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Synthesis of 1,2-Diazol-4-sulfonamides, 1,2,4- and 1,2,5-Oxadiazol-3-sulfonamides, 1,2,3-Triazol-4-sulfonamides, and Pyrimidine-5-sulfonamides starting from Cyanomethanesulfonyl Chloride

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Summary. Cyanomethanesulfonyl chloride was reacted with amines yielding cyanomethanesulfonamides which could be transformed into alkoxymethylidene and aminomethylidene derivatives. The reaction of alkoxymethylidene derivatives with phenylhydrazine resulted in the formation of 5-aminopyrazol-4-sulfonamides, whereas from cyanomethanesulfonamides *via* the *N*-hydroxyamidine derivatives and their reaction with esters 1,2,4-oxadiazol-3-methanesulfonamides became accessible. Nitrosation of cyanomethanesulfonamides yielded 2-hydroxyimino derivatives which were then transformed into 2-hydroxyimino *N*-hydroxyamidine derivatives, and finally cyclized into 4-amino-1,2,5-oxadiazol-3-sulfonamides. On the other hand diazotation of cyanomethanesulfonamides gave the 2-arylhydrazono derivatives, which after transformation into *N*-hydroxyamidine derivatives gave by reaction with $POCl_3$ 5-amino-1,2,3-triazol-4-sulfonamides. Finally, the reaction between cyanomethanesulfonamides and formamidinium acetate opened an easy access to 4-aminopyrimidine-5-sulfonamides, which could be transformed by trialkyl orthoformiates into substituted pyrimidino[4,5-*e*][1,2,4]thiadiazine derivatives. All intermediates as well as transformation products of the heterocyclic systems were isolated and well characterized. Mechanisms were discussed, and the stereochemistry, when necessary and possible, was elucidated.

Keywords. Cyanomethanesulfonyl chloride; 1,2-Diazol-4-sulfonamides; Oxadiazol-3-sulfonamides; 1,2,3-Triazol-4-sulfonamides; Pyrimidine-5-sulfonamides.

Introduction

Cyanomethanesulfonyl chloride [1] is a highly reactive and unstable compound whose potency for synthesis is only poorly explored. Some reactions with aromatic

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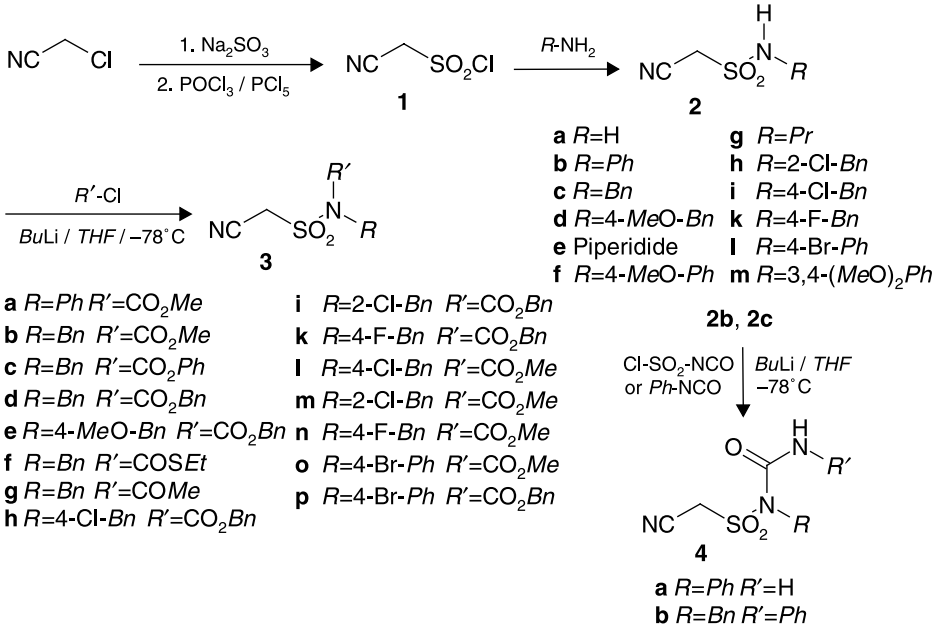
amines and applications in drug research and agriculture chemistry are described [2], the cycloaddition with enamines yielded thietane 1.1-dioxides [3], and by reaction with Et_3N the sulfene was obtained and used in [4 + 2] cycloadditions [4]. Some years ago, we decided to start a systematic study of this three-functional compound, which should allow reactions at the sulfonyl chloride function, at the methylene group, and at the nitrile function. By a combination of these possibilities we hoped to be able to synthesize a large number of derivatives, and finally to develop easy synthetic routes to different types of heterocyclic sulfonamides showing interesting properties. First results are presented. Some other will be published in a second paper [5].

Results and Discussion

Cyanomethanesulfonyl chloride (**1**) prepared from chloroacetonitrile by reaction with Na_2SO_3 and $PCl_5/POCl_3$ [6] reacted with primary or secondary amines yielding the sulfonamides **2b**–**2m** (Scheme 1). All reactions gave satisfactory to excellent yields when they were performed at 0°C by adding the freshly distilled amine to a solution of **1** in dry(!) Et_2O. Reasonable yields of the N-unsubstituted **2a** [7] were obtained when a solution of **1** in *Ac*O*Et* was dropwise neutralized with a saturated solution of NH_3 in $CHCl_3$. This method seems to us to be more effective than the described one.

The synthesis of sulfonylureas by reaction of **1** with isoureas or cyanamide [8] completely failed, and when **2b** or **2c** in *Et*OH or acetone were refluxed with KNCO [9] no products were isolated. Instead, the sulfonylureas **4a** and **4b** were obtained (yields ~80%) when the starting material **2b** or **2c**, *Bu*Li, and the isocyanate were reacted at −78°C under N_2 in *THF*. We found that this procedure was

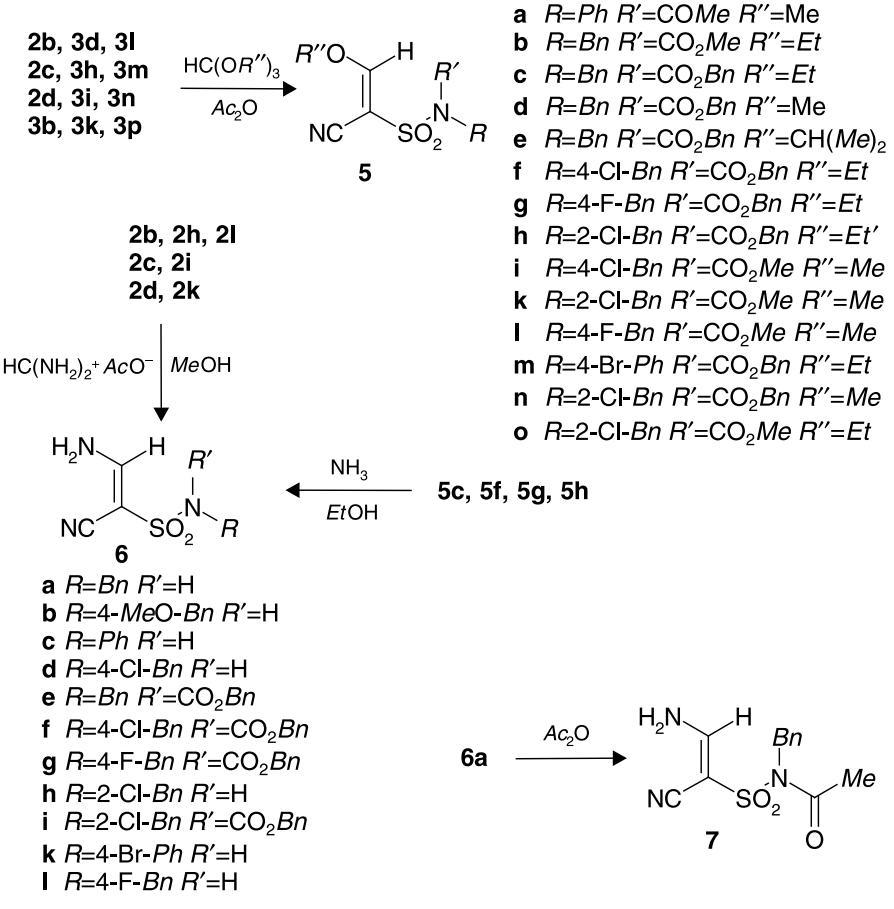


Scheme 1

useful not only for the synthesis of the sulfonylureas but even for the acylation of the sulfonamide nitrogen of **2** with acyl chlorides like methyl or benzyl chloroformate yielding the hitherto unknown cyanomethanesulfonyl carbamidates. Some aromatic sulfonyl carbamidates were described and used as agrochemicals [10]. We obtained by this procedure the N-acylated sulfonamides **3a**–**3p**. Compound **3g** was obtained from **2c** and acetyl chloride, and **3f** was prepared from **2c** with ethyl chlorothioformate.

