7.81 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.05 (—(CH$_2$)$_5$C*H*$_3$), 14.81 (C-4 *C*H$_3$), 22.59 (—CH$_2$(CH$_2$)$_3$*C*H$_2$CH$_3$), 27.49 (—*C*H$_2$(CH$_2$)$_3$CH$_2$CH$_3$), 28.72 (—CH$_2$*C*H$_2$(CH$_2$)$_3$CH$_3$), 29.34 (—(CH$_2$)$_2$*C*H$_2$(CH$_2$)$_2$CH$_3$), 31.65 (—(CH$_2$)$_3$*C*H$_2$CH$_2$CH$_3$), 52.99 (—*C*H$_2$N), 61.89 (—CH), 68.37 (—OCH$_2$), 69.24 (—O*C*H$_2$Ph), 101.31 (C-8), 112.08 (C-6), 112.97 (C-10), 114.83, 115.24, 121.44 (3-ArC), 124.10 (C-3), 124.65 (C-5), 125.53 (*C*H═C), 130.26, 134.84 (2-ArC), 143.39 (CH═*C*), 146.01 (C-4), 153.31 (C-9), 158.75 (C-7), 159.85 (ArC), 162.06 (CO); HR-ESI-TOF-MS *m/z* 526.2106 ([M + H]$^+$), calcd for [$C_{28}H_{32}ClN_3O_5$ + H]$^+$ 526.2103.

3-Hexyl-7-[2-hydroxy-3-(4-p-chlorophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16d). It was obtained as white solid in 81% yield; mp 122–126°C; IR (KBr): 3392, 2922, 2853, 1718, 1611, 1387, 1250, 1091, and 825 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, *J* = 7.3 Hz, —(CH$_2$)$_5$C*H*$_3$), 1.23–1.40 (6H, m, —CH$_2$CH$_2$(C*H*$_2$)$_3$CH$_3$), 1.45–1.54 (2H, m, —CH$_2$C*H*$_2$(CH$_2$)$_3$CH$_3$), 2.37 (3H, s, C-4 C*H*$_3$), 2.61 (2H, t, *J* = 7.3 Hz, —C*H*$_2$(CH$_2$)$_4$CH$_3$), 3.71 (1H, brs, OH), 4.02–4.10 (2H, m, —C*H*$_2$N), 4.51–4.60 (2H, m, —C*H* and —OC*H*$_\alpha$), 4.74 (1H, dd, *J* = 13.9 and 2.2 Hz, —OC*H*$_\beta$), 5.15 (2H, s, —C*H*$_2$OPh), 6.75 (1H, d, *J* = 2.9 Hz, C-8H), 6.81 (1H, dd, *J* = 9.5 and 2.9 Hz, C-6H), 6.85–6.89 (2H, m, ArH), 7.17–7.21 (2H, m, ArH), 7.47 (1H, d, *J* = 8.8 Hz, C-5H), 7.80 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.05 (—(CH$_2$)$_5$C*H*$_3$), 14.80 (C-4 *C*H$_3$), 21.46 (—CH$_2$(CH$_2$)$_3$*C*H$_2$CH$_3$), 22.59 (—*C*H$_2$(CH$_2$)$_3$CH$_2$CH$_3$), 28.74 (—CH$_2$*C*H$_2$(CH$_2$)$_3$CH$_3$), 29.35 (—(CH$_2$)$_2$*C*H$_2$(CH$_2$)$_2$CH$_3$), 31.66 (—(CH$_2$)$_3$*C*H$_2$CH$_2$CH$_3$), 53.00 (—*C*H$_2$N), 61.66 (—CH), 68.38 (—OCH$_2$), 69.26 (—O*C*H$_2$Ph), 101.35 (C-8), 111.48 (C-6), 112.11 (C-10), 115.52 (3-ArC), 122.09 (C-3), 124.52 (C-5), 125.52 (*C*H═C), 129.21 (2-ArC), 139.59 (CH═*C*), 146.02 (ArC), 153.33 (C-4), 158.09 (C-9), 159.92 (C-7), 162.06 (CO); HR-ESI-TOF-MS *m/z* 526.2103 ([M + H]$^+$), calcd for [$C_{28}H_{32}ClN_3O_5$ + H]$^+$ 526.2103.

