A One-Pot Tandem *Ugi* Multicomponent Reaction (MCR)/Click Reaction as an Efficient Protecting-Group-Free Route to 1*H*-1,2,3-Triazole-Modified *α*-Amino Acid Derivatives and Peptidomimetics

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By a one-pot tandem *Ugi* multicomponent reaction (MCR)/click reaction sequence not requiring protecting groups, 1*H*-1,2,3-triazole-modified *Ugi*-reaction products **6a**–**6n** (*Scheme 1* and *Table 2*), **7a**–**7b** (*Table 4*), and **8** (*Scheme 2*) were synthesized successfully. *i.e.*, terminal, side-chain, or both side-chain and terminal triazole-modified *Ugi*-reaction products as potential amino acid units for peptide syntheses. Different catalyst systems for the click reaction were examined to find the optimal reaction conditions (*Table 1*, *Scheme 1*). Finally, an efficient *Ugi* MCR + *Ugi* MCR/click reaction strategy was elaborated in which two *Ugi*-reaction products were coupled by a click reaction, thus incorporating the triazole fragment into the center of peptidomimetics (*Scheme 3*). Thus, the *Ugi* MCR/click reaction sequence is a convenient and simple approach to different 1*H*-1,2,3-triazole-modified amino acid derivatives and peptidomimetics.

Introduction. – Because of their wide-spread use in fields of pharmacy and synthetic and materials chemistry, 1*H*-1,2,3-triazole derivatives have received much attention [1–3]. The copper(I)-catalyzed *Huisgen* 1,3-dipolar cycloaddition reaction between acetylenes and azides is a very simple and effective route for the synthesis of 1,4-disubstituted 1*H*-1,2,3-triazoles, which is generally recognized as the most typical example of click chemistry [4][5]. Among the list of 1*H*-1,2,3-triazole derivatives, we are particularly interested in 1*H*-1,2,3-triazole-modified peptidomimetics (*Fig. 1*) [6–8]. Due to their biological activities, triazole-modified peptidomimetics can act as peptide surrogates [9]. They are used as blood components [10], anticancer medications [11], and cysteine-protease [4] and HIV-1-protease inhibitors [12]. Moreover, triazole-modified peptidomimetics have been introduced as assembling protein-like oligomers and nonpeptidic protein-mimetic foldamers [13][14]. Therefore, triazole-modified peptidomimetics have gained considerable attention for the design of biological effectors or foldamers [9][15][16].

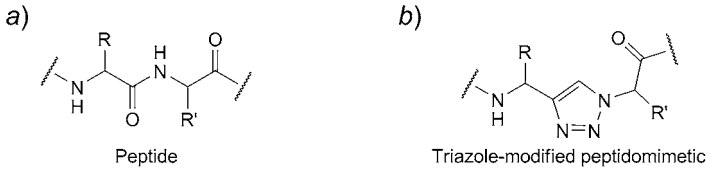


Fig. 1. *General structures of* a) *a peptide and* b) *a 1*H*-1,2,3-triazole-modified peptidomimetics*

Since the very beginning of preparing 1*H*-1,2,3-triazole-modified peptidomimetics through solid-phase synthesis [4], many triazole(s) in terminal, center, or side-chain positions of peptides linking to sugars or other peptides have been reported [17][18]. But most of the methods require protecting groups and complex procedures, while multicomponent reactions (MCRs) have significant advantages over conventional linear-type syntheses [19–21]. Owing to their atom economy, facile execution, and high efficiency, a wide range of components can be subjected to one-pot reactions. However, a multicomponent synthesis of 1*H*-1,2,3-triazole-modified peptidomimetics from readily accessible starting materials still remains elusive, and only few successful examples have been reported. *Zanze* and co-workers [22] described the coupling of one MCR with the intramolecular alkyne–azide cycloaddition providing triazole ring dipeptide systems in two steps. *Nenajdenko* and co-workers [23][24] developed chiral scaffolds combining an isocyanide and azide group which enable the preparation of hybrid peptide molecules. *Melnyk* and co-workers [25] described a three-component reaction based on a Cu^{II}-triggered aminolysis of a peptide hydrazide resin and an azide–alkyne cycloaddition sequence to generate neoglycopeptides. *Kubik* and co-workers [26] prepared a 1,5-disubstituted 1*H*-1,2,3-triazole-modified pseudohexapeptide *via* a Ru-catalyzed alkyne–azide cycloaddition, but only 10% yield for the final cycloaddition product was achieved.

To find a more convenient method, we are interested in developing a one-pot synthesis of triazole-modified peptidomimetics with triazole(s) in terminal, center, and side-chain position. Through screening of various multicomponent reactions, we selected the *Ugi* reaction as an efficient method for the construction of peptide building blocks and peptide-like molecules in one step. The *Ugi* reaction is one of the most commonly used MCRs, in which a carboxylic acid, an amine, a carbonyl compound, and an isocyanide are reacting to result in peptide derivatives [27–29]. In recent years, the *Ugi* reaction has been well developed and widely used to generate natural products and drugs in high yields and high diastereoselectivities [30–32]. We here report an efficient tandem MCR/click reaction, in which two *Ugi* MCR products were coupled by a click reaction to generate 1*H*-1,2,3-triazole-modified peptidomimetics.

Results and Discussion. – We first developed a one-pot *Ugi* MCR/click reaction strategy to synthesize 1*H*-1,2,3-terminal triazole-modified *Ugi*-reaction products. Starting from 4-aminobenzoic acid, the corresponding 4-azidobenzoic acid (**3a**; see *Fig. 2* for all starting materials) was prepared according to [33]. Based on classical protocols for the *Ugi* reaction, we first treated **3a** with aniline (**1a**), benzaldehyde (**2b**), and cyclohexyl isocyanide (**4a**) in MeOH for 1 h (*Scheme 1*). Then, according to typical thermal copper(I)-catalyzed azide–alkyne cycloadditions (CuAACs), we added phenylacetylene and CuI to the mixture at room temperature, and to our delight, after 8 h, the desired solid product **6a** was formed in 43% yield and isolated by simple filtration.

For a better performance, we then conducted an optimization with different catalyst systems for the CuAAC step (*Table 1*). The most common catalysts for the CuAAC are Cu^{I} complexes. A Cu^{II} salt in the presence of a reducing agent (often sodium ascorbate or metallic copper) was also employed to generate the required Cu^{I} catalyst *in situ*. Compared with the other tested catalyst systems, $[Cu(OAc)_2]$/sodium ascorbate/Et_3N

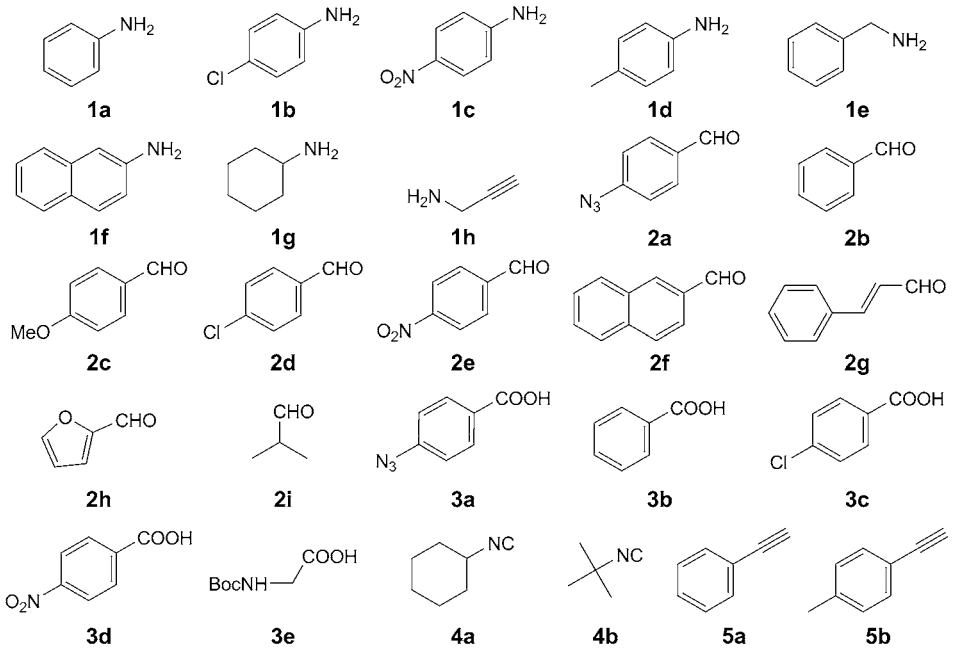
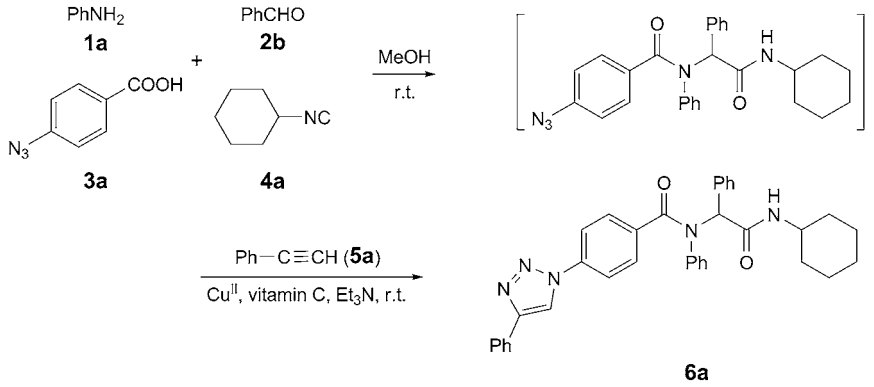


Fig. 2. *Components involved in the described* Ugi *MCR/click reactions*

Scheme 1. *One-Pot Synthesis of a Terminal 1*H*-1,2,3-Triazole-Modified* Ugi*-Reaction Product*



resulted in a slightly higher yield of **6a** within a shorter reaction period, and it is also cheaper, making $[Cu(OAc)_2]$/sodium ascorbate/Et_3N the most convenient catalyst for practical reasons.