The IR spectra (KBr) of **2a**–**2m** are characterized by bands at 3300–3200 (NH), two sharp bands at 2980 and 2920 (CH_2), a low intensity band at 2260–2270 (C≡N), and characteristic bands at 1350 and 1150 cm^{-1} (SO_2). All ^1H NMR spectra show together with the signals caused by the N-substituents a singlet signal around 4.5 ppm caused by the two methylene protons. IR spectra of the sulfonylureas **4a** and **4b** and of the acylated compounds **3** show an additional carbonyl band at 1740–1720 cm^{-1}. The spectrum of **3f** shows a band at 1675 cm^{-1} (COS*Et*), and that of **3g** at 1710 cm^{-1}.

The methylene group of the sulfonamides **2** and **3** enabled a number of condensation reactions. Reactions with orthoformates in Ac_2O yielded after refluxing for 2 h the alkoxymethylidene derivatives **5a**–**5o** in good to reasonable yields.



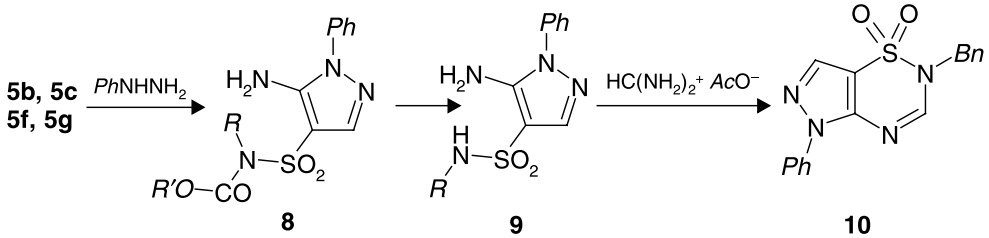
Scheme 2

Compound **5e** was obtained from **5d** by crystallization from isopropanol. The aminomethylidene derivatives **6a**–**6l** were accessible either by reaction of the parent alkoxymethylidene derivatives **5** with NH_3 in *Et*OH at 0°C (**6e**–**6g**, **6i**) or by reaction of the methylene sulfonamides **2** with formamidinium acetate in refluxing *Me*OH (Scheme 2).

As can be seen from the spectroscopic data compounds **5** and **6** were isolated as single isomers. The IR spectra of these conjugated nitriles show a band at 2210–2200 cm^{-1} for the conjugated C≡N group, and in their ^1H NMR spectra one sharp singlet between 7.5 and 8.0 ppm indicates the olefinic proton. In the ^1H NMR spectra (400 MHz) of some compounds **6** like **6e** we found a coupling between 2-H and the protons of the amino group. A definitive decision between (*E*)- and (*Z*)-isomer of three-substituted olefins from their spectroscopic data still remains a problem. Estimation of the 2-H signal position using increment systems [11] results only in small differences between (*E*)- and (*Z*)-isomer. The same problem arises using the $^3J_{C,H}$ coupling in the ^{13}C NMR spectra [12]. Significant differences are found when calculating the energies of the (*E*)- and (*Z*)-isomers [13]. In all studied examples the (*E*)-isomer was the more stable one. Therefore, we propose that compounds **5** and **6** were obtained as (*E*)-isomers.

The use of these compounds for the synthesis of heterocyclic sulfonamides was first demonstrated by the transformation of **5c** by the reaction with phenylhydrazine in *Et*OH at room temperature yielding the crystalline 1,2-diazol sulfonamide **8b**, yield 70%, from which after hydrolysis by *Et*ONa in *Et*OH at 50°C and acidification **9a** was obtained. The first reaction step may be explained as a *Michael* reaction of the hydrazine to the α,β-unsaturated nitrile followed by an elimination of *Et*OH and an addition of the amino group to the nitrile function [14]. An identical product was isolated from the sequence **5b** → **8a** → **9a**. The analogous products **9b** and **9c** were prepared from **5g** and **5f** *via* **8c** and **8d** with yields of 38 and 55%. Finally, we transformed **9a** by refluxing with formamidinium acetate in *n-Bu*OH into the bicyclic sulfonamide **10** (Scheme 3).

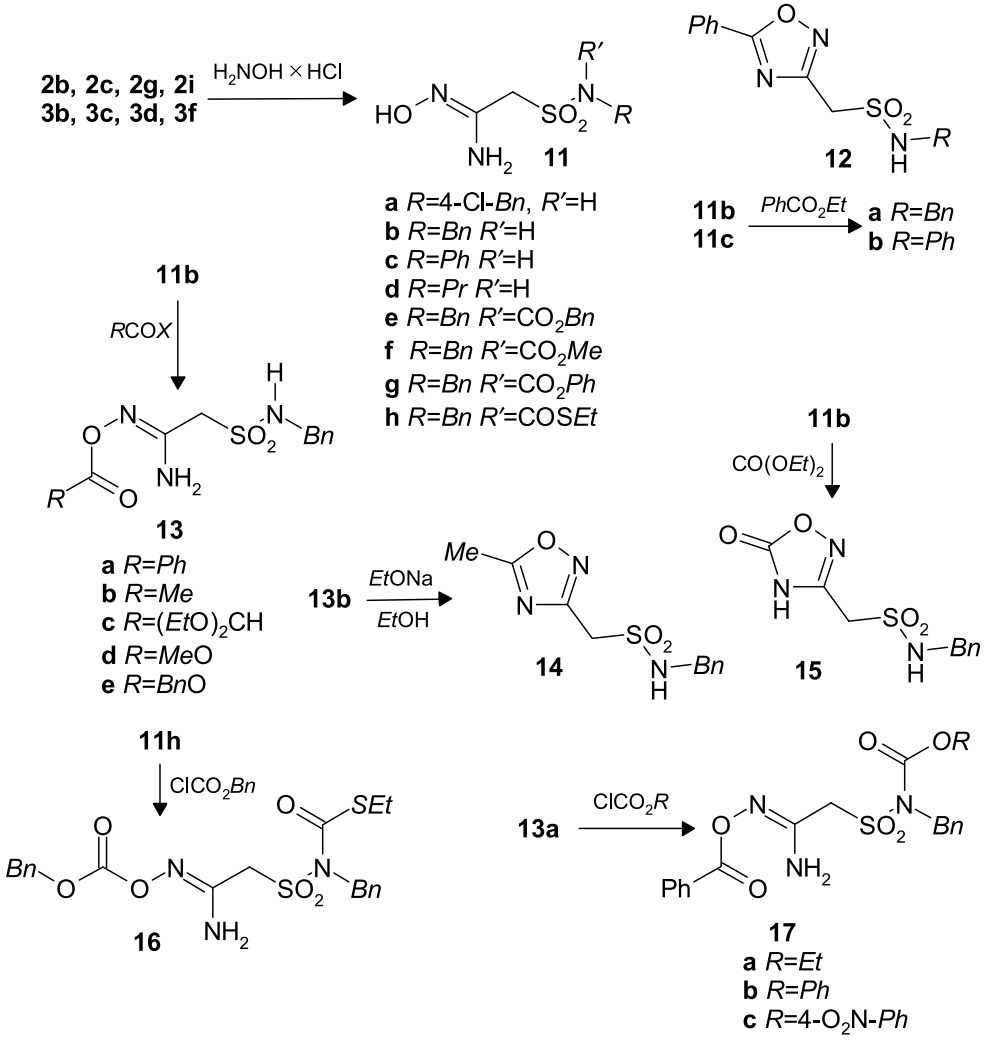
Transforming the cyanomethanesulfonamides **2** and **3** with $H_2NOH \times HCl$ into the *N*-hydroxyamidines **11a**–**11h** opened a comfortable route to the 1,2,4-oxadiazol-3-methylsulfonamides. It is essential for the successful reaction, that hydroxylamine is liberated from its salt in an aqueous solution by $NaHCO_3$, and that a



a *R*=*Bn* *R′*=Me
b *R*=*R′*=*Bn*
c *R*=4-F-*Bn* *R′*=*Bn*
d *R*=4-Cl-*Bn* *R′*=*Bn*

a *R*=*Bn*
b *R*=4-F-*Bn*
c *R*=4-Cl-*Bn*

Scheme 3



Scheme 4

solution of the cyanomethanesulfonamide in *Et*OH is slowly added to that aqueous solution at room temperature [15] (Scheme 4). The *N*-hydroxyamidines **11** were identified by usual spectroscopic and analytical methods. The H–O group gives a sharp band at 3500 cm^{-1}, the H_2N group at 3400 cm^{-1}, and the sulfonamide NH is recorded at 3260 cm^{-1} in the IR spectra. The ^1H NMR spectra of the derivatives with R'=H showed a singlet at ~3.8 ppm from the methylene protons, whereas this signal was found in the spectra of the other compounds at ~4.4 ppm demonstrating the effect of the second substituent.

