Synthesis of 2-Phenylimidazo[2,1-*b*]benzothiazole Derivatives as Modulators of Multidrug Resistance for Tumor Cells

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We have investigated 3-substituted-2-phenylimidazo[2,1-*b*]benzothiazole derivatives and herein we have discussed their pharmaceutical activities. We found that some 2-phenyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]-benzothiazoles could overcome multidrug resistance for tumor cells. Among them, 2-phenyl-3-(*N*-methyl-3-piperidyl)carbonylaminoiminomethyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole [N276-12] demonstrated the most potent activity for overcoming multidrug resistance.

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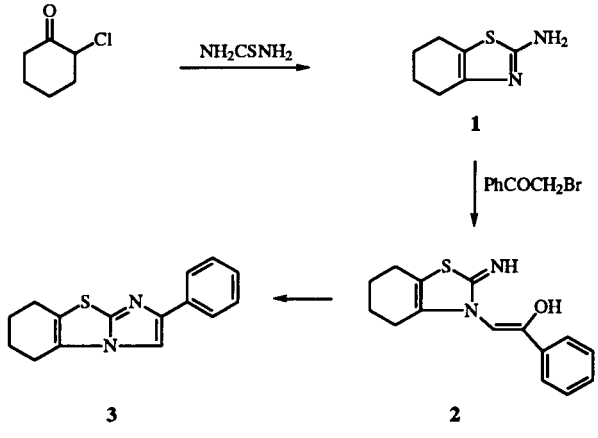
Imidazo[2,1-*b*]thiazole and imidazo[2,1-*b*]benzothiazole derivatives are useful heterocycles for pharmacological or biological activities [1-5]. Therefore a number of methods have been developed for the preparation of these derivatives [1,2,6-10]. Recognizing such facts, we have prepared a number of structurally related imidazothiazole derivatives and improved the pharmaceutical activities of these compounds through structural modification.

In this study, we described the synthesis of 3-substituted-2-phenyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole derivatives and the activity of overcoming multidrug resistance. The development of multiple drug resistance to anticancer agents in human tumor cells has been recognized as one of the major obstacles to successful cancer chemotherapy. Multidrug resistance is frequently characterized by enhanced drug efflux due to P-glycoprotein encoded by the MDR-1 [11]. Calcium channel blockers like verapamil and nicardipine has been reported to successfully overcome drug resistance [12,13]. But it was difficult to find relationships between structure and multidrug-resistant reversal activity. Therefore we screened many compounds to determine whether they could overcome multidrug resistance and found that the 2-phenyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole compounds are new heterocycles that overcome drug resistance for tumor cells.

The synthesis of 2-phenyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole was reported in previous studies [6,10]. Thus, 2-chlorocyclohexanone was heated under reflux with thiourea to give 2-amino-4,5,6,7-tetrahydrobenzothiazole hydrochloride (**1**) in good yield. Cyclization of **1** with phenacyl bromide at room temperature resulted only in 2-imino-3-benzoylmethyl-4,5,6,7-tetrahydrobenzothiazole hydrobromide (**2**) as the intermediate product. Compound **2** was assigned the enol form and gave 2-phenyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole hydrobromide (**3**) by heating in ethanol [Scheme 1].