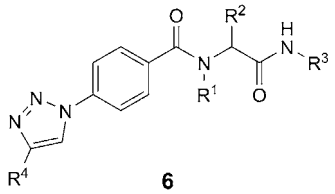
The scope of the one-pot *Ugi* MCR/click reaction sequence is illustrated by the examples in *Table 2*. In most cases, the yields of the product **6** was good. For substituted anilines R^1-NH_2, both electron-withdrawing and electron-donating groups gave similar results (*Table 2*, *Entries 1–3*). However, the electronic properties of the substituted

Table 1. *Click-Reaction Step with Different Copper-Catalyst Systems in the One-Pot* Ugi *MCR/Click Reaction Sequence* (*cf. Scheme 1*)[a])

	CuI	CuI/Et_3N[b])	[$Cu(OAc)_2$]Cu[c])	[$Cu(OAc)_2$]sodium ascorbate/Et_3N[d])
Time [h][e])	8	8	12	4
Yield [%][f])	43	45	27	48

[a]) Reaction conditions: **1a** (1 mmol), **2b** (1 mmol), **3a** (1 mmol), **4a** (1 mmol), and solvent (2 ml), 1 h at r.t.; then phenylacetylene (1 mmol), and catalyst (0.1 mmol), r.t. [b]) CuI (0.1 mmol), and Et_3N (1 mmol). [c]) [$Cu(OAc)_2$] (0.1 mmol), and Cu (0.1 mmol). [d]) [$Cu(OAc)_2$] (0.1 mmol), sodium ascorbate (0.2 mmol), and Et_3N (1 mmol). [e]) Reaction progress was monitored by TLC. [f]) Yield of isolated product **6a**.

Table 2. *Scope of the* Ugi *MCR/Click Reaction Sequence for the Synthesis of a Terminal* 1*H-1,2,3-Triazole-Modified* Ugi-*Reaction Product* ***6*** (Chx = cyclhexyl)



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Entry	R^1	R^2	R^3	R^4	Product	t_1 [h][a]), t_2 [h][b])	Yield [%][c])
1	4-ClC_6H_4	Ph	Chx	Ph	**6b**	1, 4	49
2	4-$NO_2C_6H_4$	Ph	Chx	Ph	**6c**	3, 4	47
3	4-MeC_6H_4	Ph	Chx	Ph	**6d**	3, 4	45
4	Bn	Ph	Chx	Ph	**6e**	6, 4	53
5	naphthalen-2-yl	Ph	Chx	Ph	**6f**	12, 4	38
6	Chx	4-$MeOC_6H_4$	Chx	Ph	**6g**	4, 4	65
7	Ph	4-ClC_6H_4	Chx	Ph	**6h**	2, 4	51
8	Ph	4-$NO_2C_6H_4$	Chx	Ph	**6i**	3, 4	45
9	Ph	naphthalen-2-yl	Chx	Ph	**6j**	6, 4	64
10	Ph	PhCH=CH	Chx	Ph	**6k**	12, 4	35
11	Ph	furan-2-yl	Chx	Ph	**6l**	8, 4	44
12	Ph	Ph	^{t}Bu	Ph	**6m**	6, 4	73
13	Ph	Ph	Chx	4-MeC_6H_4	**6n**	1, 4	62

[a]) Time of the *Ugi*-reaction step. [b]) Time of the click-reaction step. [c]) Overall yield of isolated product.

benzaldehydes R^2-CHO had a significant influence on the yield of the reaction (*Table 2*, *Entries 6–8*).

We found that the yield of the overall reaction sequence mainly depends on the *Ugi*-reaction step (*Table 3*). For example, the electron-donating 4-methoxybenzaldehyde (**2c**) led to the *Ugi*-reaction product isolated in 74% yield and the click-reaction product in 88% yield (*Table 3*, *Entry 1*), while with 4-nitrobenzaldehyde (**2e**) only 52% of the *Ugi*-reaction product (isolated) and 86% of the click-reaction product were formed (*Table 3*, *Entry 3*). In all cases, the yields of the click reaction were similar. The

Table 3. *The Influence of Substituents of Benzaldehydes* **2** *on the Yields of the* Ugi-*Reaction and Click-Reaction Step*

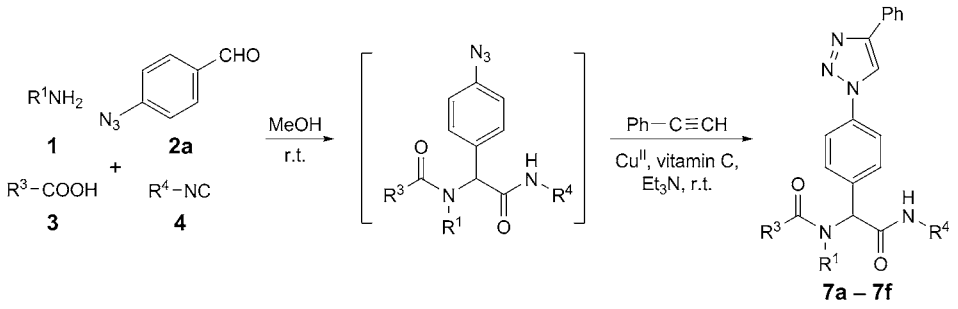
Entry	**2**	R^2	*Ugi*-reaction yield [%]	click-reaction yield [%]
1	**2c**	4-$MeOC_6H_4$	74	88
2	**2d**	4-ClC_6H_4	56	86
3	**2e**	4-$NO_2C_6H_4$	52	86

one-pot tandem reaction could be carried out without decrease of the yields compared with those of the separate steps. Consequently, the above described procedure represents an efficient one-pot *Ugi* MCR/click reaction strategy for the synthesis of terminal 1*H*-1,2,3-triazole-modified *Ugi* products.

It is noteworthy that the *Ugi* reaction and the click reaction cannot be performed directly in one step. When all reactants **1a**, **2b**, **3a**, **4a**, and **5a** and the copper catalyst were stirred in MeOH for 24 h (no Et_3N was added), only 19% of *Ugi*-reaction product was obtained, and no triazole-modified *Ugi* product **6a** was formed. It is well known that isocyanides are good ligands for transition metals [34]. Therefore, we think that copper will be coordinated to the isocyanide C-atom of **4a**, and this complex is not effective as catalyst for the *Huisgen* 1,3-dipolar cycloaddition.

We then extended the protocol to prepare *Ugi* products with 1*H*-1,2,3-triazolyl-substituted side-chains. Because of its simple synthesis [35], 4-azidobenzaldehyde (**2a**) was selected as the key reactant for generating the triazole segment. The corresponding triazole-modified *Ugi* products **7** were obtained in good yields (*Table 4*).