3-Hexyl-7-[2-hydroxy-3-(4-o-bromophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16e). It was obtained as white solid in 91% yield; mp 129–133°C; IR (KBr): 3232, 2925, 2853, 1718, 1621, 1487, 1297, 1170, 1087, and 757 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.89 (3H, t, *J* = 7.3 Hz, —(CH$_2$)$_5$C*H*$_3$), 1.25–1.40 (6H, m, —CH$_2$CH$_2$(C*H*$_2$)$_3$CH$_3$), 1.46–1.54 (2H, m, —CH$_2$C*H*$_2$(CH$_2$)$_3$CH$_3$), 2.36 (3H, s, C-4 C*H*$_3$), 2.61 (2H, t, *J* = 8.1 Hz, —C*H*$_2$(CH$_2$)$_4$CH$_3$), 3.80 (1H, brs, OH), 4.03–4.09 (2H, m, —C*H*$_2$N), 4.53–4.61 (2H, m, —C*H* and —OC*H*$_\alpha$), 4.73 (1H, dd, *J* = 13.2 and 2.9 Hz, —OC*H*$_\beta$), 5.26 (2H, s, —C*H*$_2$OPh), 6.77 (1H, d, *J* = 2.9 Hz, C-8H), 6.81–6.86 (2H, m, C-6H, ArH), 7.03 (1H, dd, *J* = 8.1 and 1.5 Hz, ArH), 7.21–7.27 (1H, m, ArH), 7.46–7.51 (2H, m, ArH and C-5H), 7.86 (1H, s triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.04 (—(CH$_2$)$_5$C*H*$_3$), 14.79 (C-4 *C*H$_3$), 22.58 (—*C*H$_2$(CH$_2$)$_3$*C*H$_2$CH$_3$), 27.49 (—CH$_2$*C*H$_2$(CH$_2$)$_3$CH$_3$), 29.33 (—(CH$_2$)$_2$*C*H$_2$(CH$_2$)$_2$CH$_3$), 31.64 (—(CH$_2$)$_3$*C*H$_2$CH$_2$CH$_3$), 53.00 (—*C*H$_2$N), 63.18 (—CH), 68.36 (—OCH$_2$), 69.19 (—O*C*H$_2$Ph), 101.30 (C-8), 112.09 (C-6 and ArC), 112.23 (C-10), 113.89 (ArC), 114.81 (C-3), 122.54 (ArC), 124.08 (C-5), 124.61 (*C*H═C), 125.52, 128.52 (2-ArC), 133.32 (CH═*C*), 145.99 (C-4), 153.32 (C-9), 154.40 (ArC), 159.87 (C-7), 162.04 (CO); HR-ESI-TOF-MS *m/z* 570.1603 ([M + H]$^+$), calcd for [$C_{28}H_{32}BrN_3O_5$ + H]$^+$ 570.1598.

3-Hexyl-7-[2-hydroxy-3-(4-p-bromophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16f). It was obtained as white solid in 85% yield; mp 99–101°C; IR (KBr): 3402, 2922, 2855, 1717, 1610, 1387, 1251, 1171, 1091, and 823 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.89 (3H, t, *J* = 7.3 Hz, —(CH$_2$)$_5$C*H*$_3$), 1.25–1.44 (6H, m, —CH$_2$CH$_2$(C*H*$_2$)$_3$CH$_3$), 1.48–1.54 (2H, m, —CH$_2$C*H*$_2$(CH$_2$)$_3$CH$_3$), 2.37 (3H, s, C-4 C*H*$_3$), 2.61 (2H, t, *J* = 8.1 Hz, —C*H*$_2$(CH$_2$)$_4$CH$_3$), 3.76 (1H, d, *J* = 4.4 Hz, OH), 4.02–4.09 (2H, m, —C*H*$_2$N), 4.50–4.59 (2H, m, —C*H* and —OC*H*$_\alpha$), 4.74 (1H, dd, *J* = 13.9 and 2.9 Hz, —OC*H*$_\beta$), 5.15 (2H, s, —C*H*$_2$OPh), 6.75 (1H, d, *J* = 2.9 Hz, C-8H), 6.80–6.85 (3H, m, C-6H and ArH), 7.33–7.36 (2H, m, ArH), 7.47 (1H, d, *J* = 8.8 Hz, C-5H), 7.80 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.03 (—(CH$_2$)$_5$C*H*$_3$), 14.79 (C-4 *C*H$_3$), 22.57 (—*C*H$_2$(CH$_2$)$_3$*C*H$_2$CH$_3$), 27.46 (—CH$_2$*C*H$_2$(CH$_2$)$_3$CH$_3$), 29.32 (—(CH$_2$)$_2$*C*H$_2$(CH$_2$)$_2$CH$_3$), 31.62 (—(CH$_2$)$_3$*C*H$_2$CH$_2$CH$_3$), 53.01 (—*C*H$_2$N), 61.83 (—CH), 68.29 (—OCH$_2$), 69.27 (—O*C*H$_2$Ph), 101.23 (C-8), 112.13 (C-6), 113.42 (C-10), 114.76, 116.46 (3-ArC), 123.99 (C-3), 124.70 (C-5), 125.50 (*C*H═C), 132.22 (2-ArC), 143.41 (CH═*C*), 146.09 (C-4), 153.24 (C-9), 157.10 (ArC), 159.86 (C-7), 162.08 (CO); HR-ESI-TOF-MS *m/z* 570.1598 ([M + H]$^+$), calcd for [$C_{28}H_{32}BrN_3O_5$ + H]$^+$ 570.1598.

3-Hexyl-7-[2-hydroxy-3-(4-o-nitrophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16g). It was obtained as white solid in 85% yield; mp 130–133°C; IR (KBr): 3419, 2924, 2856, 1689, 1612, 1347, 1255, 1163, 1090, and 739 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 0.84 (3H, t, *J* = 7.3 Hz, —(CH$_2$)$_5$C*H*$_3$), 1.23–1.40 (6H, m, —CH$_2$CH$_2$(C*H*$_2$)$_3$CH$_3$), 1.45–1.52 (2H,