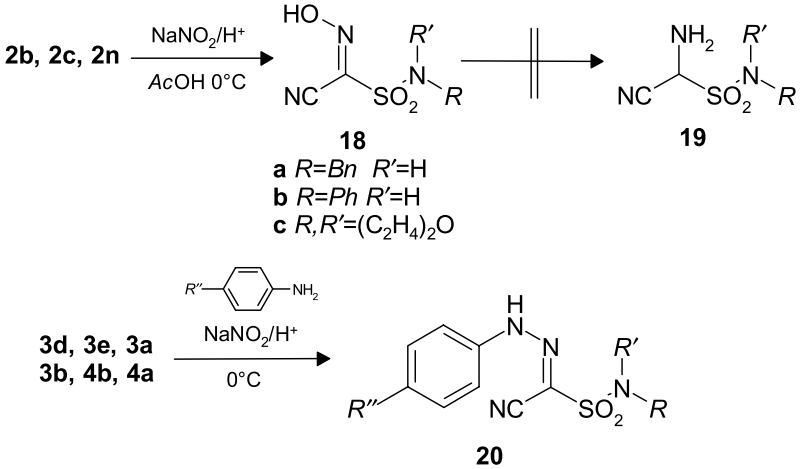
For characterization and for clarifying the reaction possibilities of **11a**–**11h** we tried a number of reactions with electrophiles, mainly using compound **11b**. O-Silylation with Cl*Si*Me_3 in the presence of Et_3N was successful. All expected signals were present in the ^1H NMR spectrum of the crude product, but isolation of the product failed. Reactions with acyl chlorides were successful when done in *THF* or $HCCl_3$ at room temperature, and in the presence of Et_3N. We obtained the

products **13a**, **13d**, and **13e** from **11b**, and **16** from **11h** with yields ∼80% from reactions with equivalent amounts of benzoyl chloride, methyl, and benzyl chloroformate using this method.

Compound **13b** was isolated from the reaction with Ac_2O in *Ac*OH at room temperature, and **13c** was prepared by refluxing **11b** for 4 h in triethyl orthoformate, yield 60%. When the O-acylated compound **13a** was reacted with equivalent amounts of ethyl, phenyl, and 4-nitrophenyl chloroformate the N-acylated derivatives **17a**, **17b**, and **17c** were isolated as crystalline compounds with yields between 50 and 60%. On the other hand, reactions with esters in *Et*OH in the presence of *Et*ONa yielded the 1,2,4-oxadiazol derivatives as is elucidated by the reactions of **11b** and **11c** with ethyl benzoate yielding **12a** and **12b**, of **11b** with diethyl carbonate to **15**, and finally by refluxing of **13b** in *Et*OH with *Et*ONa for 2 h yielding **14** (Scheme 4).

The synthesis of 1,2,4-oxadiazol derivatives is possible either by a 1,3-dipolar cycloaddition between a nitrile and a nitriloxide [16] or by the long known cyclization of O-acylated amidoximes, which was first described by *Tiemann* in 1884 [17], but to the best of our knowledge until today none of these methods was used for the synthesis of such sulfonamide derivatives [18] we described here.

Interesting results were found in reactions of the sulfonamides with N-electrophiles (Scheme 5). The reaction of **2b**, **2c**, and **2n** [6] with $NaNO_2$ and acid at 0°C yielded the (*E*)-oxime derivatives **18a**–**18c** as crystalline, stable compounds. In analogy to the known synthesis of aminomalononitrile we tried to reduce these compounds to the hitherto unknown α-aminosulfonamides **19** but we failed completely. Whereas α-aminocarboxylic acids and -phosphonic acids and their derivatives are well known compounds the synthesis of α-aminosulfonic acids or their derivatives or other α-N-substituted sulfonyl compounds seems to be difficult or not possible [19].



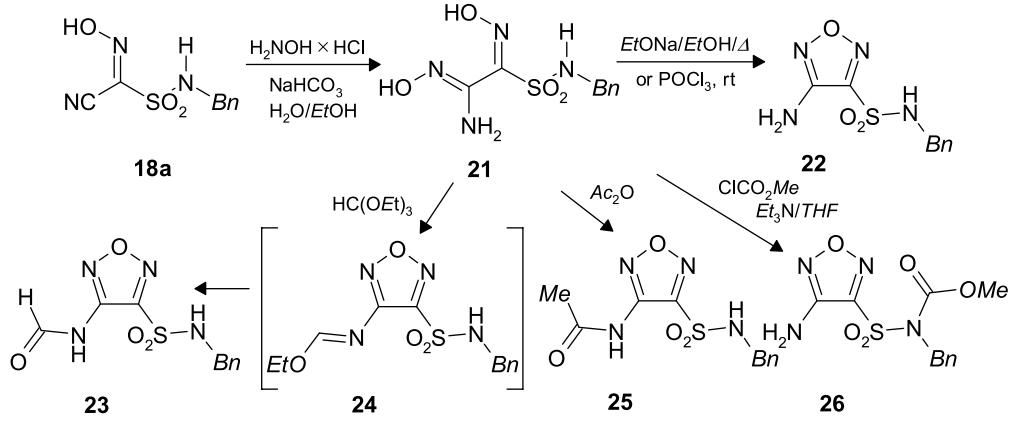
Scheme 5

The reaction of **3** or **4** with diazonium salts in *Et*OH in the presence of *Ac*ONa enabled the synthesis of the stable hydrazono derivatives **20a**–**20g** as yellow, crystalline compounds with yields from 60 to 80%. The reactions must be done at maximal 0°C, otherwise the mixture becomes red indicating the formation of formazanes. The hydrazone **20h** was prepared from **20f** by refluxing in a solution of *Me*ONa in *Me*OH with 79% yield. It was not accessible by diazotizing of **2c**.

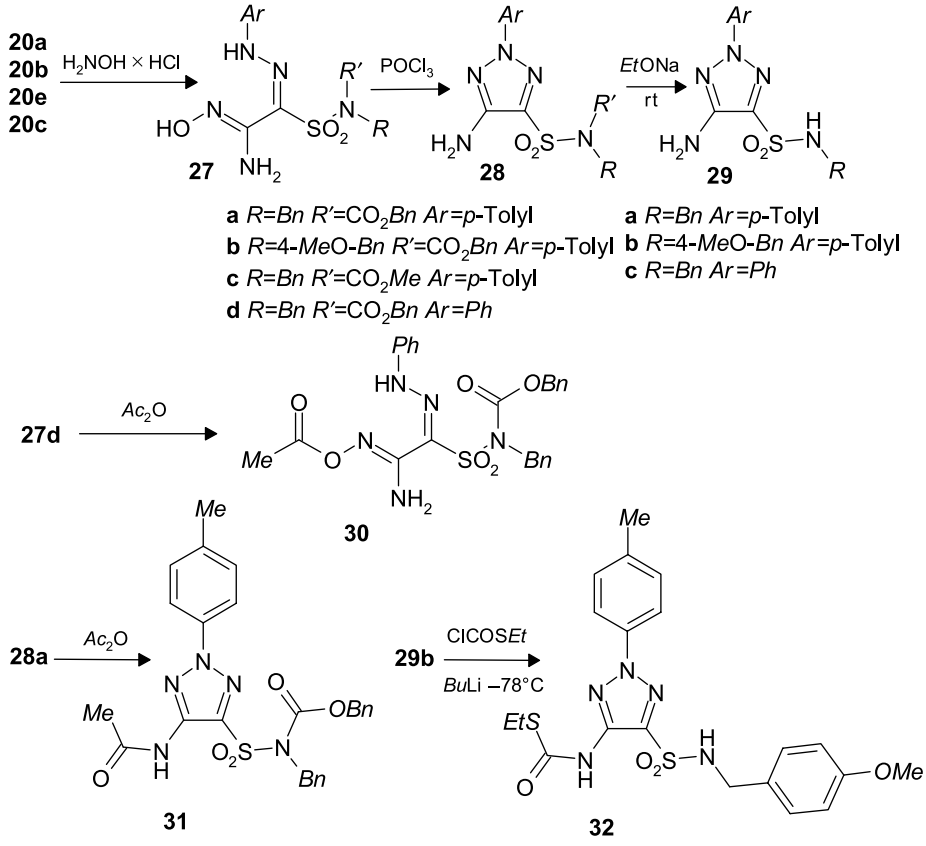
It should be mentioned that a C≡N band was not detected in the IR spectra of the hydroxyimino compounds **18a**–**18c**, whereas in the IR spectra of the hydrazono compounds **20a**–**20h** the C≡N band at 2210 cm^{-1} was the strongest band of the spectra.