Table 4. *One-Pot Synthesis of Side-Chain* 1H-*1,2,3-Triazole-Modified* Ugi-*Reaction Products* **7** (Chx = cyclohexyl, Boc = ^{t}BuOC(=O))



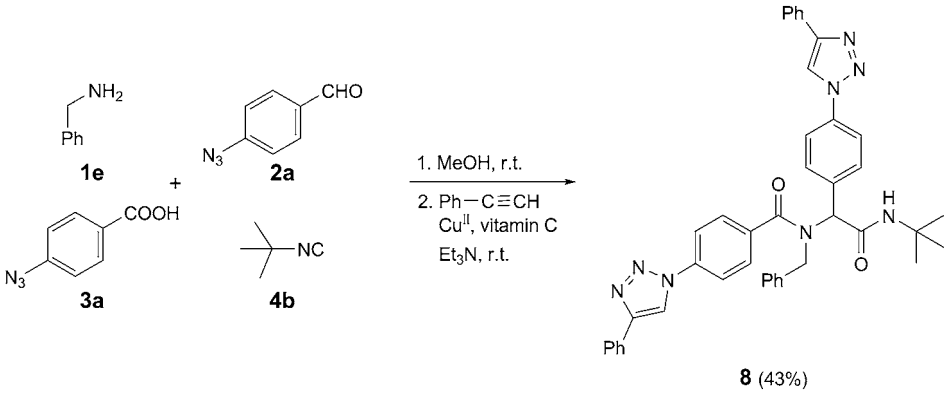
7a – 7f

Entry	**1**	**2**	**3**	**4**	R^1	R^3	R^4	Product	t_1 [h][a])/t_2 [h][b])	Yield [%][c])
1	**1a**	**2a**	**3b**	**4a**	Ph	Ph	Chx	**7a**	12, 4	54
2	**1b**	**2a**	**3b**	**4b**	4-ClC_6H_4	Ph	^{t}Bu	**7b**	10, 4	48
3	**1e**	**2a**	**3b**	**4b**	Bn	Ph	^{t}Bu	**7c**	12, 4	62
4	**1g**	**2a**	**3b**	**4b**	Chx	Ph	^{t}Bu	**7d**	24, 4	58
5	**1e**	**2a**	**3d**	**4b**	Bn	4-$NO_2C_6H_4$	^{t}Bu	**7e**	8, 4	51
6	**1e**	**2a**	**3e**	**4b**	Bn	$BocHNCH_2$	^{t}Bu	**7f**	6, 4	55

[a]) The time of *Ugi* reaction step. [b]) The time of 'click reaction' time. [c]) Total yield.

Encouraged by these results, we attempted to carry out the analogous reaction with 4-azidobenzoic acid (**3a**) and 4-azidobenzaldehyde (**2a**) in one-pot (*Scheme 2*); benzylamine (**1e**) and *tert*-butyl isocyanide (**4b**) were used to form the amide of the amino acid moiety of the triazole-modified *Ugi*-reaction product. Thus, a triazole-modified *Ugi*-reaction product **8** containing two 1*H*-1,2,3-triazole units in both the terminal and side-chain position was successfully synthesized.

Scheme 2. *One-Pot Synthesis of a Both Side-Chain and Terminal 1*H*-1,2,3-Triazole-Modified* Ugi-*Reaction Product*

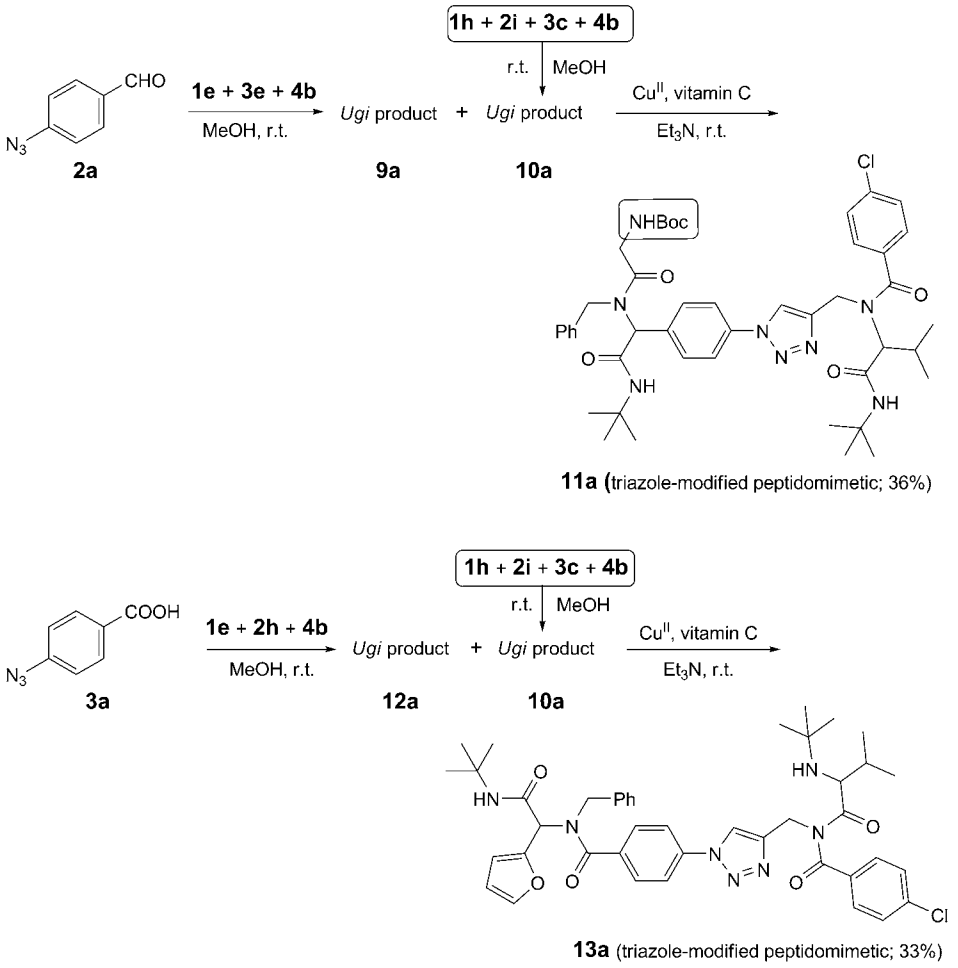


8 (43%)

Finally, we paid attention to combinations based on two *Ugi* MCR and one click reaction for the synthesis of triazolo-modified peptidomimetics which contain a central triazole unit (*Scheme 3*). First, we chose benzylamine (**1e**), 4-azidobenzaldehyde (**2a**), *N*-[(*tert*-butoxy)carbonyl]glycine (Boc-Gly; **3e**) and butyl isocyanide (**4b**) to provide the required intermediate *Ugi* product **9a** which bears an azido function. Another intermediate *Ugi* product **10a** with an alkyne moiety was synthesized from **1h**, **2i**, **3c**, and **4b**. Then, without further purification, the two intermediate *Ugi* products were treated together with $[Cu(OAc)_2]$/sodium ascorbate/Et_3N in MeOH at room temperature to result in the triazole-containing product **11a**. A second conjugate was prepared from **1e**, **2h**, **3a**, and **4b** to give the intermediate *Ugi* product **12a** which was combined with the *Ugi* product **10a** to yield product **13a** in the same way as mentioned above. It should be noted that compound **11a**, which contains a Boc-amino group, could be used in other multicomponent reactions to yield new peptide molecules. Consequently, the above described procedure represents an efficient *Ugi* MCR + *Ugi* MCR/click strategy reaction for the synthesis of modified peptidomimetics with a central 1*H*-1,2,3-triazole group. No protecting groups and no separation of intermediate products were needed in this protocol.

In conclusion, we have developed a mild and efficient one-pot *Ugi* MCR/click reaction strategy for the synthesis of 1*H*-1,2,3-triazole-modified *Ugi*-reaction products as potential precursors of triazole-modified peptidomimetics from an azido-aldehyde or an azido-carboxylic acid component. Both types of *Ugi*-reaction products, with a triazole unit at the potential peptide terminus and/or at its side chain were synthesized in good yields. Finally, we developed an *Ugi* MCR + *Ugi* MCR/click reactopm strategy,

Scheme 3. *Combination of Two* Ugi-*Reactions and One Click Reaction*



not requiring protecting groups in which two *Ugi*-reaction products were combined by a click reaction to generate a triazole-modified peptidomimetic with a central triazole unit.

Experimental Part

General. All chemicals (AR grade) were commercially available and used without further purification. TLC: precoated silica-gel (SiO_2) glass plates impregnated with a fluorescent indicator (254 nm); detection by UV light. Column chromatography (CC): silica gel *60* (SiO_2; 100–200 mesh). M.p.: *Thiele* tube; uncorrected. ^{1}H- and ^{13}C-NMR Spectra: *Bruker-DRX500* spectrometer; at 500 (^{1}H) and 125 MHz (^{13}C); δ in ppm rel. to Me_4Si as internal standard, J in Hz. ESI-MS: *Finnigan-TSQ-Quantum* MS instrument; in m/z. Elemental analyses: *Vario ELIII* recorder.

Compounds **6a**–**6n***: General Procedure.* A soln. of the corresponding amine **1** (1 mmol) and aldehyde **2** (1 mmol) in MeOH (2 ml) was stirred at r.t. for 30 min. Then, carboxylic acid **3a** (1 mmol) and isocyanide **4a** or **4b** (1 mmol) were added. The mixture was stirred for 1–12 h at r.t. Next, alkyne **5a** or **5b** (1 mmol), $[Cu(OAc)_2]$ (0.1 mmol), sodium ascorbate (0.2 mmol), and Et_3N (1 mmol) were added, and the mixture was stirred for another 4 h at r.t. The products were isolated by filtration, and no further purification was needed.