m, —$CH_2CH_2(CH_2)_3CH_3$), 2.37 (3H, s, C-4 CH_3), 2.61 (2H, t, J = 8.1 Hz, —$CH_2(CH_2)_4CH_3$), 4.01–4.10 (2H, m, —CH_2N), 4.22–4.30 (1H, m, —C*H*), 4.48 (1H, dd, J = 13.9 and 7.3 Hz, —OCH_α), 4.60 (1H, dd, J = 13.9 and 3.7 Hz, —OCH_β), 5.35 (2H, s, —CH_2OPh), 5.64 (1H, d, J = 5.12 Hz, OH), 6.93–6.96 (2H, m, C-8H and C-6H), 7.09–7.14 (1H, m, ArH), 7.57–7.70 (3H, m, ArH), 7.85 (1H, d, J = 8.1 Hz, C-5H), 8.21 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, DMSO-d_6): δ 14.01 (—$(CH_2)_5CH_3$), 14.68 (C-4 CH_3), 22.13 (—$CH_2(CH_2)_3CH_2CH_3$), 26.86 (—$CH_2CH_2(CH_2)_3CH_3$), 28.71 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.67 (—$(CH_2)_3CH_2CH_2CH_3$), 52.61 (—CH_2N), 62.58 (—CH), 67.67 (—OCH_2), 70.10 (—OCH_2Ph), 101.04 (C-8), 112.38 (C-6), 113.92 (C-10), 115.61, 120.95 (2-ArC), 122.65 (C-3), 124.99 (C-5), 125.99 (ArC), 126.39 (CH═C), 134.38, 139.77 (2-ArC), 141.56 (CH═C), 146.76 (C-4), 150.66 (C-9), 153.08 (ArC), 160.44 (C-7), 161.01 (CO); HR-ESI-TOF-MS *m/z* 537.2346 ([M + H]$^+$), calcd for $[C_{28}H_{32}N_4O_7 + H]^+$ 537.2344.

3-Hexyl-7-[2-hydroxy-3-(4-m-nitrophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16h). It was obtained as white solid in 88% yield; mp 136–140°C; IR (KBr): 3222, 2928, 2858, 1717, 1618, 1349, 1252, 1162, 1083, and 826 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 0.84 (3H, t, J = 7.3 Hz, —$(CH_2)_5CH_3$), 1.26–1.33 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.38–1.43 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.37 (3H, s, C-4 CH_3), 2.49–2.54 (2H, m, —$CH_2(CH_2)_4CH_3$), 3.99–4.07 (2H, m, —CH_2N), 4.21–4.28 (2H, m, —C*H*), 4.45 (1H, dd, J = 13.2 and 3.7 Hz, —OCH_α), 4.61 (1H, dd, J = 13.8 and 3.2 Hz, —OCH_β), 5.29 (2H, s, —CH_2OPh), 5.65 (1H, d, J = 5.1 Hz, OH), 6.93–6.96 (2H, m, C-8H and C-6H), 7.49–7.69 (3H, m, ArH), 7.80–7.87 (2H, m, ArH and C-5H), 8.25 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, DMSO-d_6): δ 13.94 (—$(CH_2)_5CH_3$), 14.62 (C-4 CH_3), 22.05 (—$CH_2(CH_2)_3CH_2CH_3$), 26.79 (—$CH_2CH_2(CH_2)_3CH_3$), 28.64 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.00 (—$(CH_2)_3CH_2CH_2CH_3$), 52.54 (—CH_2N), 61.76 (—CH), 67.61 (—OCH_2), 70.06 (—OCH_2Ph), 101.01 (C-8), 109.06 (C-6), 112.18 (C-10), 113.87, 115.76, 122.17 (3-ArC), 122.61 (C-3), 125.91 (C-5), 126.31 (CH═C), 130.66 (ArC), 141.68 (CH═C), 146.64 (C-4), 148.69 (ArC), 153.02 (C-9), 158.55 (C-7), 160.37 (ArC), 160.90 (CO); HR-ESI-TOF-MS *m/z* 537.2336 ([M + H]$^+$), calcd for $[C_{28}H_{32}N_4O_7 + H]^+$ 537.2344.

3-Hexyl-7-[2-hydroxy-3-(4-p-nitrophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16i). It was obtained as white solid in 86% yield; mp 136–140°C; IR (KBr): 3367, 2929, 2856, 1699, 1610, 1382, 1256, 1173, 1003, and 834 cm^{-1}; ^{1}H-NMR (400 MHz, DMSO-d_6): δ 0.84 (3H, t, J = 7.3 Hz, —$(CH_2)_5CH_3$), 1.26–1.33 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.38–1.45 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.37 (3H, s, C-4 CH_3), 2.50–2.54 (2H, m, —$CH_2(CH_2)_4CH_3$), 4.00–4.07 (2H, m, —CH_2N), 4.22–4.28 (1H, m, —C*H*), 4.48 (1H, dd, J = 13.9 and 7.3 Hz, —OCH_α), 4.63 (1H, dd, J = 13.9 and 3.7 Hz, —OCH_β), 5.32 (2H, s, —CH_2OPh), 5.65 (1H, d, J = 5.1 Hz, OH), 6.93–6.96 (2H, m, C-8H and C-6H), 7.24–7.27 (2H, m, ArH), 7.67 (1H, d, J = 8.8 Hz, C-5H), 8.18–8.22 (2H, m, ArH), 8.27 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, DMSO-d_6): δ 13.95 (—$(CH_2)_5CH_3$), 14.61 (C-4 CH_3), 22.07 (—$CH_2(CH_2)_3CH_2CH_3$), 26.81 (—$CH_2CH_2(CH_2)_3CH_3$), 28.66 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.10 (—$(CH_2)_3CH_2CH_2CH_3$), 52.58 (—CH_2N), 61.91 (—CH), 67.61 (—OCH_2), 70.07 (—OCH_2Ph), 101.02 (C-8), 112.28 (C-6), 113.88 (C-10), 115.20 (2-ArC), 122.62 (C-3), 125.83 (2-ArC), 126.05 (C-5), 126.32 (CH═C), 140.99 (ArC), 141.43 (CH═C), 146.65 (C-4), 153.02 (C-9), 160.38 (C-7), 160.92 (ArC), 163.31 (CO); HR-ESI-TOF-MS *m/z* 537.2341 ([M + H]$^+$), calcd for $[C_{28}H_{32}N_4O_7 + H]^+$ 537.2344.