Scheme 1



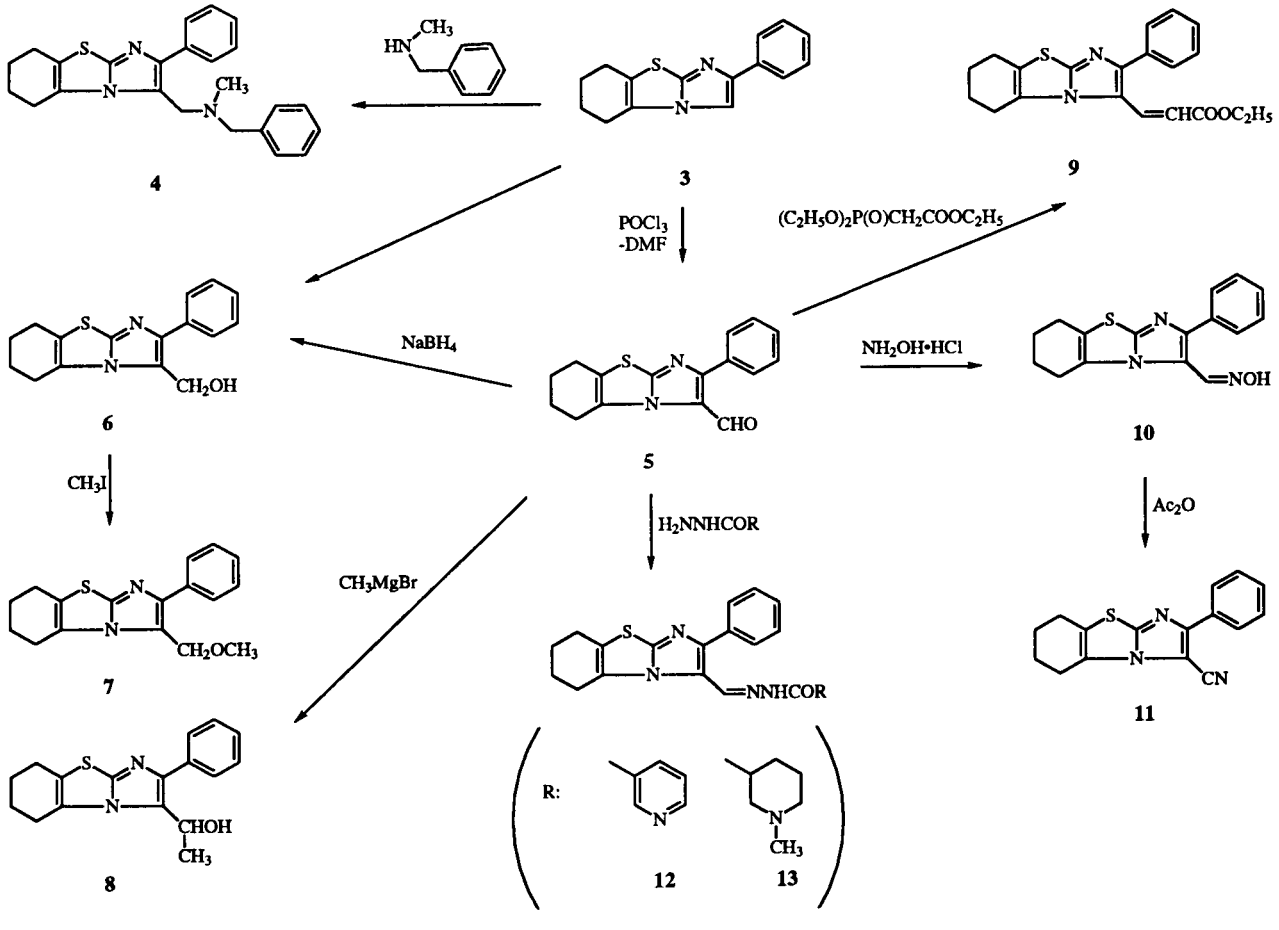
The 3-position of the imidazo[2,1-*b*]benzothiazole derivatives was active and some methods have been developed for the preparation of 3-substituted-imidazo[2,1-*b*]benzothiazole analogs [14,15]. Therefore, we introduced functional groups at the 3-position using two methods, the Mannich reaction and the Vilsmeier reaction [Scheme 2]. First, the reaction of **3** with *N*-benzyl-*N*-methylamine and 37% formalin in methanol and acetic acid at room temperature gave 2-phenyl-3-*N*-benzyl-*N*-methylaminomethyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole **4** in good yield. This method was applied to the many secondary amines, but some amines were inactive and gave mostly the starting materials. If the reaction temperature was raised to 90°, an unexpected side product was obtained along with the