Compounds **7a**–**7f***: General Procedure.* A soln. of aldehyde **2a** (1 mmol) and amine **1** (1 mmol) in MeOH (2 ml) was stirred at r.t. for 30 min. Then, carboxylic acid **3** (1 mmol) and isocyanide **4** (1 mmol) were added. The mixture was stirred for 6–24 h at r.t. Next, alkyne **5a** (1 mmol), $[Cu(OAc)_2]$ (0.1 mmol), sodium ascorbate (0.2 mmol), and Et_3N (1 mmol) were added, and the mixture was stirred for another 4 h at r.t. The products were isolated by filtration and then recrystallized from EtOH.

Synthesis of **8**. A soln. of aldehyde **2a** (1 mmol) and amine **1e** (1 mmol) in MeOH (2ml) was stirred at r.t. for 30 min. Then, carboxylic acid **3a** (1 mmol) and isocyanide **4b** (1 mmol) were added. The mixture was stirred for 12 h. Next, alkyne **5a** (2 mmol), $[Cu(OAc)_2]$ (0.2 mmol), sodium ascorbate (0.4 mmol) and Et_3N (2 mmol) were added, and the mixture was stirred for another 6 h at r.t. The product **8** was isolated by filtration and washed with hot EtOH.

Synthesis of **11a** *and* **13a**. A soln. of aldehyde **2a** (1 mmol) and amine **1e** in MeOH (2 ml) was stirred at r.t. for 30 min. Then, carboxylic acid **3e** (1 mmol) and isocyanide **4b** (1 mmol) were added. The mixture was stirred for 12 h to generated dipeptide **9a**. In a parallel experiment, amine **1h**, aldehyde **2i**, carboxylic acid **3d**, and isocyanide **4b** were treated by same method to generated *Ugi*-reaction product **10a**. Then, without isolation and further purification, **9a** and **10a** were combined, $[Cu(OAc)_2]$ (0.1 mmol), sodium ascorbate (0.2 mmol), and Et_3N (1 mmol) were added, and the mixture was stirred for another 6 h at r.t. The solvent was evaporated and the residue purified by CC (AcOEt/hexane 1:4): pure **11a**.

Product **13a** was prepared by the same method.

N-*[(Cyclohexylcarbamoyl)phenylmethyl]*-N-*phenyl-4-(4-phenyl-1*H*-1,2,3-triazol-1-yl)benzamide* (= N-*Cyclohexyl-α-{phenyl[4-(4-phenyl-1*H*-1,2,3-triazol-1-yl)benzoyl]amino}benzeneacetamide*; **6a**): Yield 0.27 g (48%). Yellow solid. M.p. >230°. ^{1}H-NMR ((D$_6$)DMSO): 9.33 (*s*, 1 H); 8.13 (*d*, *J* = 7.5, 1 H); 7.90 (*d*, *J* = 8, 2 H); 7.78 (*d*, *J* = 8.5, 2 H); 7.50–7.45 (*m*, 4 H); 7.39–7.36 (*m*, 1 H); 7.16–7.12 (*m*, 6 H); 6.97–6.90 (*m*, 4 H); 6.31 (*s*, 1 H); 3.68–3.66 (*m*, 1 H); 1.79–1.70 (*m*, 3 H); 1.64–1.54 (*m*, 2 H); 1.30–1.21 (*m*, 3 H); 1.11–1.02 (*m*, 2 H). ^{13}C-NMR ($CDCl_3$): 169.8; 168.3; 148.5; 140.9; 137.2; 136.5; 134.6; 130.4; 130.3; 130.2; 130.0; 128.9; 128.6; 128.61; 128.5; 127.5; 125.9; 119.3; 117.3; 66.8; 48.9; 32.9; 25.5; 24.8; 24.8. ESI-MS: 556 ($[M+1]^+$). Anal. calc. for $C_{35}H_{33}N_5O_2$ (555.26): C 75.65, H 5.99, N 12.60, O 5.76; found: C 75.61, H 5.95, N 12.63, O 5.72.

N-*(4-Chlorophenyl)*-N-*[(cyclohexylcarbamoyl)phenylmethyl]-4-(4-phenyl-1*H*-1,2,3-triazol-1-yl)-benzamide* (= *α-{(4-Chlorophenyl)[4-(4-phenyl-1*H*-1,2,3-triazol-1-yl)benzoyl]amino}*-N-*cyclohexylbenzeneacetamide*; **6b**): Yield 0.29 g (49%). Yellow solid. M.p. >230°. ^{1}H-NMR ($CDCl_3$): 8.18 (*s*, 1 H); 7.88 (*d*, *J* = 8, 2 H); 7.64 (*d*, *J* = 8.5, 2 H); 7.51 (*d*, *J* = 8.5, 2 H); 7.48–7.45 (*m*, 2 H); 7.39–7.36 (*m*, 1 H); 7.31–7.27 (*m*, 3 H); 7.26–7.24 (*m*, 2 H); 7.00 (*s*, 4 H); 6.28 (*s*, 1 H); 5.58 (*d*, *J* = 8, 1 H); 3.91 (*m*, 1 H); 1.99–1.92 (*m*, 2 H); 1.71–1.60 (*m*, 3 H); 1.41–1.35 (*m*, 2 H); 1.18–1.09 (*m*, 3 H). ^{13}C-NMR ($CDCl_3$): 169.8; 168.3; 148.6, 139.1; 137.4; 136.2; 134.3; 133.4; 131.9; 130.0; 128.9; 128.8; 128.7; 128.5; 125.9; 119.5; 117.3; 65.9; 49.0; 32.9; 25.5; 24.9; 24.8. ESI-MS: 590 ($[M+1]^+$). Anal. calc. for $C_{35}H_{32}ClN_5O_2$ (589.22): C 71.24, H 5.47, N 11.87, O 5.42; found: C 71.21, H 5.44, N 11.82, O 5.39.

N-*[(Cyclohexylcarbamoyl)phenylmethyl]*-N-*(4-nitrophenyl)-4-(4-phenyl-1*H*-1,2,3-triazol-1-yl)benzamide* (= N-*Cyclohexyl-α-{(4-nitrophenyl)[4-(4-phenyl-1*H*-1,2,3-triazol-1-yl)benzoyl]amino}benzeneacetamide*; **6c**). Yield 0.28 g (47%). Yellow solid. M.p. >230°. ^{1}H-NMR ($CDCl_3$): 9.26 (*s*, 1 H); 8.16 (*d*, *J* = 7, 1 H); 7.90 (*d*, *J* = 7.5, 2 H); 7.78 (*d*, *J* = 8, 2 H); 7.50–7.46 (*m*, 4 H); 7.39–7.36 (*m*, 1 H); 7.25 (*d*, *J* = 8, 1 H); 7.18–7.17 (*m*, 3 H); 7.03–6.98 (*m*, 3 H); 6.28 (*s*, 1 H); 3.66 (*m*, 1 H); 1.78–1.72 (*m*, 3 H); 1.62–1.55 (*m*, 3 H); 1.30–1.20 (*m*, 3 H); 1.12–1.02 (*m*, 2 H). ^{13}C-NMR ((D$_6$)DMSO): 169.2; 168.5; 147.8; 140.4; 137.3; 137.0; 134.9; 132.8; 132.5; 131.5; 130.6; 130.1; 129.5; 128.8; 128.5; 128.4; 127.6; 125.8; 120.0; 119.4; 118.7; 64.1; 48.5; 32.7; 32.6; 25.7; 25.1; 24.9. ESI-MS: 601 ($[M+1]^+$). Anal. calc. for $C_{35}H_{32}N_6O_4$ (600.25): C 69.98, H 5.37, N 13.99, O 10.65; found: C 69.93, H 5.35, N 13.95, O 10.67.

N-*[(Cyclohexylcarbamoyl)phenylmethyl]*-N-*(4-methylphenyl)-4-(4-phenyl-1*H*-1,2,3-triazol-1-yl)-benzamide* (= N-*Cyclohexyl-α-{(4-methylphenyl)[4-(4-phenyl-1*H*-1,2,3-triazol-1-yl)benzoyl]amino}ben-

zeneacetamide; **6d**). Yield 0.26 g (45%). Yellow solid. M.p. >230°. ^{1}H-NMR ($CDCl_3$): 8.14 (*s*, 1 H); 7.89–7.87 (*m*, 2 H); 7.61 (*d*, *J* = 8.5, 2 H); 7.53 (*d*, *J* = 9, 2 H); 7.47 (*d*, *J* = 7.5, 2 H); 7.42 (*d*, *J* = 6.5, 2 H); 7.38–7.36 (*m*, 1 H); 7.29–7.28 (*m*, 5 H); 6.92 (*s*, 2 H); 6.85 (*d*, *J* = 8, 2 H); 6.18 (*s*, 1 H); 5.69 (*d*, *J* = 8, 1 H); 3.92 (*m*, 1 H); 2.19 (*s*, 3 H); 1.99–1.72 (*m*, 2 H); 1.69–1.60 (*m*, 3 H); 1.41–1.35 (*m*, 2 H); 1.19–1.11 (*m*, 3 H). ^{13}C-NMR ($CDCl_3$): 169.9; 168.4; 148.5; 138.2; 137.4; 137.2; 136.7; 134.7; 130.3; 130.2; 130.0; 129.3; 128.9; 128.6; 128.5; 125.9; 119.3; 117.3; 66.8; 48.9; 32.9; 25.5; 24.8; 24.8; 21.0. ESI-MS: 570 ($[M+1]^+$). Anal. calc. for $C_{36}H_{35}N_5O_2$ (569.28): C 75.90, H 6.19, N 12.29, O 5.62; found: C 75.87, H 6.17, N 12.33, O 5.67.