3-Hexyl-7-[2-hydroxy-3-(4-o-tolyloxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16j). It was obtained as white solid in 83% yield; mp 120–122°C; IR (KBr): 3385, 2922, 2852, 1716, 1611, 1387, 1250, 1121, 1025, and 748 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.86 (3H, t, J = 7.3 Hz, —$(CH_2)_5CH_3$), 1.23–1.40 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.45–1.52 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.18 (3H, s, Ph-CH_3), 2.36 (3H, s, C-4 CH_3), 2.61 (2H, t, J = 8.1 Hz, —$CH_2(CH_2)_4CH_3$), 3.87 (1H, d, J = 5.1 Hz, OH), 4.05–4.09 (2H, m, —CH_2N), 4.54–4.60 (2H, m, —C*H* and —OCH_α), 4.71 (1H, dd, J = 13.9 and 3.7 Hz, —OCH_β), 5.19 (2H, s, —CH_2OPh), 6.75–6.92 (4H, m, C-8H, C-6H, and ArH), 7.10–7.15 (2H, m, ArH), 7.47 (1H, d, J = 8.7 Hz, C-5H), 7.78 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.04 (—$(CH_2)_5CH_3$), 14.79 (Ph-CH_3), 20.41 (C-4 CH_3), 22.59 (—$CH_2(CH_2)_3CH_2CH_3$), 27.49 (—$CH_2CH_2(CH_2)_3CH_3$), 29.34 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.65 (—$(CH_2)_3CH_2CH_2CH_3$), 52.97 (—CH_2N), 61.85 (—CH), 68.39 (—OCH_2), 69.25 (—OCH_2Ph), 101.36 (C-8), 112.07 (C-6), 114.53 (ArC), 114.81 (C-10), 124.08 (ArC), 124.49 (C-3), 125.51 (C-5), 129.91 (2-ArC), 130.52 (CH═C and ArC), 144.15 (CH═C), 145.98 (C-4), 153.33 (C-9), 155.96 (ArC), 159.89 (C-7), 162.05 (CO); HR-ESI-TOF-MS *m/z* 506.2653 ([M + H]$^+$), calcd for $[C_{29}H_{35}N_3O_5 + H]^+$ 506.2649.

3-Hexyl-7-[2-hydroxy-3-(4-m-tolyloxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16k). It was obtained as white solid in 86% yield; mp 99–102°C; IR (KBr): 3511, 2924, 2852, 1718, 1610, 1385, 1259, 1173, 1085, and 777 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, J = 7.3 Hz, —$(CH_2)_5CH_3$), 1.30–1.40 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.45–1.52 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.31 (3H, s, Ph-CH_3), 2.36 (3H, s, C-4 CH_3), 2.61 (2H, t, J = 8.1 Hz —$CH_2(CH_2)_4CH_3$), 3.77 (d, 1H, J = 5.1 Hz, OH), 4.03–4.09 (2H, m, —CH_2N), 4.53–4.58 (2H, m, —C*H* and —OCH_α), 4.72 (1H, dd, J = 13.9 and 3.7 Hz, —OCH_β), 5.16 (2H, s, —CH_2OPh), 6.74–6.85 (5H, m, C-6H, C-8H, and ArH), 7.11–7.16 (1H, m, ArH), 7.47 (1H, d, J = 8.7 Hz, C-5H), 7.79 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.03 (—$(CH_2)_5CH_3$), 14.78 (C-4 CH_3), 21.44 (Ph-CH_3), 22.57 (—$CH_2(CH_2)_3CH_2CH_3$), 27.47 (—$CH_2CH_2(CH_2)_3CH_3$), 29.32 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.63 (—$(CH_2)_3CH_2CH_2CH_3$), 53.01 (—CH_2N), 61.59 (—CH), 68.32 (—OCH_2), 69.26 (—OCH_2Ph), 101.29 (C-8), 111.44 (C-6), 112.11 (ArC), 114.75 (C-10), 115.48, 122.07 (2-ArC), 123.99 (C-3), 124.54 (C-5), 125.48 (CH═C), 129.18, 139.55 (2-ArC), 144.01 (CH═C), 146.04 (C-4), 153.29 (C-9), 158.06 (C-7), 159.91 (ArC), 162.07 (CO); HR-ESI-TOF-MS *m/z* 506.2651 ([M + H]$^+$), calcd for $[C_{28}H_{35}N_3O_5 + H]^+$ 506.2649.