desired product. This side reaction was considered to be a hydroxymethylation and the structure of this side product was assigned as 2-phenyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole-3-methanol **6** which was supported by nmr. We next synthesized 2-phenyl-3-formyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole **5** using the Vilsmeier reaction because the aldehyde **5** was a useful starting material for preparing 3-substituted-imidazo[2,1-*b*]benzothiazole derivatives. Thus, aldehyde **5** was reduced to the alcohol **6** in good yield by the use of sodium borohydride and alcohol **6** reacted with methyl iodide to give the methyl ether **7**. The aldehyde **5** also reacted with methylmagnesium bromide to give a secondary alcohol **8**, but the malonic acid condensation in pyridine and piperidine gave mostly starting materials. On the other hand, the Wittig reagent reacted with aldehyde **5** to give the ethyl propenoate **9** in high yield. The aldehyde **5** reacted with hydroxylamine to give oxime **10** and oxime **10** was converted to nitrile **11** with acetic anhydride at 130°. The aldehyde **5** reacted with nicotinic acid hydrazide to give hydrazone **12** in alkaline methanol at 90° and compound **13** was synthesized in the same manner using *N*-methyl-3-piperidinecarboxylic acid hydrazide.

Compounds **9**, **10**, **12** and **13** were expected to give two isomers, so we examined their formation using nmr. Compound **9** gave no evidence for the formation of the *Z*-isomer and the *E*-configuration of the side chain double bond was determined by the ^1H nmr coupling constants (J = 16.0 Hz). Usually, the oxime or hydrazone was assigned at about 145 ppm by the ^{13}C nmr chemical shift and these compounds shifted up-field due to a shielding effect [16]. Oxime **10** had the *anti*-configuration in deuteriochloroform but for the mixture of two isomers in dimethyl-d_6 sulfoxide, the *syn*-configuration was assigned at 137.6 ppm and the *anti*-configuration was assigned at 138.7 ppm. On the other hand, hydrazone **12** exhibited only the *anti*-configuration in dimethyl-d_6 sulfoxide but mixtures in deuteriochloroform and **13** gave a mixture of the *syn* and *anti* conformations in both solvents and these configuration ratios were exchanged in the different solvents [Table 1].

We have screened a series of imidazo[2,1-*b*]benzothiazole analogs to overcome the multidrug resistance in human KB/VJ-300 cells and cell survival was determined by colony formation assay as previously described [17]. We found some 2-phenylimidazo[2,1-*b*]benzothiazoles with impressive activity while the hydrazone **13** had the most potent activity

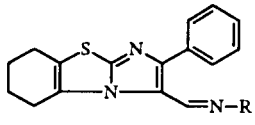
Scheme 2



of overcoming multidrug resistance *in vitro*. These results of the *in vitro* screening of selected compounds against cancer cell lines are shown in Table 2 and Table 3.

Table 1

^{13}C-NMR Chemical Shift of the *syn* and *anti* Configuration of Compounds **10**, **12** and **13**



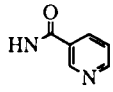
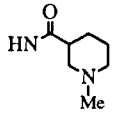
No.	R	^{13}C-NMR Chemical Shift (ppm) *anti/syn* (deuteriochloroform) (ratio)	*anti/syn* (dimethyl-d_6 sulfoxide) (ratio)
10	OH	141.2/–	138.7/137.6 (2:1)
12		139.2/136.6 (4:1)	137.9/–
13		137.6/135.4 (2:1)	135.9/134.1 (1:1)

Table 2

Effect of N276-5 [a] and N276-12 [b] on Drug Resistance in Antitumor Agents

No	Dose (μg/ml)	Relative resistance [c] DXR	VCR	VP-16
Control	—	27.6	307	22.2
N276-5	1.0	4.70	3.87	2.93
N276-12	1.0	1.00	1.16	1.21

[a] 2-Phenyl-3-(3-pyridylcarbonyl)aminoiminiomethyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole (**12**).
[b] 2-Phenyl-3-(*N*-methyl-3-piperidyl)carbonylaminoiminomethyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole (**13**).
[c] Relative resistance = $\frac{LD_{50} \text{ of VCR against VJ-300}}{LD_{50} \text{ of VCR against KB}}$

Table 3

Effect of N276-5 [a] and N276-12 [b] on Drug Resistance in VCR

No.	Dose (μg/ml)	Relative resistance [c] VCR
Control	—	307
N276-5	0.3	31.8
	1.0	3.87
N276-12	0.3	2.04
	1.0	1.16