N-*Benzyl*-N-*[(cyclohexylcarbamoyl)phenylmethyl]-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzamide* (= N-*Cyclohexyl-α-{(phenylmethyl)[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzoyl]amino}benzeneacetamide*; **6e**). Yield 0.30 g (53%). White solid. M.p. 212–214°. ^{1}H-NMR ($CDCl_3$): 8.20 (*s*, 1 H); 7.91 (*d*, *J* = 7.5, 2 H); 7.78 (*s*, 2 H); 7.68 (*d*, *J* = 4.5, 2 H); 7.50–7.47 (*t*, *J* = 7.5, 3 H); 7.41–7.35 (*m*, 4 H); 7.21–7.18 (*m*, 3 H); 7.10 (*d*, *J* = 1.5, 2 H); 5.57 (*s*, 1 H); 4.76 (*d*, *J* = 16.5, 1 H); 4.50 (*s*, 1 H); 1.95–1.88 (*m*, 2 H); 1.69–1.59 (*m*, 3 H); 1.40–1.33 (*m*, 2 H); 1.14–1.12 (*m*, 2 H). ^{13}C-NMR ($CDCl_3$): 171.9; 168.0; 148.7; 137.8; 136.6; 130.0; 129.8; 129.0; 129.0; 128.9; 128.6; 128.5; 128.4; 127.2; 126.9; 125.9; 120.2; 117.4; 48.8; 32.8; 30.9; 25.5; 24.8; 24.7. ESI-MS: 570 ($[M+1]^+$). Anal. calc. for $C_{36}H_{35}N_5O_2$ (569.28): C 75.90, H 6.19, N 12.29, O 5.62; found: C 75.88, H 6.15, N 12.26, O 5.59.

N-*[(Cyclohexylcarbamoyl)phenylmethyl]*-N-*naphthalen-1-yl-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzamide* (= N-*Cyclohexyl-α-{(naphthalen-2-yl)[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzoyl]amino}benzeneacetamide*; **6f**). Yield 0.23 g (38%). White solid. M.p. 209–211°. ^{1}H-NMR (500 MHz, $CDCl_3$): 8.53 (*d*, *J* = 2.5, 1 H); 8.02 (*d*, *J* = 3, 1 H); 7.82 (*d*, *J* = 6.5, 2 H); 7.73 (*d*, *J* = 9, 1 H); 7.64 (*d*, *J* = 8, 1 H); 7.65 (*m*, 2 H); 7.58–7.56 (*m*, 3 H); 7.52–7.50 (*m*, 3 H); 7.44–7.43 (*m*, 2 H); 7.41–7.35 (*m*, 4 H); 7.31–7.28 (*m*, 1 H); 7.20–7.17 (*m*, 2 H); 5.82 (*s*, 1 H); 5.60 (*d*, *J* = 7.5, 1 H); 3.97–3.96 (*m*, 1 H); 2.06–1.97 (*m*, 2 H); 1.70–1.60 (*m*, 3 H); 1.43–1.39 (*m*, 2 H); 1.16–1.14 (*m*, 3 H). ^{13}C-NMR ($CDCl_3$): 170.5; 168.2; 168.1; 148.4; 137.4; 137.3; 136.5; 134.5; 134.2; 131.0; 130.2; 130.0; 129.2; 129.1; 129.0; 128.9; 128.8; 128.7; 128.6; 128.5; 128.3; 127.3; 127.1; 126.4; 126.4; 125.8; 125.3; 125.0; 123.7; 123.4; 119.1; 117.2; 49.0; 48.8; 32.8; 30.9; 25.5; 24.9; 24.7. ESI-MS: 606 ($[M+1]^+$). Anal. calc. for $C_{39}H_{35}N_5O_2$ (605.28): C 77.33, H 5.82, N 11.56, O 5.28; found: C 77.31, H 5.78, N 11.58, O 5.24.

N-*Cyclohexyl-N-[(cyclohexylcarbamoyl)(4-methoxyphenyl)methyl]-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzamide* (= N-*Cyclohexyl-α-{cyclohexyl[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzoyl]amino}-4-methoxybenzeneacetamide*; **6g**). Yield 0.38 g (65%). Yellow solid. M.p. >230°. ^{1}H-NMR ($CDCl_3$): 8.13 (*s*, 1 H); 7.87 (*d*, *J* = 7.5, 2 H); 7.61–7.59 (*m*, 2 H); 7.53–7.51 (*m*, 2 H); 7.47–7.46 (*m*, 2 H); 7.39–7.36 (*m*, 1 H); 7.19–7.17 (*m*, 2 H); 7.07 (*s*, 5 H); 6.79–6.78 (*m*, 2 H); 6.18 (*s*, 1 H); 5.63 (*d*, *J* = 8, 1 H); 3.79 (*s*, 3 H); 2.01–1.93 (*s*, 2 H); 1.73–1.60 (*m*, 3 H); 1.40–1.36 (*m*, 2 H); 1.18–1.10 (*m*, 3 H). ^{13}C-NMR ($CDCl_3$): 169.7; 168.6; 159.7; 148.5; 140.8; 137.2; 136.6; 131.7; 130.5; 130.2; 130.0; 129.0; 128.6; 128.5; 127.5; 126.5; 125.9; 119.3; 117.3; 113.9; 66.0; 55.2; 48.9; 32.9; 25.5; 24.9; 24.8. ESI-MS: 585 ($[M+1]^+$). Anal. calc. for $C_{36}H_{35}N_5O_3$ (585.27): C 73.82, H 6.02, N 11.96, O 8.20; found: C 73.78, H 6.00, N 11.93, O 8.18.

N-*[(4-Chlorophenyl)(cyclohexylcarbamoyl)methyl]*-N-*phenyl-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)-benzamide* (=*4-Chloro*-N-*cyclohexyl-α-{phenyl[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzoyl]amino}benzeneacetamide*; **6h**). Yield 0.30 g (51%). Yellow solid. M.p. >230°. ^{1}H-NMR ($CDCl_3$): 8.15 (*s*, 1 H); 7.98–7.94 (*m*, 1 H); 7.67 (*d*, *J* = 8.5, 2 H); 7.54–7.50 (*m*, 2 H); 7.48–7.44 (*m*, 3 H); 7.40–7.38 (*m*, 1 H); 7.23–7.28 (*m*, 3 H); 7.24–7.23 (*m*, 3 H); 6.39 (*s*, 1 H); 5.57 (*d*, *J* = 7.5 1 H); 3.91–3.92 (*m*, 1 H); 2.06–1.97 (*m*, 2 H); 1.73–1.65 (*m*, 3 H); 1.42–1.38 (*m*, 2 H); 1.21–1.11 (*m*, 3 H). ^{13}C-NMR ($CDCl_3$): 169.6; 168.1; 148.7; 146.6; 146.2; 137.8; 135.6; 133.8; 131.7; 131.4; 130.3; 129.9; 129.2; 129.0; 129.0; 127.6; 126.0; 125.9; 123.7; 120.0; 117.2; 65.7; 49.2; 32.9; 25.4; 24.9; 24.8. ESI-MS: 590 ($[M+1]^+$). Anal. calc. for $C_{35}H_{32}ClN_5O_2$ (589.22): C 71.24, H 5.47, N 11.87, O 5.42; found: C 71.20, H 5.45, N 11.89, O 5.39.