3-Hexyl-7-[2-hydroxy-3-(4-p-tolyloxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16l). It was obtained as white solid in 84% yield; mp 130–134°C; IR (KBr): 3386, 2920, 2852, 1721, 1610, 1383, 1247, 1176, 1089, and 831 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, J = 7.3 Hz, —$(CH_2)_5CH_3$), 1.25–1.44 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.45–1.54 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.27 (3H, s, Ph-CH_3), 2.36 (3H, s, C-4 CH_3), 2.61 (2H, t, J = 8.1 Hz, —$CH_2(CH2)_4CH_3$), 3.85 (1H, d, J = 5.1 Hz, OH), 4.03–4.10 (2H, m, —CH_2N), 4.49–4.58 (2H, m, —C*H* and —OCH_α), 4.72 (1H, dd, J = 13.9 and 3.7 Hz, —OCH_β), 5.14 (2H, s, —CH_2OPh), 6.75–6.86 (4H, m, C-8H, C-6H, and ArH), 7.03–7.07 (2H, m, ArH), 7.47 (1H, d, J = 8.7 Hz, C-5H), 7.79 (1H, s, triazole H); ^{13}C-NMR (100.6 MH_Z, $CDCl_3$): δ 14.05 (—$(CH_2)_5CH_3$), 14.75 (C-4 CH_3), 22.59 (Ph-CH_3), 27.49 (—$CH_2(CH_2)_3CH_2CH_3$), 29.34 (—$CH_2CH_2(CH_2)_3CH_3$), 53.34 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.65 (—$(CH_2)_3CH_2CH_2CH_3$), 53.00 (—CH_2N), 62.12 (—CH), 68.36 (—OCH_2), 69.25 (—OCH_2Ph), 101.27 (C-8), 105.24 (C-6), 112.04 (2-ArC), 114.77 (C-10), 121.83 (C-3), 124.52

(C-5), 125.70 (*C*H═C), 126.39, 127.42, 134.42 (3-ArC), 144.07 (CH═*C*), 146.00 (C-4), 153.29 (C-9), 153.75 (ArC), 159.86 (C-7), 162.05 (CO); HR-ESI-TOF-MS *m/z* 506.2647 ([M + H]$^+$), calcd for [$C_{29}H_{35}N_3O_5$ + H]$^+$ 506.2649.

3-Hexyl-7-[2-hydroxy-3-(4-o-methoxyphenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16m). It was obtained as white solid in 83% yield; mp 86–90°C; IR (KBr): 3411, 2924, 2854, 1694, 1608, 1385, 1255, 1124, 1087, and 736 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.89 (3H, t, *J* = 7.3 Hz, —$(CH_2)_5CH_3$), 1.25–1.40 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.45–1.52 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.37 (3H, s, C-4 CH_3), 2.61 (2H, t, *J* = 8.1 Hz, —$CH_2(CH_2)_4CH_3$), 3.83 (4H, m, Ph-OCH_3 and OH), 4.01–4.05 (2H, m, —CH_2N), 4.45–4.55 (2H, m, —C*H* and —OCH_α), 4.69 (1H, dd, *J* = 11.9 and 2.9 Hz, —OCH_β), 5.26 (2H, s, —CH_2OPh), 6.76–7.04 (6H, m, C-8H, C-6H, and ArH), 7.47 (1H, d, *J* = 8.8 Hz, C-5H), 7.83 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.05 (—$(CH_2)_5CH_3$), 14.80 (C-4 CH_3), 22.59 (—$CH_2(CH_2)_3CH_2CH_3$), 27.49 (—$CH_2CH_2(CH_2)_3CH_3$), 29.34 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.65 (—$(CH_2)_3CH_2CH_2CH_3$), 52.94 (—CH_2N), 55.75 (Ph-OCH_3), 62.87 (—CH), 68.40 (—OCH_2), 69.22 (—OCH_2Ph), 101.35 (C-8), 111.80 (C-6), 112.04 (ArC), 114.31 (C-10), 114.80, 120.81, 121.89 (3-ArC), 124.08 (C-3), 124.76 (C-5), 125.50 (*C*H═C), 144.08 (CH═*C*), 145.95 (C-4), 147.45, 149.52 (2-ArC), 153.33 (C-9), 159.89 (C-7), 162.02 (CO); HR-ESI-TOF-MS *m/z* 522.2596 ([M + H]$^+$), calcd for [$C_{29}H_{35}N_3O_6$ + H]$^+$ 522.2599.

3-Hexyl-7-[2-hydroxy-3-(4-m-methoxyphenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16n). It was obtained as white solid in 86% yield; mp 89–92°C; IR (KBr): 3222, 2923, 2853, 1715, 1609, 1301, 1201, 1160, 1051, and 783 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, *J* = 7.3 Hz, —$(CH_2)_5CH_3$), 1.25–1.42 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.46–1.54 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.36 (3H, s, C-4 CH_3), 2.61 (2H, t, *J* = 8.0 Hz, —$CH_2(CH_2)_4CH_3$), 3.76–3.79 (4H, m, OH and Ph-OCH_3), 4.03–4.10 (2H, m, —CH_2N), 4.53–4.59 (2H, m, —C*H* and —OCH_α), 4.72 (1H, dd, *J* = 12.4 and 2.2 Hz, —OCH_β), 5.16 (2H, s, —CH_2OPh), 6.51–6.57 (3H, m, C-8H, C-6H, and ArH), 6.76–6.85 (2H, m, ArH), 7.13–7.18 (1H, m, ArH), 7.48 (1H, d, *J* = 8.8 Hz, C-5H), 7.80 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.03 (—$(CH_2)_5CH_3$), 14.78 (C-4 CH_3), 22.57 (—$CH_2(CH_2)_3CH_2CH_3$), 27.47 (—$CH_2CH_2(CH_2)_3CH_3$), 29.32 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.64 (—$(CH_2)_3CH_2CH_2CH_3$), 52.98 (—CH_2N), 55.20 (Ph-OCH_3), 61.69 (—CH), 68.34 (—OCH_2), 69.24 (—OCH_2Ph), 101.19 (ArC), 106.65 (C-8), 106.83, 112.08 (2-ArC), 114.77 (C-6), 124.02 (C-10), 124.59 (C-3), 125.49 (C-5), 129.91 (*C*H═C), 143.81 (ArC), 146.03 (CH═*C*), 153.29 (C-4), 159.27 (C-9), 159.88 (C-7), 160.72 (2-ArC), 162.07 (CO); HR-ESI-TOF-MS *m/z* 522.2593 ([M + H]$^+$), calcd for [$C_{29}H_{35}N_3O_6$ + H]$^+$ 522.2599.