Nevertheless, the hydroxyimino compounds **18a**–**18c** and the hydrazono compounds **20a**–**20h** allowed a number of interesting transformations. It is long known that 1,2-dioximes can be dehydrated forming 1,2,5-oxadiazols (furazans) [20, 21], but there are not many examples described. Therefore, we transformed **18a** with $H_2NOH \times HCl$ in the presence of $NaHCO_3$ in H_2O by refluxing for 6 h into the hydroxyamidine derivative **21** which by refluxing with *Et*ONa in *Et*OH or by reaction with $POCl_3$ gave the 4-amino-1,2,5-oxadiazol sulfonamide **22**. When the hydroxyamidine **21** was refluxed with $HC(OEt)_3$, and when the crude intermediate **24** was crystallized from $CHCl_3$ the *N*-formyl derivative **23** was isolated as a crystalline compound, yield 80%. Refluxing of **21** in Ac_2O ended up with the isolation of the acetylated **25**, and finally, the reaction with methyl chloroformate in *THF* gave the N-acylated sulfonamide derivative **26** (Scheme 6).

Formal replacement of the O-atom in 1,2,5-oxadiazols by an N-atom results in 1,2,3-triazols. This structure is well known, and one of the first examples was prepared by *Dimroth* by a reaction between a CH acid with phenyl azide [22]. Another possibility was realized by condensation between a hydrazone and an oxime [23]. As we had successfully used this method for the synthesis of 1,2,5-oxadiazols we transferred it to the hydrazono derivatives **20a**, **20b**, **20e**, and **20c**. When they were reacted with $H_2NOH \times HCl$ in the presence of $NaHCO_3$, we obtained the hydroxyimino hydrazono derivatives **27a**–**27d** with yields up to 90% as crystalline compounds. During this reaction the yellow color of the starting materials disappeared. Treatment of **27** with $POCl_3$ transformed them into the



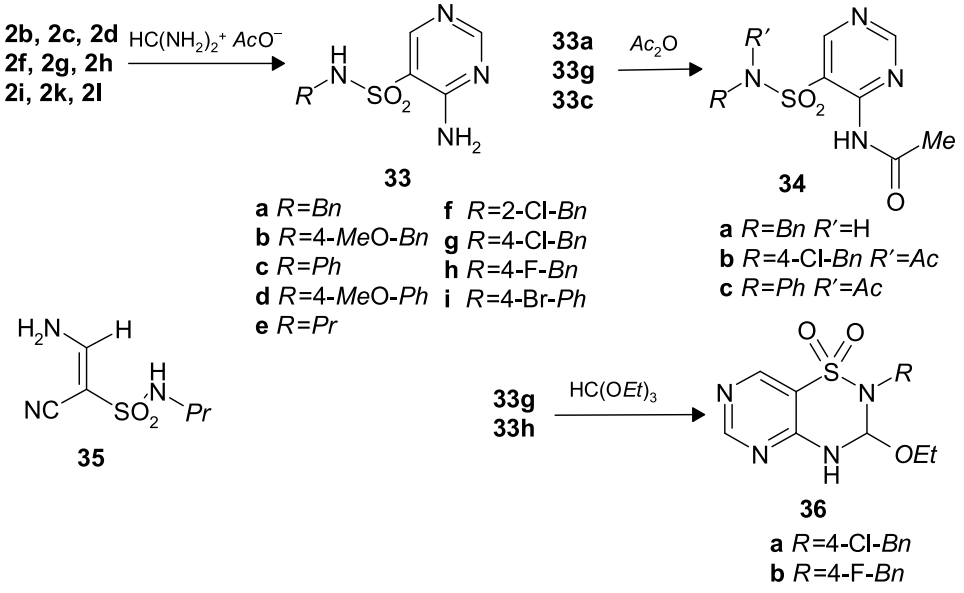
Scheme 6



Scheme 7

1,2,3-triazol-4-sulfonamides **28a**–**28d** isolated as crystalline compounds with high yields (Scheme 7). These derivatives were treated with *Et*ONa at room temperature, whereby the deacylated derivatives **29a**–**29c** were obtained. Acylation of the amino group was possible by reaction with Ac_2O as demonstrated by the transformation of **28a** into **31**, or by reaction with ClCOS*Et* as shown by the reaction of **29b** to **32**. Compound **27d** was acetylated to the derivative **30**, but it was not possible to transform this into a triazolo derivative. Furthermore, we have to add that the sulfonylurea derivatives **20f** and **20g** could not be transformed into the hydroxyimino compounds and thereby not transferred into aminotriazolsulfonylurea derivatives. Both decomposed completely during the reaction with $H_2NOH \times HCl$.

The only sparingly soluble 4-aminopyrimidine-5-sulfonamides **33a**–**33i** were obtained from the reaction between the parent aminomethylidene compounds **6** and formamidinium acetate, or with higher yields (~80%) without isolation of the aminomethylidene compounds by refluxing for 6 h of the cyanomethanesulfonamides **2b**–**2l** and an excess of formamidinium acetate in *n-Bu*OH (Scheme 8). The *N*-acetyl derivatives **34a**–**34c** were prepared by refluxing of the parent compounds **33** in *Ac*OH/Ac_2O. Finally, compounds **33g** and **33h** were transformed into the pyrimidinothiadiazine derivatives **36a** and **36b** by refluxing with triethyl orthoformate and catalytic amounts of *Ac*OH [24] for 6 h. Compound **35** was



Scheme 8

obtained as a by-product (5%) in the synthesis of **33e** from **2g** and formamidinium acetate.

Experimental Part

Melting points: *Linström* apparatus; IR spectra (KBr): Perkin-Elmer IR 1310, Beckman IR 4240; ^{1}H and ^{13}C NMR spectra: Varian T 60 (^{1}H, 60 MHz), Bruker WP 80/90 (^{1}H, 80/90 MHz), WM 300, AM 400 (300/400 MHz for ^{1}H, 100.614 MHz for ^{13}C), room temperature, internal *TMS*, values from 80 MHz spectra in $CDCl_3$, if not noted otherwise; MS spectra: Finnigan GC MS 4000, MAT 312, MAT 44S; elemental analyses: Institute of Pharmacy or Chemisches Laboratorium, University of Freiburg (Germany) or Greifswald (Germany): All compounds[†] gave satisfactory elemental analyses; results agreed with the calculated values within experimental error. Tetrahydrofuran (*THF*) was stored over $CaCl_2$ or KOH, then refluxed with Na and benzophenone, and distilled prior to use. Other solvents were dried/purified according to literature procedures [25]. Thin-layer chromatography (tlc): Precoated silica-gel $60F_{254}$ plates (Merck 5549 or 5715). Column chromatography (CC): Silica gel 60 (Merck 7734).

Cyanomethanesulfonyl chloride (**1**)
See Ref. [1].

Cyanomethanesulfonamide (**2a**, $C_2H_4N_2O_2S$) [7]
A satd solution of NH_3 in $CHCl_3$ was slowly added at 0°C to a solution of **1** (4.2 g, 30 mmol) in 100 cm^3 *Ac*O*Et*. After stirring for 2 h at room temperature, the solvent was evaporated *in vacuo*, the residue was dissolved in *Ac*O*Et*, and the solution was washed with a satd NH_4Cl solution, dried (Na_2SO_4), and evaporated. Crystallization was induced by a few drops of $CHCl_3$, and storing at 0°C for several hours. Yield 0.9 g (25%); colorless crystals; mp 97–98°C (*Ac*O*Et*/$CHCl_3$); IR: $\bar{\nu} = 3300$,

[†] For simplicity, compounds were named as cyano sulfonamides, ignoring potentially higher-ranking substituents

3220 (NH_2), 2980, 2920 (CH_2), 2260 (CN), 1360, 1140 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.41$ (s, CH_2), 6.7–7.1 (s, NH_2) ppm.

General Procedure for the Synthesis of ***2***
At 0°C, a solution of **1** in 100 cm^3 (for 100 mmol) or 20–30 cm^3 (for 10 mmol) Et_2O was slowly added to a solution of the amine (freshly distilled!) in 100–500 (50–60) cm^3 Et_2O. The mixture was stirred for 2 h at room temperature, the precipitate was separated, and the filtrate was concentrated *in vacuo* to the half (only for 100 mmol reactions), washed with H_2O, dried (Na_2SO_4), and evaporated. The residue was crystallized as noted.

N-Phenylcyanomethanesulfonamide (**2b**)
See Ref. [6].

N-Benzylcyanomethanesulfonamide (**2c**, $C_9H_{10}N_2O_2S$)
From **1** (14 g, 100 mmol) and 21.4 g benzylamine (200 mmol). Yield 12.6 g (60%); mp 49–50°C ($CHCl_3/CCl_4$); IR: $\bar{\nu} = 3290$ (NH), 3090 (CH), 2980, 2930 (CH_2), 2265 (CN), 1340, 1150 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.73$ (s, CH_2), 4.33 (s, CH_2), 5.5–6.0 (s, NH), 7.4 (s, 5 *ar* H) ppm.