N-*[(Cyclohexylcarbamoyl)(4-nitrophenyl)methyl]*-N-*phenyl-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzamide* (= N-*Cyclohexyl-4-nitro-α-{phenyl[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzoyl]amino}benzeneacetamide*; **6i**). Yield 0.27 g (45%). Yellow solid. M.p. >230°. ^{1}H-NMR ((D_6)DMSO): 9.26 (*s*, 1 H); 8.16 (*d*, *J* = 7.5, 1 H); 7.91–7.90 (*m*, 2 H); 7.79–7.77 (*m*, 2 H); 7.50–7.45 (*m*, 4 H); 7.39–7.36 (*m*, 1 H); 7.26–7.22 (*m*, 2 H); 7.18–7.13 (*m*, 4 H); 7.04–6.98 (*m*, 3 H); 6.28 (*s*, 1 H); 3.66–3.63 (*m*, 1 H); 1.76–1.69 (*m*, 3 H); 1.61–1.54 (*m*, 2 H); 1.30–1.19 (*m*, 3 H); 1.12–1.04 (*m*, 2 H). ^{13}C-NMR ((D_6)DMSO): 1169.2;

168.5; 147.8; 132.5; 131.5; 130.5; 130.1; 129.5; 128. 8; 128.5; 128.4; 125. 8; 120.0; 119.4; 48.5; 32.7; 32.6; 25.6; 25.1. ESI-MS: 601 ($[M+1]^+$). Anal. calc. for $C_{35}H_{32}N_6O_4$ (600.25): C 69.98, H 5.37, N 13.99, O 10.65; found: C 69.95, H 5.39, N 13.93, O 10.63.

N-*[(Cyclohexylcarbamoyl)(naphthalen-1-yl)methyl]*-N-*phenyl-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)-benzamide* (= N-*Cyclohexyl-α-{phenyl[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzoyl]amino}naphthalene-2-acetamide*; **6j**). Yield 0.39 g (64%). Yellow solid. M.p. 224–226°. ^{1}H-NMR ($CDCl_3$): 8.21 (*d*, *J* = 8.5 , 1 H); 8.11 (*s*, 1 H); 7.87–7.85 (*m*, 3 H); 7.75–7.73 (*m*, 1 H); 7.69–7.66 (*m*, 1 H); 7.59–7.55 (*m*, 3 H); 7.55–7.53 (*m*, 2 H); 7.46–7.43 (*m*, 2 H); 7.38–7.36 (*m*, 1 H); 7.35 (*s*, 1 H); 7.31 (*s*, 1 H); 7.28–7.27 (*m*, 1 H); 7.25–7.22 (*m*, 2 H); 6.89–6.82 (*s*, 2 H); 5.66 (*d*, *J* = 7.5, 1 H); 4.00 (*m*, 1 H); 2.05–2.00 (*m*, 2 H); 1.71 (*m*, 3 H); 1.68–1.61 (*m*, 2 H); 1.41–1.39 (*m*, 3 H). ^{13}C-NMR ($CDCl_3$): 169.9; 168.1; 148.5; 139.6; 137.2; 136.6; 133.5; 132.2; 130.3; 130.4; 130.2; 130.0; 129.5; 129.2; 129.1; 128.9; 128.5; 128.0; 127.3; 126.2; 125.9; 124.9; 123.0; 119.3; 117.3; 60.9; 49.2; 32.9; 25.5; 24.9; 24.8. ESI-MS: 606 ($[M+1]^+$). Anal. calc. for $C_{39}H_{35}N_5O_2$ (605.28): C 77.33, H 5.82, N 11.56, O 5.28; found: C 77.30, H 5.78, N 11.55, O 5.25.

N-*[1-(Cyclohexylcarbamoyl)-3-phenylallyl]*-N-*phenyl-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzamide* (= N-*{1-[(Cyclohexylamino)carbonyl]-3-phenylprop-2-en-1-yl}*-N-*phenyl-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzeneamide*; **6k**). Yield 0.20 g (35%). Yellow solid. M.p. 216–218°. ^{1}H-NMR ($CDCl_3$): 8.15 (*s*, 1 H); 7.89–7.88 (*m*, 2 H); 7.62 (*d*, *J* = 9, 2 H); 7.53 (*d*, *J* = 8.5, 2 H); 7.48 (*d*, *J* = 8.5, 2 H); 7.40–7.31 (*m*, 5 H); 7.28–7.21 (*m*, 4 H); 6.75 (*d*, *J* = 16, 1 H); 6.56–6.51 (*m*, 1 H); 6.13 (*d*, *J* = 7.5, 1 H); 5.41 (*d*, *J* = 9, 1 H); 2.00 (*m*, 2 H); 1.75–1,72 (*m*, 2 H); 1.39 (*m*, 1 H); 1.24–1.23 (*m*, 2 H); 1.22–1.21 (*m*, 3 H). ^{13}C-NMR (125 MHz, $CDCl_3$): 169.3; 168.0; 148.5; 141.8; 137.4; 137.2; 136.1; 135.8; 130.3; 129.3; 128.9; 128.7; 128.6; 127.8; 126.9; 125.9; 122.5; 119.4; 117.3; 66.5; 48.8; 33.0; 25.5; 24.8. ESI-MS: 582 ($[M+1]^+$). Anal. calc. for $C_{37}H_{35}N_5O_2$ (581.28): C 76.40, H 6.06, N 12.04, O 5.50; found: C 76.35, H 6.04, N 12.01, O 5.52

N-*[(Cyclohexylcarbamoyl)(furan-2-yl)methyl]*-N-*phenyl-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzamide* (= N-*Cyclohexyl-α-{phenyl[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzoyl]amino}furan-2-acetamide*; **6l**). Yield 0.24 g (44%). White solid. M.p. 214–216°. ^{1}H-NMR ($CDCl_3$): 8.14 (*s*, 1 H); 7.87 (*d*, *J* = 7.5, 2 H); 7.62 (*d*, *J* = 8.5, 2 H); 7.52 (*d*, *J* = 8.5, 2 H); 7.46 (*d*, *J* = 7.5, 2 H); 7.44 (*m*, 2 H); 7.38 (*m*, 3 H); 7.14–7.08 (*m*, 2 H); 6.44 (*d*, *J* = 3, 1 H); 6.33 (*s*, 1 H); 6.33–6.30 (*m*, 2 H); 6.07 (*d*, *J* = 8); 3.90 (*m*, 1 H); 2.01–1.96 (*m*, 2 H); 1.75–1.72 (*m*, 2 H); 1.64–1.62 (*m*, 1 H); 1.42–1.39 (*m*, 2 H); 1.24–1.19 (*m*, 3 H). ^{13}C-NMR ($CDCl_3$): 169.6; 166.2; 148.5; 147.9; 143.0; 140.8; 137.4; 136.0; 130.3; 130.0; 129.5; 128.9; 128.8; 128.6; 127.8; 125.9; 119.4; 117.3; 112.4; 110.9; 60.2; 48. 9; 32.8; 25.5; 24.8; 24.7. ESI-MS: 546 ($[M+1]^+$). Anal. calc. for $C_{33}H_{31}N_5O_3$ (545.24): C 72.64, H 5.73, N 12.84, O 8.80; found: C 72.62, H 5.70, N 12.86, O 8.78.

N-*{[(*tert-*Butyl)carbamoyl]phenylmethyl}*-N-*phenyl-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzamide* (= N-*(1,1-Dimethylethyl)-α-{phenyl[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzoyl]amino}benzeneacetamide*; **6m**). Yield 0.39 g (73%). White solid. M.p. 216–218°. ^{1}H-NMR ($CDCl_3$): 8.13 (*s*, 1 H); 7.89–7.87 (*m*, 2 H); 7.62–7.76 (*m*, 2 H); 7.54–7.52 (*m*, 2 H); 7.47–7.44 (*t*, *J* = 7.5, 2 H); 7.39–7.36 (*m*, 1 H); 7.28–7.27 (*m*, 5 H); 7.05 (*s*, 5 H); 6.14 (*s*, 1 H); 5.66 (*s*, 1 H); 1.41 (*s*, 9 H). ^{13}C-NMR ($CDCl_3$): 169.7; 168.4; 148.5; 140.9; 137.2; 136.6; 134.7; 130.3; 130.2; 130.0; 128.9; 128.6; 128.6; 128.5; 127.5; 125.9; 119.3; 117.3; 67.2; 51.8; 28.7. ESI-MS: 530 ($[M+1]^+$). Anal. calc. for $C_{33}H_{31}N_5O_2$ (529.25): C 74.84, H 5.90, N 13.22, O 6.04; found: C 74.81, H 5.88, N 13.25, O 6.02.