3-Hexyl-7-[2-hydroxy-3-(4-o-iodophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16o). It was obtained as white solid in 83% yield; mp 168–173°C; IR (KBr): 3285, 2924, 2855, 1717, 1618, 1333, 1297, 1169, 1086, and 761 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, *J* = 7.3 Hz, —$(CH_2)_5CH_3$), 1.25–1.42 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.48–1.54 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.37 (3H, s, C-4 CH_3), 2.61 (2H, t, *J* = 8.0 Hz, —$CH_2(CH_2)_4CH_3$), 3.78 (1H, d, *J* = 5.2 Hz, OH), 4.03–4.08 (2H, m, —CH_2N), 4.54–4.63 (1H, m, —C*H* and —OCH_α), 4.72 (1H, dd, *J* = 13.2 and 2.9 Hz, —OCH_β), 5.24 (2H, s, —CH_2OPh), 6.69–6.96 (4H, m, C-8H, C-6H, and ArH), 7.25–7.30 (1H, m, ArH), 7.48 (1H, d, *J* = 8.8 Hz, C-5H), 7.71–7.73 (1H, m, ArH), 7.89 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.06 (—$(CH_2)_5CH_3$), 14.82 (C-4 CH_3), 22.59 (—$CH_2(CH_2)_3CH_2CH_3$), 27.49 (—$CH_2CH_2(CH_2)_3CH_3$), 29.34 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.66 (—$(CH_2)_3CH_2CH_2CH_3$), 52.99 (—CH_2N), 61.88 (—CH), 68.37 (—OCH_2), 69.24 (—OCH_2Ph), 101.31 (ArC), 112.08 (C-8), 112.97 (C-6), 114.83 (C-10), 115.24, 121.44 (2-ArC), 124.10 (C-3), 124.65 (C-5), 125.53 (*C*H═C), 130.26, 134.84 (2-ArC), 143.39 (CH═*C*), 146.01 (C-4), 153.31 (C-9), 158.75 (C-7), 159.85 (ArC), 162.06 (CO); HR-ESI-TOF-MS *m/z* 618.1475 ([M + H]$^+$), calcd for [$C_{28}H_{32}IN_3O_5$ + H]$^+$ 1459.

3-Hexyl-7-[2-hydroxy-3-(4-p-iodophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16p). It was obtained as white solid in 85% yield; mp 158–163°C; IR (KBr): 3384, 2922, 2852, 1717, 1611, 1386, 1249, 1175, 1096, and 841 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, *J* = 7.3 Hz, —$(CH_2)_5CH_3$), 1.26–1.42 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.46–1.54 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.37 (3H, s, C-4 CH_3), 2.61 (2H, t, *J* = 8.0 Hz, —$CH_2(CH_2)_4CH_3$), 3.77 (1H, brs, OH), 4.02–4.09 (2H, m, —CH_2N), 4.53–4.59 (2H, m, —C*H* and —OCH_α), 4.71 (1H, dd, *J* = 13.2 and 3.7 Hz, —OCH_β), 5.14 (2H, s, —CH_2OPh), 6.71–6.83 (4H, m, C-8H, C-6H, and ArH), 7.46–7.53 (3H, m, ArH and C-5H), 7.80 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.05 (—$(CH_2)_5CH_3$), 14.83 (C-4 CH_3), 22.58 (—$CH_2(CH_2)_3CH_2CH_3$), 27.48 (—$CH_2CH_2(CH_2)_3CH_3$), 29.33 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.63 (—$(CH_2)_3CH_2CH_2CH_3$), 53.01 (—CH_2N), 61.69 (—CH), 68.29 (—OCH_2), 69.26 (—OCH_2Ph), 83.45 (ArC), 101.24 (C-8), 112.12 (C-6), 112.77 (C-10), 117.03 (2-ArC), 124.02 (C-3), 124.70 (C-5), 125.51 (*C*H═C), 138.19 (2-ArC), 143.39 (CH═*C*), 146.09 (C-4), 153.24 (C-9), 157.87 (ArC), 159.85 (C-7), 162.08 (CO); HR-ESI-TOF-MS *m/z* 618.1459 ([M + H]$^+$), calcd for [$C_{28}H_{32}IN_3O_5$ + H]$^+$ 618.1459.