[a] 2-Phenyl-3-(3-pyridylcarbonyl)aminoiminomethyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole (**12**).
[b] 2-Phenyl-3-(*N*-methyl-3-piperidyl)carbonylaminoiminomethyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole (**13**).
[c] Relative resistance = $\frac{LD_{50} \text{ of VCR against KB/VJ-300}}{LD_{50} \text{ of VCR against KB}}$

EXPERIMENTAL

Melting points were determined using a Yamato melting point apparatus and were uncorrected. The ^{1}H nmr and ^{13}C nmr spectra were obtained on a JEOL EX-400 spectrometer and spectra were referenced to the solvent (^{1}H nmr: chloroform δ = 7.26 ppm, dimethyl sulfoxide δ = 2.50 ppm, ^{13}C nmr: chloroform δ = 77 ppm, dimethyl sulfoxide δ = 39.5 ppm). Elemental analyses were performed by the Sumika Research Laboratory.

2-Phenyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole (**3**).

A mixture of 19.0 g (123 mmoles) of **1** and 24.5 g (123 mmoles) of phenacyl bromide in 50 ml of ethanol was allowed to stand at room temperature overnight. The crystals which separated were collected by filtration and washed with a small amount of ethanol to yield 29.2 g (67%) of the 2-imino-3-benzoylmethyl-4,5,6,7-tetrahydrobenzothiazole hydrobromide (**2**) as the intermediate product. This product was used in the next step without further purification; ^{1}H nmr (dimethyl-d_6 sulfoxide): 1.73 (m, 4H), 2.34 (m, 2H), 2.55 (m, 2H), 5.76 (s, 1H), 7.64 (t, 2H), 7.77 (m, 1H), 8.06 (d, 2H); ^{13}C nmr (dimethyl-d_6 sulfoxide): 20.81, 21.89, 22.16, 22.33, 52.27, 114.5, 128.5, 128.9, 133.7, 134.5, 134.5, 167.8, 190.7.

A suspension of 29.2 g (82.7 mmoles) of **2** in 200 ml of ethanol was heated under reflux for 6 hours after cooling, the crystals which separated were collected by filtration to yield 26.1 g (94%) of **3** hydrobromide. Then, the precipitate was made alkaline with ammonia solution and extracted with chloroform, washed with water and dried over anhydrous sodium sulfate. After filtration, the solution was evaporated to dryness *in vacuo* and recrystallized from ethanol to give the analytical sample **3** as colorless crystals; mp 169.5-170.0° (lit 169°) [9]; ^{1}H nmr (deuteriochloroform): 1.94 (m, 4H), 2.67 (m, 4H), 7.25 (t, 1H), 7.38 (t, 2H), 7.54 (s, 1H), 7.82 (d, 2H); ^{13}C nmr (deuteriochloroform), 21.6, 22.5, 23.0, 24.2, 105.5, 121.5, 124.9, 125.7, 126.9, 128.5, 134.4, 146.2, 148.1.

Anal. Calcd. for $C_{15}H_{14}N_2S$: C, 70.83; H, 5.55; N, 11.01; S, 12.60. Found: C, 70.60; H, 5.79; N, 10.98; S, 12.47.

2-Phenyl-3-*N*-methybenzylaminomethyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole (**4**).

A mixture of 2.54 g (10.0 mmoles) of **3** and 1.20 g (10.0 mmoles) of *N*-benzyl-*N*-methyl amine and 3 ml of 37% formalin in 40 ml of methanol and 3 ml of acetic acid was stirred at room temperature overnight. The solution was extracted with chloroform, washed with water and dried over anhydrous sodium sulfate. After filtration, the solution was evaporated to dryness *in vacuo* and recrystallized from ethyl acetate to yield 2.95 g (76%) of **4** as colorless crystals; mp 125.0-126.5°; ^{1}H nmr (deuteriochloroform): 1.90 (m, 4H), 2.06 (s, 3H), 2.70 (m, 2H), 3.07 (m, 2H), 3.42 (s, 2H), 3.88 (s, 2H), 7.15 (d, 2H), 7.20 (t, 1H), 7.26 (t, 2H), 7.32 (t, 1H), 7.42 (t, 2H), 7.69 (d, 2H); ^{13}C nmr (deuteriochloroform): 22.1, 22.7, 23.1, 24.7, 41.3, 50.9, 61.0, 120.4, 120.8, 126.9, 127.0, 128.0, 128.0, 128.2, 128.6, 128.9, 135.1, 138.8, 146.0, 148.3.