N-*[(Cyclohexylcarbamoyl)phenylmethyl]-4-[4-(4-methylphenyl)-1*H-*1,2,3-triazol-1-yl]*-N-*phenyl-benzamide* (= N-*Cyclohexyl-α-{[4-[4-(4-methylphenyl)-1*H-*1,2,3-triazol-1-yl]benzoyl}phenylamino}benzeneacetamide*; **6n**). Yield 0.35 g (62%). Yellow solid. M.p. > 230°. ^{1}H-NMR ((D_6)DMSO): 9.20 (*s*, 1 H); 8.13 (*d*, *J* = 8, 1 H); 7.80–7.77 (*m*, 4 H); 7.46–7.44 (*m*, 2 H); 7.30–7.28 (*m*, 2 H); 7.19–7.13 (*m*, 6 H); 6.99–6.93 (*m*, 3 H); 6.31 (*s*, 1 H); 3.67–3.66 (*m*, 1 H); 2.34 (*s*, 3 H); 1.79–1.73 (*m*, 3 H); 1.69–1.54 (*m*, 2 H); 1.30–1.20 (*m*, 3 H); 1.11–1.04 (*m*, 2 H). ^{13}C-NMR ((D_6)DMSO): 169.3; 168.9; 147.9; 140.6; 138.2; 137.4; 136.9; 135.8; 131.5; 130.6; 130.1; 130.0; 128.3; 128.3; 128.1; 127.8; 127.4; 125.7; 119.5; 119.3; 64.8; 48.5; 32.7; 36.6; 25.7; 25.1; 25.0; 21.3. ESI-MS: 570 ($[M+1]^+$). Anal. calc. for $C_{36}H_{35}N_5O_2$ (529.28): C 75.90, H 6.19, N 12.29, O 5.62; found: C 75.85, H 6.17, N 12.24, O 5.61.

N-*{(Cyclohexylcarbamoyl)[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)phenyl]methyl}*-N-*phenylbenzamide* (= *α-(Benzoylphenylamino)*-N-*cyclohexyl-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzeneacetamide*; **7a**). Yield 0.29 g (53%). Yellow solid. M.p. 220–222°. ^{1}H-NMR ($CDCl_3$): 8.18 (*s*, 1 H); 8.12 (*d*, *J* = 8.5,

1 H); 7.98–7.95 (*m*, 1 H); 7.91 (*d*, *J* = 7, 2 H); 7.71 (*d*, *J* = 7.5, 2 H); 7.52–7.47 (*m*, 4 H); 7.41–7.40 (*m*, 1 H); 7.35–7.34 (*m*, 2 H); 7.27–7.23 (*m*, 1 H); 7.18–715 (*m*, 2 H); 7.08–7.05 (*m*, 4 H); 6.28 (*s*, 1 H); 6.11 (*d*, *J* = 7.5, 1 H); 2.05–1.95 (*m*, 2 H); 1.76–1.62 (*m*, 3 H); 1.73–1.69 (*m*, 3 H); 1.43–1.38 (*m*, 2 H); 1.25–1.15 (*m*, 3 H). ^{13}C-NMR ($CDCl_3$): 171.4; 168.1; 158.4; 151.5; 148.5; 141.1; 136.8; 135.7; 135.6; 131.6; 130.2; 130.1; 130.1; 129.8; 129.3; 129.0; 128.7; 128.6; 128.6; 127.7; 127.5; 126.5; 125.9; 125.9; 120.9; 120.4; 120.1; 117.4; 65.9; 48.9; 32.9; 25.5; 24.8; 24.7. ESI-MS: 556 ($[M+1]^+$). Anal. calc. for $C_{35}H_{33}N_5O_2$ (555.26): C 75.65, H 5.99, N 12.60, O 5.76; found: C 75.63, H 5.97, N 12.56, O 5.73.

N-*{[(*tert-*Butyl)carbamoyl][4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)phenyl]methyl}*-N-*(4-chlorophenyl)-benzamide* (= *α-[Benzoyl(4-chlorophenyl)amino]*-N-*(1,1-dimethylethyl)-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzeneacetamide*; **7b**). Yield 0.27 g (48%). Yellow solid. M.p. 180–182°. ^{1}H-NMR (500 MHz, $CDCl_3$): 8.18 (*s*, 3 H); 7.92 (*d*, *J* = 8.5, 2 H); 7.63 (*s*, 2 H); 7.63 (*s*, 4 H); 7.22–7.20 (*m*, 2 H); 7.43–7.40 (*m*, 1 H); 7.16–7.15 (*m*, 3 H); 6.93 (*s*, 2 H); 5.75 (*s*, 1 H); 5.61 (*s*, 1 H); 4.73–4.70 (*d*, *J* = 15, 1 H); 4.52 (*d*, *J* = 16.5, 1 H); 1.389 (*s*, 9 H). ^{13}C-NMR ($CDCl_3$): 171.2; 167.5; 148.7; 148.4; 142.2; 137.2; 131.4; 129.9; 129.0; 128.7; 128.6; 127.7; 127.4; 126.7; 125.9; 123.8; 120.7; 117.3; 52.1; 28.6. ESI-MS: 565 ($[M+1]^+$). Anal. calc. for $C_{33}H_{30}ClN_5O_2$ (563.21): C 70.27, H 5.36, N 12.42, O 5.67; found: C 70.25, H 5.33, N 12.39, O 5.62.

N-*Benzyl*-N-*{[(*tert-*butyl)carbamoyl][4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)phenyl]methyl}benzamide* (= *α-[Benzoyl(phenylmethyl)amino]*-N-*(1,1-dimethyl)-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzeneacetamide*; **7c**). Yield 0.34 g (62%). Yellow solid. M.p. 180–182°. ^{1}H-NMR ($CDCl_3$): 8.17 (*s*, 1 H); 7.93 (*d*, *J* = 7.5, 2 H); 7.72 (*d*, *J* = 8, 2 H); 7.54–7.48 (*m*, 6 H); 7.22–7.20 (*m*, 5 H); 7.19–7.08 (*m*, 3 H); 7.08 (*s*, 2 H); 7.35–7.34 (*m*, 2 H); 5.53 (*s*, 1 H); 4.84–4.80 (*m*, 1 H); 4.57 (*d*, *J* = 15, 1 H); 1.36 (*s*, 9 H). ^{13}C-NMR ($CDCl_3$): 173.3; 167.9; 148.6; 136.8; 135.9; 131.0; 130.1; 129.7; 129.0; 128.7; 128.6; 128.5; 128.1; 127.3; 126.7; 125.9; 120.5; 120.3; 117.4; 51.8; 30.9; 28.6. ESI-MS: 545 ($[M+1]^+$). Anal. calc. for $C_{34}H_{33}N_5O_2$ (543.26): C 75.11, H 6.12, N 12.88, O 5.89; found: C 75.08, H 6.10, N 12.85, O 5.85.

N-*{[(*tert-*Butyl)carbamoyl][4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)phenyl]methyl}*-N-*cyclohexylbenzamide* (= *α-[Benzoylcyclohexylamino)*-N-*(1,1-dimethylethyl)-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzeneacetamide*; **7d**). Yield 0.31 g (58%). Yellow solid. M.p. 190–192°. ^{1}H-NMR ($CDCl_3$): 8.20 (*s*, 1 H); 7.94–7.92 (*m*, 3 H); 7.82–7.80 (*m*, 2 H); 7.62 (*d*, *J* = 8, 2 H); 7.50–7.46 (*m*, 3 H); 7.41–7.8 (*m*, 4 H); 5.01 (*s*, 1 H); 3.75–3.71 (*m*, 1 H); 1.91–1.86 (*m*, 2 H); 1.81–1.78 (*m*, 3 H); 1.65–1.55 (*m*, 2 H); 1.55 (*s*, 9 H); 1.11 (*s*, 3 H). ^{13}C-NMR ($CDCl_3$): 172.5; 169.8; 157.0; 148.6; 148.4; 138.2; 137.9; 137.0; 136.5; 136.2; 130.2; 130.1; 130.1; 129.4; 128.9; 128.7; 128.5; 128.4; 126.1; 125.9; 125.9; 120.6; 120.3; 117.5; 117.4; 70.0; 64.7; 60.7; 58.5; 51.4; 34.3; 31.7; 28.6; 25.7; 25.6; 25.5; 24.9; 24.7; 18.4. ESI-MS: 535 ($[M+1]^+$). Anal. calc. for $C_{33}H_{37}N_5O_2$ (535.29): C 73.99, H 6.96, N 13.07, O 5.97; found: C 73.97, H 6.95, N 13.03, O 5.93.

N-*Benzyl*-N-*{[(*tert-*butyl)carbamoyl][4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)phenyl]methyl}-4-nitrobenzamide* (= N-*(1,1-Dimethylethyl)-α-(4-nitrobenzoyl)(phenylmethyl)amino]-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzeneacetamide*; **7e**). Yield 0.29 g (51%). Yellow solid. M.p. >230°. ^{1}H-NMR ($CDCl_3$): 8.19 (*s*, 1 H); 7.91 (*d*, *J* = 7.5, 2 H); 7.73 (*d*, *J* = 7.5, 2 H); 7.50–7.47 (*m*, 4 H); 7.40 (*t*, *J* = 7.5, 1 H); 7.32 (*d*, *J* = 7, 2 H); 7.26–7.25 (*m*, 1 H); 7.21–7.18 (*m*, 2 H); 7.04–7.02 (*m*, 4 H); 6.25 (*s*, 1 H); 5.88 (*s*, 1 H); 1.43 (*s*, 9 H). ^{13}C-NMR ($CDCl_3$): 171.2; 168.1; 148.6; 139.3; 136.9; 135.4; 135.3; 133.3; 131.6; 130.0; 129.9; 129.0; 128.8; 128.6; 128.5; 127.9; 125.9; 120.3; 117.3; 65.4; 52.0; 30.9; 28.7. ESI-MS: 576 ($[M+1]^+$). Anal. calc. for $C_{33}H_{30}N_6O_4$ (574.23): C 68.98, H 5.26, N 14.63, O 11.14; found: C 68.95, H 5.22, N 14.61, O 11.12.