3-Hexyl-7-[2-hydroxy-3-(4-m-fluorophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16q). It was obtained as white solid in 87% yield; mp 120–122°C; IR (KBr): 3404, 2931, 2858, 1702, 1615, 1335, 1287, 1158, 1087, and 844 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, *J* = 7.3 Hz, —$(CH_2)_5CH_3$), 1.23–1.40 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.45–1.52 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.36 (3H, s, C-4 CH_3), 2.61 (2H, t, *J* = 8.0 Hz, —$CH_2(CH_2)_4CH_3$), 3.78 (1H, d, *J* = 5.12 Hz, OH), 4.00–4.07 (2H, m, —CH_2N), 4.48–4.58 (2H, m, —C*H* and —OCH_α), 4.71 (1H, dd, *J* = 13.2 and 2.9 Hz, —OCH_β), 5.16 (2H, s, —CH_2OPh), 6.61–6.84 (5H, m, C-8H, C-6H, and ArH), 7.16–7.23 (1H, m, ArH), 7.47 (1H, d, *J* = 8.8 Hz, C-5H), 7.82 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.05 (—$(CH_2)_5CH_3$), 14.79 (C-4 CH_3), 22.59 (—$CH_2(CH_2)_3CH_2CH_3$), 27.51 (—$CH_2CH_2(CH_2)_3CH_3$), 29.35 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.63 (—$(CH_2)_3CH_2CH_2CH_3$), 52.97 (—CH_2N), 61.96 (—CH), 68.39 (—OCH_2), 69.23 (—OCH_2Ph), 101.34 (ArC), 102.46 (C-8), 102.71, 107.99 (2-ArC), 108.21 (C-6), 110.29 (C-10), 112.06 (C-3), 114.87 (C-5), 124.14 (*C*H═C), 124.63 (ArC), 125.54 (CH═*C*), 130.33 (C-4), 143.49 (C-9), 145.99 (C-7), 153.33, 159.85 (2-ArC), 162.05 (CO); HR-ESI-TOF-MS *m/z* 510.2393 ([M + H]$^+$), calcd for [$C_{28}H_{32}FN_3O_5$ + H]$^+$ 510.2399.

3-Hexyl-7-[2-hydroxy-3-(4-p-fluorophenoxymethyl-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16r). It was obtained as white solid in 85% yield; mp 126–129°C; IR (KBr): 3413, 2932, 2859, 1702, 1615, 1355, 1216, 1158, 1087, and 829 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, *J* = 7.3 Hz, —$(CH_2)_5CH_3$), 1.30–1.42 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.46–1.54 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.36 (3H, s, C-4 CH_3), 2.61 (2H, t, *J* = 8.0 Hz, —$CH_2(CH_2)_4CH_3$), 3.84 (1H, d, *J* = 4.4 Hz, OH), 4.03–4.10 (2H, m, —CH_2N), 4.50–4.60 (2H, m, —C*H* and —OCH_α), 4.74

(1H, dd, J = 13.2 and 2.9 Hz, —OCH_β), 5.14 (2H, s, —CH_2OPh), 6.75–6.97 (6H, m, C-8H, C-6H, and ArH), 7.47 (1H, d, J = 8.8 Hz, C-5H), 7.81 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.02 (—$(CH_2)_5CH_3$), 14.77 (C-4 CH_3), 22.56 (—$CH_2(CH_2)_3CH_2CH_3$), 27.45 (—$CH_2CH_2(CH_2)_3CH_3$), 29.31 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.62 (—$(CH_2)_3CH_2CH_2CH_3$), 52.99 (—CH_2N), 62.26 (—CH), 68.29 (—OCH_2), 69.25 (—OCH_2Ph), 101.23 (C-8), 112.12 (C-6), 114.75 (C-10), 115.69, 115.78, 115.92 (4-ArC), 123.99 (C-3), 124.64 (C-5), 125.49 (CH═C), 143.67 (CH═C), 146.09 (C-4), 153.25 (C-9), 154.09, 156.21 (2-ArC), 159.87 (C-7), 162.09 (CO); HR-ESI-TOF-MS m/z 510.2399 ([M + H]$^+$), calcd for $[C_{28}H_{32}FN_3O_5 + H]^+$ 510.2399.

3-Hexyl-7-[2-hydroxy-3-(4-(4-phenylphenoxymethyl)-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16s). It was obtained as white solid in 89% yield; mp 126–129°C; IR (KBr): 3421, 2925, 2856, 1707, 1609, 1387, 1251, 1085, and 761 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, J = 7.0 Hz, —$(CH_2)_5CH_3$), 1.26–1.44 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.46–1.54 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.34 (3H, s, C-4 CH_3), 2.61 (2H, t, J = 8.1 Hz, —$CH_2(CH_2)_4CH_3$), 3.79 (1H, brs, OH), 4.02–4.09 (2H, m, —CH_2N), 4.51–4.57 (2H, m, —CH and —OCH_α), 4.70 (1H, dd, J = 13.7 and 2.8 Hz, —OCH_β), 5.23 (2H, s, —CH_2OPh), 6.76–6.83 (2H, m, C-8H and C-6H), 7.01–7.04 (2H, m, ArH), 7.29–7.53 (8H, m, C-5H and ArH), 7.83 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.03 (—$(CH_2)_5CH_3$), 14.74 (C-4 CH_3), 22.58 (—$CH_2(CH_2)_3CH_2CH_2CH_3$), 27.47 (—$CH_2CH_2(CH_2)_3CH_3$), 29.33 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.64 (—$(CH_2)_3CH_2CH_2CH_3$), 53.02 (—CH_2N), 61.78 (—CH), 68.34 (—OCH_2), 69.27 (—OCH_2Ph), 101.30 (C-8), 112.06 (C-6), 114.78 (C-10), 114.95, 124.02 (3-ArC), 124.02 (C-3), 124.64 (C-5), 125.49, 126.59 (3-ArC), 126.71 (CH═C), 128.08, 128.67, 134.22, 140.41 (6-ArC), 143.85 (CH═C), 146.02 (C-4), 153.29 (C-9), 157.59 (ArC), 159.88 (C-7), 162.06 (CO); HR-ESI-TOF-MS m/z 568.2804 ([M + H]$^+$), calcd for $[C_{34}H_{37}N_3O_5 + H]^+$ 568.2806.