N-(4-Methoxybenzyl)cyanomethanesulfonamide (**2d**, $C_{10}H_{12}N_2O_3S$)
From **1** (1.4 g, 10 mmol) and 2.7 g 4-methoxybenzylamine (20 mmol). Yield 1.2 g (50%); mp 70°C ($CHCl_3/CCl_4$); IR: $\bar{\nu} = 3300$ (NH), 3010 (CH), 2990, 2930 (CH_2), 2270 (CN), 1335, 1145 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.75$ (s, CH_2), 3.81 (s, O*Me*), 4.4 (d, $J = 6$ Hz, CH_2), 5.5 (t, $J = 6$ Hz, NH), 6.8–7.4 (m, 4 *ar* H) ppm.

Cyanomethanesulfopiperidide (**2e**, $C_7H_{12}N_2O_2S$)
From **1** (1.4 g, 10 mmol) and 1.7 g piperidine (20 mmol). Yield 1.0 g (60%); mp 134°C ($CHCl_3/CCl_4$); IR: $\bar{\nu} = 2980$, 2930 (CH_2), 2860 (CH), 2260 (CN), 1340, 1160 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 1.5$–1.7, 3.3–3.5 (2m, 10 *al* H), 4.11 (s, CH_2) ppm.

N-(4-Methoxyphenyl)cyanomethanesulfonamide (**2f**, $C_9H_{10}N_2O_3S$)
From **1** (1.4 g, 10 mmol) and 2.5 g 4-methoxyaniline (20 mmol). Yield 0.45 g (20%); mp 145°C ($CHCl_3/CCl_4$); IR: $\bar{\nu} = 3200$ (NH), 2980, 2930 (CH_2), 2830 (CH), 2260 (CN), 1350, 1160 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.85$ (s, *Me*), 4.05 (s, CH_2), 7.0–7.5 (m, 4 *ar* H), 8.6–8.8 (s, NH) ppm.

N-Propylcyanomethanesulfonamide (**2g**, $C_5H_{10}N_2O_2S$)
From **1** (1.4 g, 10 mmol) and 1.2 g *n*-propylamine (20 mmol). Purification by Kugelrohr distillation (180°C/0.1 Torr). Yield 0.7 g (45%); mp 40–45°C; IR: $\bar{\nu} = 3280$ (NH), 2980, 2920 (CH_2), 2880 (CH), 2250 (CN), 1325, 1140 (SO_2) cm^{-1}; ^1H NMR: $\delta = 1.0$ (t, $J = 8$ Hz, *Me*), 1.4–1.8 (m, CH_2), 3.0–3.4 (q, $J = 7$ Hz, CH_2), 4.42 (s, CH_2), 6.6–7.0 (t, NH) ppm.

N-(2-Chlorobenzyl)cyanomethanesulfonamide (**2h**, $C_9H_9ClN_2O_2S$)
From **1** (7 g, 50 mmol) and 14.2 g 2-chlorobenzylamine (100 mmol). Yield 2.8 g (23%); colorless crystals; mp 67°C; IR: $\bar{\nu} = 3314$ (NH), 3061 (CH), 2990, 2940 (CH_2), 2258 (CN), 1336, 1141 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.8$ (s, CH_2), 4.5 (d, $J = 6.6$ Hz, CH_2), 5.7 (t, $J = 6.6$, NH), 7.2–7.5 (m, 4 *ar* H) ppm.

N-(4-Chlorobenzyl)cyanomethanesulfonamide (**2i**, $C_9H_9ClN_2O_2S$)
From **1** (7 g, 50 mmol) and 14.2 g 4-chlorobenzylamine (100 mmol). Yield 4.3 g (35%); colorless crystals; mp 90°C; IR: $\bar{\nu} = 3259$ (NH), 2977, 2924 (CH_2), 2264 (CN), 1343, 1144 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.9$ (s, CH_2), 4.4 (d, $J = 6.6$ Hz, CH_2), 5.7 (t, $J = 6.6$ Hz, NH), 7.2–7.5 (m, 4 *ar* H) ppm.

N-(4-Fluorobenzyl)cyanomethanesulfonamide (**2k**, $C_9H_9FN_2O_2S$)
From **1** (7 g, 50 mmol) and 17.5 g 4-fluorobenzylamine (100 mmol). Yield 3.0 g (26%); colorless crystals; mp 99°C; IR: $\bar{\nu} = 3290$ (NH), 2988, 2934 (CH_2), 2263 (CN), 1334, 1160 (SO_2) cm^{-1}; ^1H NMR (60 MHz): $\delta = 3.8$ (s, CH_2), 4.3 (d, $J = 6.6$ Hz, CH_2), 5.7 (t, $J = 6.6$ Hz, NH), 6.9–7.5 (m, 4 *ar* H) ppm.

N-(4-Bromophenyl)cyanomethanesulfonamide (**2l**, $C_8H_7BrN_2O_2S$)
From **1** (7 g, 50 mmol) and 17.2 g 4-bromoaniline (100 mmol). Yield 8.5 g (31%); colorless crystals; mp 107°C ($CHCl_3$); IR: $\bar{\nu} = 3300$ (NH), 3100 (CH), 2980, 2940 (CH_2), 2280 (CN), 1340, 1150 (SO_2) cm^{-1}; ^1H NMR: $\delta = 4.9$ (s, CH_2), 7.1–7.6 (m, 4 *ar* H), 10.8 (s, NH) ppm.

N-(3,4-Dimethoxyphenyl)cyanomethanesulfonamide (**2m**, $C_{10}H_{12}N_2O_4S$)
From **1** (3.5 g, 25 mmol) and 7.6 g 3,4-dimethoxyaniline (50 mmol). Yield 1.3 g (10%); mp 120°C ($CHCl_3$); IR: $\bar{\nu} = 3243$ (NH), 2955, 2914 (CH_2), 2258 (CN), 1349, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 3.73$, 3.75 (2s, 2 *Me*), 4.8 (s, CH_2), 6.7–7.0 (m, 3 *ar* H), 10.4 (s, NH) ppm.

Cyanomethanesulfomorpholide (**2n**)
See Ref. [6].

General Procedure for the Synthesis of ***3***
At −78°C, *Bu*Li (6.5 cm^3, 10 mmol) was added to a solution of the cyanomethane-sulfonamide **2** (10 mmol) in 50 cm^3 *THF*. After 10 min, a solution of the acyl chloride (10 mmol) in 10 cm^3 *THF* was added, and the mixture was stirred for 1 h at −78°C. After warming to room temperature, the mixture was hydrolyzed with a satd NaCl solution (100 cm^3), the organic layer was separated, dried ($MgSO_4$), evaporated *in vacuo*, and the residue was crystallized from *Me*OH.

N-Methoxycarbonyl-N-phenylcyanomethanesulfonamide (**3a**, $C_{10}H_{10}N_2O_4S$)
From **2b** (1.9 g, 10 mmol) and 0.95 g methyl chloroformate. Yield 1.8 g (70%); mp 118°C; IR: $\bar{\nu} = 3070$ (CH), 2980, 2920 (CH_2), 2260 (CN), 1730 (CO), 1370, 1180 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.77$ (s, *Me*), 4.68 (s, CH_2), 7.4 (s, 5 *ar* H) ppm.

N-Benzyl-N-(methoxycarbonyl)cyanomethanesulfonamide (**3b**, $C_{11}H_{12}N_2O_4S$)
From **2c** (2.1 g, 10 mmol) and 0.95 g methyl chloroformate. Yield 2.2 g (75%); mp 122–123°C; IR: $\bar{\nu} = 3070$, 3020 (CH), 2980, 2920 (CH_2), 2260 (CN), 1730 (CO), 1370, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 3.83$ (s, *Me*), 4.97, 5.00 (2s, 2 CH_2), 7.2–7.5 (s, 5 *ar* H) ppm.

N-Benzyl-N-(phenoxycarbonyl)cyanomethanesulfonamide (**3c**, $C_{16}H_{14}N_2O_4S$)
From **2c** (2.1 g, 10 mmol) and 1.56 g phenyl chloroformate. Yield 2.7 g (75%); mp 105°C; IR: $\bar{\nu} = 3030$ (CH), 2980, 2920 (CH_2), 2270 (CN), 1730 (CO), 1380, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 5.18$ (m, 2 CH_2) 7.1–7.6 (m, 10 *ar* H) ppm.