Anal. Calcd. for $C_{24}H_{25}N_3S$: C, 74.38; H, 6.50; N, 10.84; S, 8.27. Found: C, 74.42; H, 6.66; N, 10.80; S, 8.32.

2-Phenyl-3-formyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole (**5**).

The Vilsmeier reagent was prepared by adding 10 ml of phosphorus oxychloride dropwise into a stirred and cooled solution

of 100 ml of *N,N*-dimethylformamide. Then, 16.0 g (47.8 mmoles) of **3** hydrobromide was added to the cooled Vilsmeier reagent, stirred 1 hour at room temperature and then 2 hours at 60°. The solution was poured into 10% sodium carbonate solution and stirred at 90° for 2 hours. After cooling, the solution was extracted with chloroform, washed with water and dried with anhydrous sodium sulfate. The combined extracts were evaporated to dryness *in vacuo* end recrystallized from ethanol to yield 10.7 g (79%) of **5** as colorless crystals; mp 150.0-151.0°; ^{1}H nmr (deuteriochloroform): 1.90 (m, 4H), 2.72 (m, 2H), 3.24 (m, 2H), 7.46 (m, 3H), 7.70 (m, 2H), 9.66 (s, 1H); ^{13}C nmr (deuteriochloroform): 22.3, 22.5, 25.0, 26.1, 123.7, 125.2, 128.6, 129.3, 129.7, 130.7, 132.8, 155.1, 160.4, 177.7.

Anal. Calcd. $C_{16}H_{14}N_2OS$: C, 68.06; H, 5.00; N, 9.92; S, 11.35. Found: C, 68.05; H, 5.09; N, 9.94; S, 11.36.

2-Phenyl-3-methoxymethyl-5,6,7,8-tetrahydroimidazo-[2,1-*d*]benzothiazole (**7**).

Compound **5** (1.00 g, 3.55 mmoles) was added in small portions to a stirred and cooled solution of 0.20 g (5.26 mmoles) of sodium borohydride in 40 ml of methanol. After 3 hours at room temperature, the resulting solution was poured into ice water and the precipitate was collected by filtration to yield 0.90 g (89%) of **6** as a colorless solid. Alcohol **6** was used in the next step without further purification; ^{1}H nmr (deuteriochloroform): 1.93 (m, 4H), 2.70 (m, 2H), 3.03 (m, 2H), 4.91 (s, 1H), 7.32 (t, 1H), 7.41 (t, 2H), 7.65 (d, 2H); ^{13}C nmr (deuteriochloroform): 22.0, 22.7, 23.0, 24.6, 54.2, 121.7, 121.7, 127.3, 12.7.4 128.0, 128.5, 134.3, 145.7, 148.7.

A mixture of 0.90 g (3.17 mmoles) of **6** and 0.73 g (5.00 mmoles) of methyl iodide in 10 ml of dry dimethylformamide was stirred and heated at 50° for 8 hours. After cooling, the solution was extracted with ethyl acetate, washed with water and dried over anhydrous sodium sulfate. After filtration, the solution was evaporated to dryness *in vacuo* and recrystallized from 2-propanol to yield 0.59 g (63%) of **7** as colorless crystals; mp 138.5-139.5°; ^{1}H nmr (deuteriochloroform): 1.94 (m, 4H), 2.70 (m, 2H), 2.96 (m, 2H), 3.41 (s, 3H), 4.64 (s, 2H), 7.33 (t, 1H), 7.43 (t, 2H), 7.66 (d, 2H); ^{13}C nmr (deuteriochloroform): 22.0, 22.6 (2 peaks), 24.5 (21.5, 22.0, 22.2, 24.1 in dimethyl-d_6 sulfoxide), 57.4, 63.5, 119.2, 121.6, 127.2, 127.3, 128.1, 128.4, 134.4, 146.5, 148.6.