N-*{{Benzyl{[(*tert-*Butyl)carbamoyl][4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)phenyl]methyl}carbamoyl)-methyl}carbamic Acid* tert-*Butyl Ester* (= N-*{2-{{2-[(1,1-Dimethylethyl)amino]-2-oxo-1-[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)phenyl]ethyl}phenylmethyl)amino}-2-oxoethyl}carbamic Acid 1,1-Dimethylethyl Ester*; **7f**). Yield 0.32 g (55%). Yellow solid. M.p. 198–200°. ^{1}H-NMR ($CDCl_3$): 8.15 (*s*, 1 H); 7.91 (*d*, *J* = 7.5, 2 H); 7.69 (*d*, *J* = 7.5, 2 H); 7.54–7.47 (*m*, 4 H); 7.41–7.38 (*t*, *J* = 7.5, 1 H); 7.22–7.15 (*m*, 3 H); 7.03–7.01 (*d*, *J* = 7, 2 H); 5.89 (*s*, 1 H); 5.75 (*s*, 1 H); 5.43 (*s*, 1 H); 4.76 (*d*, *J* = 17.5, 1 H); 4.61 (*d*, *J* = 17.5, 1 H); 4.06 (*d*, *J* = 19, 1 H); 3.94–3.90 (*m*, 1 H); 1.45 (*s*, 1 H); 1.38 (*s*, 1 H). ^{13}C-NMR ($CDCl_3$): 170.9; 167.8; 155.7; 148.6; 137.0; 136.2; 135.4; 131.2; 130.0; 129.0; 128.7; 128.6; 127.5; 126.2; 125.9; 120.5; 117.3; 79.8; 63.1; 52.0; 49.6; 43.1; 28.6; 28.4. ESI-MS: 584 ($[M+1]^+$). Anal. calc. for $C_{33}H_{38}N_6O_4$ (582.30): C 68.02, H 6.57, N 14.42, O 10.98; found: C 68.00, H 6.56, N 14.39, O 11.01.

N-*Benzyl*-N-*{[(*tert-*butyl)carbamoyl][4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)phenyl]methyl}-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzamide* (= N-*(1,1-Dimethylethyl)-α-{(phenylmethyl)[4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzoyl]amino}-4-(4-phenyl-1*H-*1,2,3-triazol-1-yl)benzeneacetamide*; **8**). Yield 0.29 g

(43%). Yellow solid. M.p. >230°. ^{1}H-NMR ((D$_6$)DMSO): 9.45 (*s*, 1 H); 9.26 (*s*, 1 H); 8.14–7.94 (*m*, 7 H); 7.80–7.73 (*m*, 4 H); 7.52–7.49 (*m*, 5 H); 7.41–7.38 (*m*, 3 H); 7.12–7.05 (*m*, 5 H); 5.55 (*s*, 1 H); 5.06 (*s*, 1 H); 4.39 (*s*, 1 H); 1.27 (*s*, 9 H). ^{13}C-NMR ((D$_6$)DMSO): 168.7; 148.0; 147.8; 137.2; 136.5; 131.2; 130.6; 130.6; 129.5; 128.8; 128.5; 128.1; 127.1; 125.9; 125.8; 120.2; 120.0; 51.0; 28.7. ESI-MS: 685 ([*M* – 1]$^-$). Anal. calc. for $C_{42}H_{38}N_8O_2$ (686.31): C 73.45, H 5.58, N 16.32, O 4.66; found: C 73.42, H 5.55, N 16.29, O 4.65.

N-*{2-{Benzyl{2-[(*tert-*butyl)amino]-1-{4-{4-{{*N-*{1-[(*tert-*butyl)amino]-3-methyl-1-oxobutan-2-yl}-4-chlorobenzamido}methyl}-1*H-*1,2,3-triazol-1-yl}phenyl}-2-oxoethyl}amino}-2-oxoethylcarbamic Acid* tert-*Butyl Ester* (= N-*{2-{{1-{4-{{(4-Chlorobenzyl){1-{[(1,1-dimethylethyl)amino]carbonyl}-2-methylpropyl}amino}methyl}-1*H-*1,2,3-triazol-1-yl}phenyl}-2-[(1,1-dimethylethyl)amino]-2-oxethyl}phenylmethyl)amino}-2-oxoethyl}carbamic Acid 1,1-Dimethylethyl Ester*; **11a**). Yield 0.29 g (36%). White solid. M.p. 134–136°. ^{1}H-NMR ($CDCl_3$): 8.11–7.82 (*m*, 1 H); 7.62–7.57 (*m*, 3 H); 7.49–7.47 (*m*, 2 H); 7.43–7.41 (*m*, 4 H); 7.21–7.16 (*m*, 3 H); 7.01–6.99 (*m*, 3 H); 5.85 (*s*, 1 H); 5.68 (*s*, 1 H); 5.42 (*s*, 1 H); 4.75–4.70 (*m*, 2 H); 4.65–4.56 (*m*, 2 H); 4.05 (*d*, *J* = 17.5, 1 H); 3.91 (*d*, *J* = 18, 1 H); 2.60 (*m*, 1 H); 1.50 (*s*, 1 H); 1.35 (*s*, 1 H); 1.27–1.23 (*m*, 1 H); 1.03–0.99 (*q*, *J* = 5.5, 4 H); 0.90–0.83 (*m*, 2 H). ^{13}C-NMR ($CDCl_3$): 173.0; 170.8; 169.26; 167.8; 155.7; 144.0; 136.8; 136.2; 135.5; 134.6; 131.1; 129.0; 128.8; 128.7; 127.5; 126.2; 121.2; 120.4; 79.7; 63.1; 52.0; 51.1; 49.6; 43.4; 43.1; 30.9; 29.7; 28.6; 28.5; 28.3; 26.9; 19.9; 19.1. ESI-MS: 811 ([*M* – 1]$^-$). Anal. calc. for $C_{45}H_{59}ClN_8O_6$ (812.41): C 64.08, H 7.05, N 13.29, O 11.38; found: C 64.05, H 7.03, N 13.25, O 11.36.

N-*Benzyl*-N-*{2-[(*tert-*butyl)amino]-1-(furan-2-yl)-2-oxoethyl}-4-{4-{{(*N-*{2-[(*tert-*butyl)amino]-3-methylbutanoyl}-4-chlorobenzamido}methyl}-1*H-*1,2,3-triazol-1-yl}benzamide* (= *α-{{4-{4-{{(4-Chlorobenzoyl){2-[(1,1-dimethylethyl)amino]-3-methyl-1-oxobutyl}amino}methyl}-1*H-*1,2,3-triazol-1-yl}benzoyl}(phenylmethyl)amino}*-N-*(1,1-dimethylethyl)furan-2-acetamide*; **13a**). Yield 0.26 g (33%). White solid. M.p. 108–110°. ^{1}H-NMR ($CDCl_3$): 7.86 (*s*, 1 H); 7.61–7.56 (*m*, 6 H); 7.42–7.39 (*m*, 3 H); 7.32–7.32 (*m*, 1 H); 7.16 (*s*, 3 H); 6.92 (*s*, 2 H); 6.59 (*s*, 1 H); 6.31–6.30 (*m*, 1 H); 6.06 (*s*, 1 H); 5.84 (*s*, 1 H); 4.81–4.63 (*m*, 4 H); 4.12 (*m*, 1 H); 2.60 (*s*, 1 H); 1.36 (*s*, 11 H); 1.22 (*s*, 7 H); 1.03–1.00 (*m*, 4 H); 0.92–0.83 (*m*, 2 H). ^{13}C-NMR ($CDCl_3$): 173.1; 171.8; 169.2; 166.2; 148.3; 144.1; 143.2; 137.6; 136.4; 136.2; 134.6; 129.0; 128.8; 128.4; 128.3; 126.5; 121.3; 120.1; 112.1; 110.9; 62.3; 58.4; 51.9; 51.1; 43.3; 32.1; 29.9; 29.7; 28.6; 28.5; 26.8; 19.9; 19.8; 19.1; 18.4. ESI-MS: 802 ([*M* – 1]$^-$). Anal. calc. for $C_{43}H_{50}N_7O_5$ (803.36): C 66.18, H 6.46, N 12.56, O 10.25; found: C 66.15, H 6.45, N 12.53, O 10.23.

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