N-Benzyl-N-(benzyloxycarbonyl)cyanomethanesulfonamide (**3d**, $C_{17}H_{16}N_2O_4S$)
From **2c** (2.1 g, 10 mmol) and 1.8 g benzyl chloroformate. Yield 2.7 g (80%); mp 91°C; IR: $\bar{\nu} = 3030$ (CH), 2980, 2920 (CH_2), 1740 (CO), 1360, 1160 (SO_2) cm^{-1}; ^1H NMR: $\delta = 4.39$, 4.89, 5.25 (3s, 3 CH_2), 7.5 (s, 10 *ar* H) ppm.

N-(Benzyloxycarbonyl)-N-(4-methoxybenzyl)cyanomethanesulfonamide (**3e**, $C_{18}H_{18}N_2O_5S$)
From **2d** (2.4 g, 10 mmol) and 1.8 g benzyl chloroformate. Yield 3.0 g (80%); mp 103–104°C; IR: $\bar{\nu} = 2980$, 2920 (CH_2), 2250 (CN), 1720 (CO), 1380, 1150 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.76$ (s, *Me*), 4.35, 4.92, 5.26 (3s, 3 CH_2), 6.7–7.4 (m, 9 *ar* H) ppm.

N-Benzyl-N-(S-ethylthiocarbonyl)cyanomethanesulfonamide (**3f**, $C_{12}H_{14}H_2O_3S_2$)
From **2c** (2.1 g, 10 mmol) and 1.25 g ethyl chlorothioformate. Yield 2.1 g (70%); mp 103–104°C; IR: $\bar{\nu} = 3020$ (CH), 2980, 2920 (CH_2), 2260 (CN), 1675 (COS*Et*), 1360, 1180 (SO_2) cm^{-1}; ^1H NMR: $\delta = 1.3$ (t, $J = 7.5$ Hz, *Me*), 2.8–3.1 (q, $J = 7.5$ Hz, CH_2), 4.52, 5.08 (2s, 2 CH_2), 7.3 (s, 5 *ar* H) ppm.

N-Acetyl-N-benzylcyanomethanesulfonamide (**3g**, $C_{11}H_{12}N_2O_3S$)
From **2c** (2.1 g, 10 mmol) and 0.79 g acetyl chloride. Purification by CC (*Ac*O*Et*). Yield 0.5 g (20%); IR (Film): $\bar{\nu} = 2980$, 2920 (CH_2), 2260 (CN), 1710 (CO), 1370, 1170 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.34$ (s, *Me*), 4.40, 5.11 (2s, 2 CH_2), 7.3 (s, 5 *ar* H) ppm.

N-(Benzyloxycarbonyl)-N-(4-chlorobenzyl)cyanomethanesulfonamide (**3h**, $C_{17}H_{15}ClN_2O_4S$)
From **2i** (2.4 g, 10 mmol) and 1.8 g benzyl chloroformate. Yield 2.7 g (72%); colorless crystals; mp 90°C; IR: $\bar{\nu} = 3030$ (CH), 2980, 2920 (CH_2), 2260 (CN), 1740 (CO), 1360, 1160 (SO_2) cm^{-1}; ^1H NMR: $\delta = 4.50$, 4.95, 5.3 (3s, 3 CH_2), 7.2–7.5 (m, 9 *ar* H) ppm.

N-(Benzyloxycarbonyl)-N-(2-chlorobenzyl)cyanomethanesulfonamide (**3i**, $C_{17}H_{15}ClN_2O_4S$)
From **2h** (2.4 g, 10 mmol) and 1.8 g benzyl chloroformate. Yield 2.5 g (66%); mp 78°C; IR: $\bar{\nu} = 3040$ (CH), 2985, 2920 (CH_2), 2260 (CN), 1750 (CO), 1370, 1150 (SO_2) cm^{-1}; ^1H NMR (90 MHz): $\delta = 4.50$, 5.10, 5.25 (3s, 3 CH_2), 7.1–7.45 (m, 9 *ar* H) ppm.

N-(Benzyloxycarbonyl)-N-(4-fluorobenzyl)cyanomethanesulfonamide (**3k**, $C_{17}H_{15}FN_2O_4S$)
From **2k** (2.3 g, 10 mmol) and 1.8 g benzyl chloroformate. Yield 2.2 g (61%); colorless crystals; mp 100°C; IR: $\bar{\nu} = 3060$ (CH), 2985, 2910 (CH_2), 2260 (CN), 1760 (CO), 1370, 1150 (SO_2) cm^{-1}; ^1H NMR (90 MHz): $\delta = 4.40$, 4.90, 5.30 (3s, 3 CH_2), 6.9–7.5 (m, 9 *ar* H) ppm.

N-(4-Chlorobenzyl)-N-(methoxycarbonyl)cyanomethanesulfonamide (**3l**, $C_{11}H_{11}ClN_2O_4S$)
From **2i** (2.4 g, 10 mmol) and 0.95 g methyl chloroformate. Yield 3.0 g (99%); colorless crystals; mp 145°C; IR: $\bar{\nu} = 2980$, 2920 (CH_2), 2260 (CN), 1740 (CO), 1370, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 3.90$ (s, *Me*), 4.90, 5.10 (2s, 2 CH_2), 7.4 (s, 4 *ar* H) ppm.

N-(2-Chlorobenzyl)-N-(methoxycarbonyl)cyanomethanesulfonamide (**3m**, $C_{11}H_{11}ClN_2O_4S$)
From **2h** (2.4 g, 10 mmol) and 0.95 g methyl chloroformate. Yield 0.6 g (20%); colorless crystals; mp 98°C; IR: $\bar{\nu} = 2980$, 2940 (CH_2), 2270 (CN), 1750 (CO), 1370, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 3.90$ (s, *Me*), 5.2 (m, 2 CH_2), 7.35 (s, 4 *ar* H) ppm.

N-(4-Fluorobenzyl)-N-(methoxycarbonyl)cyanomethanesulfonamide (**3n**, $C_{11}H_{11}FN_2O_4S$)
From **2k** (2.3 g, 10 mmol) and 0.95 g methyl chloroformate. Yield 1.6 g (60%); colorless crystals; mp 135°C; IR: $\bar{\nu} = 2980$, 2920 (CH_2), 2265 (CN), 1740 (CO), 1370, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 3.90$ (s, *Me*), 5.0 (m, 2 CH_2), 7.0–7.55 (m, 4 *ar* H) ppm.

N-(4-Bromophenyl)-N-(methoxycarbonyl)cyanomethanesulfonamide (**3o**, $C_{10}H_9BrN_2O_4S$)
From **2l** (2.8 g, 10 mmol) and 0.95 g methyl chloroformate. Yield 1.85 g (67%); colorless crystals; mp 145°C (*Me*OH); IR: $\bar{\nu} = 3000$ (CH_2), 2940 (*Me*), 2270 (CN), 1720 (CO), 1370, 1160 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.75$ (s, *Me*), 4.6 (s, CH_2), 7.2–7.7 (m, 4 *ar* H) ppm.

N-(Benzyloxycarbonyl)-N-(4-bromophenyl)cyanomethanesulfonamide (**3p**, $C_{16}H_{13}BrN_2O_4S$)
From **2l** (2.8 g, 10 mmol) and 1.8 g benzyl chloroformate. Yield 2.0 g (49%); colorless crystals; mp 159°C (*Me*OH); IR: $\bar{\nu} = 3093$ (CH), 2925, 2993 (CH_2), 2265 (CN), 1741 (CO), 1373, 1173 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 5.25$, 5.30 (2s, 2 CH_2), 7.5 (m, 9 *ar* H) ppm.

N-Carbamoyl-N-phenylcyanomethanesulfonamide (**4a**, $C_9H_9N_3O_3S$)
From **2b** (1.9 g, 10 mmol) and 1.45 g chlorosulfonyl isocyanate. After stirring for 0.5 h at −78°C the mixture was hydrolyzed with 2.5 cm^3 HCl (36%), washed with a satd NaCl solution, the organic layer was separated, dried ($MgSO_4$), and evaporated *in vacuo*. Yield 1.9 g (80%); mp 140–141°C ($CHCl_3$/CCl_4); IR: $\bar{\nu} = 3440$, 3350 (NH_2), 3180 (CH), 2980, 2930 (CH_2), 2270 (CN), 1730 (CO), 1350, 1170 (SO_2) cm^{-1}; ^1H NMR: $\delta = 5.17$ (s, CH_2), 6.1–6.3 (s, NH_2), 7.5 (s, 5 *ar* H) ppm.

N-Benzyl-N-(phenylcarbamoyl)cyanomethanesulfonamide (**4b**, $C_{16}H_{15}N_3O_3S$)
From **2c** (2.1 g, 10 mmol) and 1.2 g phenyl isocyanate as described for **4a**. Yield 2.6 g (78%); mp 147°C ($CHCl_3$/CCl_4); IR: $\bar{\nu} = 3360$ (NH), 3060 (CH), 2980, 2910 (CH_2), 2270 (CN), 1720 (CO), 1360, 1150 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.91$, 5.11 (2s, 2 CH_2), 7.0–7.5 (m, 10 *ar* H), 8.4 (s, NH) ppm.