Anal. Calcd. $C_{17}H_{15}N_2OS$: C, 68.43; H, 6.08; N, 9.39; S, 10.74. Found: C, 68.36; H, 6.20; N, 9.35; S, 10.70.

2-Phenyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole-3-(1-methymethanol) (**8**).

A solution of 6 ml of methylmagnesium bromide (*ca.* 1 mole/tetrahydrofuran) was added to a stirred and cooled solution of 1.41 g (50.0 mmoles) of **5** in 50 ml of dry tetrahydrofuran. After 2 hours, the solution was poured into ice water and collected by filtration, washed with water and dried to yield 1.40 g (95%) of **8** as a colorless solid. An analytical sample was recrystallized from tetrahydrofuran to give **8** as colorless crystals; mp 197.5-199.5°; ^{1}H nmr (deuteriochloroform): 1.64 (d, 3H), 1.86 (m, 2H), 1.95 (m, 2H), 2.71 (m, 2H), 2.85 (m, 1H), 3.33 (m, 1H), 5.43 (q, 1H), 7.31 (t, 1H), 7.40 (t, 2H), 7.51 (d, 2H); ^{13}C nmr (deuteriochloroform): 22.6, 23.9, 25.0, 25.7 (22.1, 22.2, 23.9, 24.4, 25.1 in dimethyl-d_6 sulfoxide), 61.8, 121.4, 126.1, 127.3, 127.9, 128.2, 128.8, 135.1, 143.8, 148.7.

Anal. Calcd. $C_{17}H_{18}N_2OS$: C, 68.43; H, 6.08; N, 9.39; S, 10.74. Found: C, 68.42; H, 6.22; N, 9.34; S, 10.76.

Ethyl 2-Phenyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole-3-propenoate (**9**).

The Wittig reagent was prepared by adding dropwise of 1.20 g (5.36 mmoles) of diethyl phosphonoacetic acid ethyl ester into a stirred and cooled solution of 0.22 g of sodium hydride and 20 ml of tetrahydrofuran. A small portion of 1.41 g (5.00 mmoles) of **5** was added to the Wittig reagent at 0° and after 3 hours at room temperature, the solution was poured into ice water and extracted with chloroform. The combined extracts were washed with water and dried over anhydrous sodium sulfate. After filtration, the solution was evaporated to dryness *in vacuo* and recrystallized from ethanol to yield 1.55 g (88%) of **9** as pale yellow crystals; mp 150.0-151.0°; ^{1}H nmr (deuteriochloroform): 1.27 (t, 3H), 1.94 (m, 4H), 2.73 (m, 2H), 2.97 (m, 2H), 4.19 (q, 2H), 6.08 (d, 1H, J = 16.0 Hz), 7.36 (t, 1H), 7.43 (t, 2H), 7.66 (d, 2H), 7.98 (d, 1H, J = 16.0 Hz): ^{13}C nmr (deuteriochloroform): 14.3, 22.0, 22.3, 24.7, 60.4, 115.7, 120.6, 123.3, 127.8, 128.2, 128.6, 128.7, 130.5, 134.8, 148.8, 150.5, 167.4.

Anal. Calcd. $C_{20}H_{20}N_2O_2S$: C, 68.16; H, 5.72; N, 7.95; S, 9.10. Found: C, 68.11; H, 5.92; N, 7.91; S, 9.03

2-Phenyl-3-cyano-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole (**11**).

A mixture of 2.82 g (10.0 mmoles) of **5** and 0.80 g (11.7 mmoles) of hydroxylamine hydrochloride in 20 ml of pyridine was heated at 100° for 6 hours. After cooling, the solution was poured into ice water and the precipitate was collected by filtration, washed with water and dried to yield 2.80 g (94%) of oxime **10** as a colorless solid. Oxime **10** was used in the next step without further purification. ^{1}H nmr (deuteriochloroform): 1.89 (m, 4H), 2.71 (m, 2H), 3.01 (m, 2H), 7.36 (t, 1H), 7.43 (t, 2H), 7.66 (d, 2H), 8.31 (s, 1H); ^{13}C nmr (deuteriochloroform): 22.3, 22.5, 25.0, 26.0, 116.1, 122.2, 128.0, 128.5, 128.8, 129.0, 133.9, 141.2, 149.8, 151.2.