3-Hexyl-7-[2-hydroxy-3-(4-(naphthalen-2-loxymethyl)-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16t). It was obtained as white solid in 89% yield; mp 139–140°C; IR (KBr): 3161, 2925, 2856, 1718, 1621, 1390, 1294, 1161, 1084, and 845 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, J = 7.3 Hz, —$(CH_2)_5CH_3$), 1.26–1.42 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.45–1.52 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.34 (3H, s, C-4 CH_3), 2.61 (2H, t, J = 8.0 Hz, —$CH_2(CH_2)_4CH_3$), 3.77 (1H, brs, OH), 4.02–4.09 (2H, m, —CH_2N), 4.48–4.58 (2H, m, —CH and —OCH_α), 4.70 (1H, dd, J = 13.7 and 2.8 Hz, —OCH_β), 5.29 (2H, s, —CH_2OPh), 6.73–6.82 (2H, m, C-8H and C-6H), 7.12–7.23 (2H, m, ArH), 7.32–7.75 (6H, m, C-5H and ArH), 7.83 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.03 (—$(CH_2)_5CH_3$), 14.71 (C-4 CH_3), 22.57 (—$CH_2(CH_2)_3CH_2CH_2CH_3$), 27.45 (—$CH_2CH_2(CH_2)_3CH_3$), 29.32 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.62 (—$(CH_2)_3CH_2CH_2CH_3$), 53.03 (—CH_2N), 61.65 (—CH), 68.29 (—OCH_2), 69.27 (—OCH_2Ph), 101.23 (C-8), 107.02 (ArC), 112.05 (C-6), 114.69 (C-10), 118.59 (ArC), 123.81 (C-3), 123.81, 123.93 (3-ArC), 124.69 (C-5), 125.44, 126.38, 126.78 (3-ArC), 127.51 (CH═C), 129.03, 129.45, 134.25 (3-ArC), 143.70 (CH═C), 146.02 (C-4), 153.23 (C-9), 155.93 (ArC), 159.87 (C-7), 162.05 (CO); HR-ESI-TOF-MS m/z 542.2649 ([M + H]$^+$), calcd for $[C_{32}H_{35}N_3O_5 + H]^+$ 542.2649.

3-Hexyl-7-[2-hydroxy-3-(4-(naphthalen-1-loxymethyl)-1,2,3-triazol-1-yl)propyloxy]-4-methylcoumarin (16u). It was obtained as white solid in 90% yield; mp 109–101°C; IR (KBr): 3384, 2923, 2853, 1716, 1610, 1395, 1271, 1104, 1021, and 766 cm^{-1}; ^{1}H-NMR (400 MHz, $CDCl_3$): δ 0.88 (3H, t, J = 7.3 Hz, —$(CH_2)_5CH_3$), 1.23–1.40 (6H, m, —$CH_2CH_2(CH_2)_3CH_3$), 1.45–1.52 (2H, m, —$CH_2CH_2(CH_2)_3CH_3$), 2.33 (3H, s, C-4 CH_3), 2.61 (2H, t, J = 8.0 Hz, —$CH_2(CH_2)_4CH_3$), 3.89 (1H, brs, OH), 4.01–4.08 (2H, m, —CH_2N), 4.52–4.59 (2H, m, —CH and —OCH_α), 4.70 (1H, dd, J = 13.7 and 2.8 Hz, —OCH_β), 5.36 (2H, s, —CH_2OPh), 6.75–6.81 (2H, m, C-8H and C-6H), 6.91 (1H, d, J = 7.3 Hz, ArH), 7.31–7.48 (5H, m, ArH), 7.76 (1H, d, J = 8.1 Hz, C-5H), 7.86 (1H, s, triazole H); ^{13}C-NMR (100.6 MHz, $CDCl_3$): δ 14.05 (—$(CH_2)_5CH_3$), 14.82 (C-4 CH_3), 22.59 (—$CH_2(CH_2)_3CH_2CH_3$), 27.51 (—$CH_2CH_2(CH_2)_3CH_3$), 29.34 (—$(CH_2)_2CH_2(CH_2)_2CH_3$), 31.66 (—$(CH_2)_3CH_2CH_2CH_3$), 52.97 (—CH_2N), 63.40 (—CH), 68.39 (—OCH_2), 69.15 (—OCH_2Ph), 86.60 (C-8), 101.35 (ArC), 112.09 (C-6 and C-10), 112.73 (ArC and C-3), 114.85, 123.18 (2-ArC), 124.13 (C-5), 124.62 (3-ArC), 125.55 (CH═C), 129.55, 139.38 (2-ArC), 143.96 (CH═C), 145.97 (C-4), 153.34 (C-9), 156.59 (ArC), 159.86 (C-7), 162.03 (CO); HR-ESI-TOF-MS m/z 542.2652 ([M + H]$^+$), calcd for $[C_{32}H_{35}N_3O_5 + H]^+$ 542.2649.

CONCLUSIONS

A practical and efficient synthesis of a series of two novel 7-(3-azido-2-hydroxypropyloxy)-3-alkyl-4-methylcoumarins and 50 7-[2-hydroxy-3-(1,2,3-triazol-1-yl)propyloxy]-3-alkyl-4-methylcoumarins has been reported in 80 to 92% yields. The triazole-conjugated coumarins were synthesized via Cu(I)-catalyzed 1,3-dipolar cycloaddition reaction "click chemistry."

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