General Procedure for the Synthesis of ***5***
The trialkyl orthoformate (10 mmol) and the cyanomethanesulfonamide **2** or **3** (10 mmol) in 10 cm^3 Ac_2O were refluxed for 2 h, cooled to room temperature, and evaporated *in vacuo*. The residue was dissolved in $CHCl_3$, and washed with a $NaHCO_3$ solution. The organic layer was separated, dried (Na_2SO_4), and evaporated *in vacuo*. The residue was purified as noted.

(E)-N-Acetyl-1-cyano-2-methoxy-N-phenylethene-1-sulfonamide (**5a**, $C_{12}H_{12}N_2O_3S$)
From **2b** (2.0 g, 10 mmol) and 1.1 g HC(O*Me*)$_3$. Yield 1.95 g (70%); colorless crystals; mp 122°C (*Me*OH); IR: $\bar{\nu} = 3050$, 2980 (CH), 2210 (CN), 1690 (CO), 1610 (C=C), 1360, 1170 (SO_2) cm^{-1}; ^1H NMR: $\delta = 1.90$ (s, *Me*), 4.16 (s, O*Me*), 7.4 (s, 5 *ar* H), 8.14 (s, 2-H) ppm.

(E)-N-Benzyl-1-cyano-2-ethoxy-N-(methoxycarbonyl)ethane-1-sulfonamide (**5b**, $C_{14}H_{16}N_2O_5S$)
From **3b** (2.7 g, 10 mmol) and 1.5 g HC(O*Me*)$_3$. Yield *ca.* 90%; viscous liquid; IR (Film): $\bar{\nu} = 3060$, 2990, 2980 (CH), 2210 (CN), 1720 (CO), 1610 (C=C), 1370, 1180 (SO_2) cm^{-1}; the product was immediately used for the synthesis of **8a**.

(E)-N-Benzyl-N-(benzyloxycarbonyl)-1-cyano-2-ethoxyethene-1-sulfonamide (**5c**, $C_{20}H_{20}N_2O_5S$)
From **3d** (3.4 g, 10 mmol) and 1.5 g HC(O*Et*)$_3$. Yield *ca.* 90%; viscous liquid; IR (Film): $\bar{\nu} = 3060$, 2990, 2960 (CH), 2210 (CN), 1720 (CO), 1610 (C=C), 1370, 1170 (SO_2) cm^{-1}; ^1H NMR: $\delta = 1.4$ (t, $J = 7$ Hz, *Me*), 4.0 (q, $J = 7$ Hz, CH_2), 5.03, 5.24 (2s, 2 CH_2), 7.3 (m, 10 *ar* H), 7.78 (s, 2-H) ppm; the product was immediately used for the synthesis of **8b**.

(E)-N-Benzyl-N-(benzyloxycarbonyl)-1-cyano-2-methoxyethene-1-sulfonamide (**5d**, $C_{19}H_{18}N_2O_5S$)
From **3d** (2.0 g, 6 mmol) and 1.0 g HC(O*Me*)$_3$. Yield 0.4 g (17%); colorless crystals; mp 84–85°C (*Me*OH); IR: $\bar{\nu} = 3060$ (CH), 2210 (CN), 1720 (CO), 1610 (C=C), 1370, 1170 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.80$ (s, *Me*), 5.00 (s, NCH_2), 5.20 (s, OCH_2), 7.2–7.5 (m, 10 *ar* H), 7.60 (s, 2-H) ppm.

(E)-N-Benzyl-N-(benzyloxycarbonyl)-1-cyano-2-isopropoxyethene-1-sulfonamide
(**5e**, $C_{21}H_{22}N_2O_5S$)
From **5d** (2.4 g, 6 mmol) by crystallization from *i-Pr*OH. 0.5 g (20%); colorless crystals; mp 75°C; IR: $\bar{\nu} = 3060$, 2990 (CH), 2210 (CN), 1720 (CO), 1610 (C=C), 1370, 1170 (SO_2) cm^{-1}; ^1H NMR (60 MHz): $\delta = 1.25$ (d, $J = 4.4$ Hz, *Me*), 1.40 (d, $J = 4.4$ Hz, *Me*), 4.2 (q, CH), 5.0 (s, NCH_2), 5.20 (s, OCH_2), 7.40 (s, 10 *ar* H), 7.90 (s, 2-H) ppm.

(E)-N-(Benzyloxycarbonyl)-N-(4-chlorobenzyl)-1-cyano-2-ethoxyethene-1-sulfonamide
(**5f**, $C_{20}H_{19}ClN_2O_5S$)
From **3h** (3.8 g, 10 mmol) and 1.5 g HC(O*Et*)$_3$. Yield *ca.* 90%; viscous liquid; IR (Film): $\bar{\nu} = 3060$, 2990, 2960 (CH), 2210 (CN), 1720 (CO), 1610 (C=C), 1370, 1170 (SO_2) cm^{-1}; ^1H NMR: $\delta = 1.3$

(t, $J = 7$ Hz, *Me*), 4.1 (q, $J = 15.4$ Hz, CH_2), 4.96 (s, NCH_2), 5.20 (s, OCH_2), 7.2–7.5 (m, 9 *ar* H), 7.8 (s, 2-H) ppm; the product was immediately used for the synthesis of **8d**.

(E)-N-(Benzyloxycarbonyl)-1-cyano-N-(4-fluorobenzyl)-2-ethoxyethene-1-sulfonamide
(**5g**, $C_{20}H_{19}FN_2O_5S$)
From **3k** (3.6 g, 10 mmol) and 1.5 g $HC(OEt)_3$. Yield *ca.* 90%; ^{1}H NMR: $\delta = 1.3$ (t, $J = 7$ Hz, *Me*), 4.0 (q, $J = 15.4$ Hz, CH_2), 4.95 (s, NCH_2), 5.20 (s, OCH_2), 6.8–7.5 (m, 9 *ar* H), 7.8 (s, 2-H) ppm; the product was immediately used for the synthesis of **8c**.

(E)-N-(Benzyloxycarbonyl)-N-(2-chlorobenzyl)-1-cyano-2-ethoxyethene-1-sulfonamide
(**5h**, $C_{20}H_{19}ClN_2O_5S$)
From **3i** (3.8 g, 10 mmol) and 1.5 g $HC(OEt)_3$. Yield 3.3 g (74%); colorless crystals; mp 100°C (*Et*OH); IR: $\bar{\nu} = 3060$, 2990, 2960 (CH), 2210 (CN), 1720 (CO), 1610 (C=C), 1370, 1170 (SO_2) cm^{-1}; ^{1}H NMR: $\delta = 1.3$ (t, $J = 7$ Hz, *Me*), 4.1 (q, $J = 15.4$ Hz, CH_2), 5.15, 5.25 (2s, NCH_2, OCH_2), 7.1–7.5 (m, 9 *ar* H), 7.9 (s, 2-H) ppm; ^{13}C-NMR: $\delta = 15.11$ (*Me*), 49.12 (NCH_2), 69.62 (OCH_2), 75.09 (OCH_2), 94.6 (C-1), 109.74 (CN), 151.79 (CO), 174.99 (C-2) ppm.

N-(4-Chlorobenzyl)-1-cyano-2-methoxy-N-(methoxycarbonyl)ethene-1-sulfonamide
(**5i**, $C_{13}H_{13}ClN_2O_5S$)
From **3l** (3.0 g, 10 mmol) and 1.1 g $HC(OMe)_3$. Yield *ca.* 90%; yellow viscous liquid; IR (Film): $\bar{\nu} = 3040$, 2960 (CH), 2220 (CN), 1750 (CO), 1610 (C=C), 1360, 1170 (SO_2) cm^{-1}.

N-(2-Chlorobenzyl)-1-cyano-2-methoxy-N-(methoxycarbonyl)ethene-1-sulfonamide
(**5k**, $C_{13}H_{13}ClN_2O_5S$)
From **3m** (3.0 g, 10 mmol) and 1.1 g $HC(OMe)_3$. Yield *ca.* 50%; yellow viscous liquid; IR (Film): $\bar{\nu} = 3060$, 2960 (CH), 2220 (CN), 1740 (CO), 1620 (C=C), 1380, 1180 (SO_2) cm^{-1}.

(E)-1-Cyano-N-(4-fluorobenzyl)-2-methoxy-N-(methoxycarbonyl)ethene-1-sulfonamide
(**5l**, $C_{13}H_{13}FN_2O_5S$)
From **3n** (2.8 g, 10 mmol) and 1.1 g $HC(OMe)_3$. Yield *ca.* 80%; yellow viscous liquid; IR (Film): $\bar{\nu} = 3040$, 2960 (CH), 2210 (CN), 1750 (CO), 1610 (C=C), 1360, 1170 (SO_2) cm^{-1}.