A suspension of 2.80 g (9.43 mmoles) of **10** in 20 ml of acetic anhydride was heated at 130° for 7 hours. After cooling, the solution was poured into ice water and the precipitate was collected by filtration and recrystallized from ethyl acetate to yield 1.90 g (72%) of **11** as colorless crystals; mp 205.5-306.5°; ^{1}H nmr (deuteriochloroform): 1.97 (m, 4H), 2.73 (m, 2H), 3.02 (m, 2H), 7.42 (t, 1H), 7.47 (t, 2H), 8.05 (d, 2H); ^{13}C nmr (deuteriochloroform): 21.4, 22.5, 22.5, 24.3, 93.1, 113.4, 124.3, 126.5, 127.6, 128.8, 129.3, 131.7, 151.4, 154.8.

Anal. Calcd. $C_{16}H_{13}N_3S$: C, 68.79; H, 4.69; N, 15.04; S, 11.48. Found: C, 68.76; H, 4.77; N, 15.06; S, 11.45.

2-Phenyl-3-(3-pyridylcarbonyl)aminoiminomethyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole (**12**) [N276-5].

A mixture of 1.41 g (5.00 mmoles) of **5**, 0.80 g (5.84 mmoles) of nicotinic acid hydrazide and 0.10 g of potassium hydroxide in 20 ml of methanol was stirred and refluxed for 2 hours. After cooling, the solution was poured into ice water, extracted with chloroform, washed with water and dried over anhydrous sodium sulfate. After filtration, the solution was evaporated to dryness *in vacuo* and recrystallized from ethyl acetate to yield 1.79 g (89%) of **12** as pale yellow crystals; mp 161.0-162.0° dec; ^{1}H nmr (dimethyl-d_6 sulfoxide): 1.83 (m, 4H), 2.72 (m, 2H), 3.27 (m, 2H), 7.41 (t, 1H), 7.45 (q, 1H), 7.49 (t, 2H), 7.70 (d, 2H), 8.25 (m, 1H), 8.61 (s, 1H), 8.74 (m, 1H), 9.07 (m, 1H); ^{13}C nmr (dimethyl-d_6 sulfoxide), 22.0, 22.0, 24.6, 26.2, 119.7, 121.8, 123.6, 128.0, 128.5, 128.7, 128.9, 129.9, 133.7, 135.3, 137.9, 148.5, 149.7, 150.7, 152.2, 161.2.

Anal. Calcd. $C_{22}H_{19}N_5OS$: C, 65.82; H, 4.77; N, 17.44; S, 7.99. Found: C, 65.73; H, 4.84; N, 17.35; S, 7.93.

2-Phenyl-3-(*N*-methyl-3-piperidyl)carbonylaminoiminomethyl-5,6,7,8-tetrahydroimidazo[2,1-*b*]benzothiazole (**13**) [N276-12].

In a similar manner, **13** was prepared from 0.56 g (1.99 mmoles) of **5** with 0.40 g (2.55 mmoles) of *N*-methyl-3-piperidinecarboxylic acid hydrazide and recrystallized from ethyl acetate to yield 0.58 g (69%) of **13** as colorless crystals; mp 203.0-205.0° dec; ^{1}H nmr (dimethyl-d_6 sulfoxide): 2.18 (s, 3H), 8.28 (s, *syn*), 8.35 (s, *anti*). The other signals were not identified; ^{13}C nmr (dimethyl-d_6 sulfoxide): *syn*, 21.8, 22.0, 24.2, 25.6, 26.0, 46.1, 55.3, 57.2, 59.7, 119.3, 121.6, 127.8, 128.4, 128.5, 129.7, 133.8, 148.8, 149.8, 174.4. *anti* 22.0, 24.4, 24.6, 26.1, 26.4, 41.4, 46.0, 55.0, 57.6, 119.8, 121.7, 127.9, 128.3, 128.7, 128.8, 134.1, 135.7, 148.9, 150.2, 169.3.

Anal. Calcd. $C_{23}H_{27}N_6OS$: C, 65.53; H, 6.46; N, 16.61; S, 7.61. Found: C, 64.57; H, 6.28; N, 16.28; S, 7.45.

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