(E)-N-(Benzyloxycarbonyl)-N-(4-bromophenyl)-1-cyano-2-ethoxyethene-1-sulfonamide
(**5m**, $C_{19}H_{17}BrN_2O_5S$)
From **3p** (2.1 g, 5 mmol) and 0.75 g $HC(OEt)_3$. Yield 1.2 g (52%); mp 147°C (*Et*OH); IR: $\bar{\nu} = 3089$, 3061, 2978 (CH), 2234 (CN), 1737 (CO), 1625 (C=C), 1377, 1177 (SO_2) cm^{-1}; ^{1}H NMR: $\delta = 1.4$ (t, $J = 7.7$ Hz, *Me*), 4.25 (q, $J = 15.4$ Hz, CH_2), 5.2 (s, CH_2), 7.25 (m, 9 *ar* H), 8.0 (s, 2-H) ppm.

(E)-N-(Benzyloxycarbonyl)-N-(2-chlorobenzyl)-1-cyano-2-methoxyethene-1-sulfonamide
(**5n**, $C_{19}H_{17}ClN_2O_5S$)
From 4.3 g **5f** by crystallization from *Me*OH. Yield 2.4 g (57%); mp 145°C (*Me*OH); IR: $\bar{\nu} = 3047$, 2958 (CH), 2228 (CN), 1745 (CO), 1617 (C=C), 1363, 1177 (SO_2) cm^{-1}; ^{1}H NMR: $\delta = 3.9$ (s, O*Me*), 5.15, 5.25 (2s, NCH_2, OCH_2), 7.1–7.5 (m, 9 *ar* H), 7.75 (s, 2-H) ppm.

(E)-N-(2-Chlorobenzyl)-1-cyano-2-ethoxy-N-(methoxycarbonyl)ethene-1-sulfonamide
(**5o**, $C_{14}H_{15}ClN_2O_5S$)
From 3.4 g **5k** by crystallization from *Et*OH. Yield 2.0 g (56%); mp 105°C; IR: $\bar{\nu} = 2980$, 2950 (CH), 2220 (CN), 1740 (CO), 1600 (C=C), 1360, 1170 (SO_2) cm^{-1}; ^{1}H NMR (90 MHz): $\delta = 1.5$ (t, $J = 7.55$ Hz, *Me*), 3.8 (s, O*Me*), 4.4 (q, $J = 7.55$ Hz, OCH_2), 5.1 (s, NCH_2), 7.2–7.5 (m, 4 *ar* H), 8.0 (s, 2-H) ppm.

General Procedures for the Synthesis of ***6***

Method a. The cyanomethanesulfonamide **2** (10 mmol) and formamidinium acetate (1.0 g, 10 mmol) in 50 cm^3 *Bu*OH were refluxed for 4–6 h. After cooling to room temperature, the solution was evaporated *in vacuo*, and the residue was crystallized from $CHCl_3$.

Method b. The 2-alkoxy-1-cyanoethene-1-sulfonamide **5** (5 mmol) was stirred in 300 cm^3 abs. *Et*OH saturated with NH_3 at 0°C for 6–10 h. Then, the solvent was evaporated *in vacuo*, and the residue was crystallized from *Me*CN.

(E)-2-Amino-N-benzyl-1-cyanoethene-1-sulfonamide (**6a**, $C_{10}H_{11}N_3O_3S$)
From **2c** (2.1 g), method a. Yield 0.95 g (40%); mp 158–159°C; IR: $\bar{\nu} = 3440$, 3300 (NH_2), 3070, 3030 (CH), 2200 (CN), 1640 (C=C), 1310, 1160 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.2$ (d, $J = 6$ Hz, CH_2), 6.7 (br t, NH), 7.2–8.0 (m, 5 *ar* H, NH_2, 2-H) ppm.

(E)-2-Amino-1-cyano-N-(4-methoxybenzyl)ethene-1-sulfonamide (**6b**, $C_{11}H_{13}N_3O_3S$)
From **2d** (2.4 g) and 6.0 g formamidinium acetate (60 mmol), method a, 30 min, 100°C, purification by CC (*Ac*O*Et*). Yield 0.5 g (20%) (and 1.6 g **33b**); mp 151–153°C (*Ac*O*Et*); IR: $\bar{\nu} = 3425$, 3300, 3260 (NH), 3210, 3005, 2940, 2840 (CH), 2200 (CN), 1655 (C=C), 1310, 1170 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 3.84$ (s, O*Me*), 4.2 (d, $J = 6$ Hz, CH_2), 6.5–6.6 (t, $J = 6$ Hz, NH), 6.8–8.0 (m, 4 *ar* H, NH_2, 2-H) ppm.

(E)-2-Amino-N-phenyl-1-cyanoethene-1-sulfonamide (**6c**, $C_9H_9N_3O_2S$)
From **2b** (2.0 g), method a. Yield 0.9 g (40%); mp 156°C ($CHCl_3$); IR: $\bar{\nu} = 3430$, 3280, 3260 (NH_2), 3200, 3060 (CH), 2200 (CN), 1650 (C=C), 1320, 1170 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 7.0$–8.5 (m, 5 *ar* H, NH_2, 2-H), 9.8–10.2 (br s, NH) ppm.

(E)-2-Amino-N-(4-chlorobenzyl)-1-cyanoethene-1-sulfonamide (**6d**, $C_{10}H_{10}ClN_3O_2S$)
From **2i** (2.4 g), method a. Yield 0.9 g (33%); colorless crystals; mp 156°C; IR: $\bar{\nu} = 3439$, 3295 (NH_2), 2210 (CN), 1655 (C=C), 1310, 1165 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.2$ (d, $J = 6.6$ Hz, CH_2), 6.8 (t, NH), 7.3–7.95 (m, 4 *ar* H, NH_2, 2-H) ppm.

(E)-2-Amino-N-benzyl-N-(benzyloxycarbonyl)-1-cyanoethene-1-sulfonamide (**6e**, $C_{18}H_{17}N_3O_4S$)
From **5c** (2.0 g), method b. Yield 0.67 g (36%); colorless crystals; mp 155°C; IR: $\bar{\nu} = 3200$ (NH_2), 3070, 3030 (CH), 2210 (CN), 1740 (CO), 1620 (C=C), 1340, 1150 (SO_2) cm^{-1}; ^1H NMR ($CDCl_3$/*DMSO*-d_6, 400 MHz): $\delta = 4.20$ (d, $J = 6$ Hz, NCH_2), 5.20 (s, OCH_2), 7.1–7.4 (m, 10 *ar* H), 7.7 (t, $J = 6$ Hz, 2-H), 8.1 (d, $J = 7.5$ Hz, 1H, NH_2), 10.3 (s, 1H, NH_2) ppm.

(E)-2-Amino-N-(benzyloxycarbonyl)-N-(4-chlorobenzyl)-1-cyanoethene-1-sulfonamide
(**6f**, $C_{18}H_{16}ClN_3O_4S$)
From **5f** (2.2 g), method b. Yield 0.5 g (25%); mp 156°C; IR: $\bar{\nu} = 3200$ (NH_2), 3100, 3030 (CH), 2210 (CN), 1720 (CO), 1620 (C=C), 1340, 1150 (SO_2) cm^{-1}; ^1H NMR ($CDCl_3$/*DMSO*-d_6): $\delta = 4.2$ (d, $J = 5.5$ Hz, CH_2), 5.2 (s, CH_2), 7.1–7.5 (m, 9 *ar* H), 8.0 (s, 2-H), 9.8 (s, NH_2) ppm.

(E)-2-Amino-N-(benzyloxycarbonyl)-N-(4-fluorobenzyl)-1-cyanoethene-1-sulfonamide
(**6g**, $C_{18}H_{16}FN_3O_4S$)
From **5g** (2.1 g), method b. Yield 0.5 g (24%); mp 150°C; IR: $\bar{\nu} = 3200$ (NH_2), 3100, 3030 (CH), 2210 (CN), 1720 (CO), 1620 (C=C), 1340, 1150 (SO_2) cm^{-1}; ^1H NMR ($CDCl_3$/*DMSO*-d_6): $\delta = 4.2$ (d, $J = 5.9$ Hz, CH_2), 5.3 (s, CH_2), 7.0–7.5 (m, 9 *ar* H), 7.9 (s, 2-H), 8.7 (s, NH_2) ppm.

(E)-2-Amino-N-(2-chlorobenzyl)-1-cyanoethene-1-sulfonamide (**6h**, $C_{10}H_{10}ClN_3O_2S$)
From **2h** (2.4 g), method a. Yield 0.5 g (18%); mp 123°C; IR: $\bar{\nu} = 3440$, 3300 (NH_2), 3070, 3030 (CH), 2200 (CN), 1640 (C=C), 1310, 1160 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.3$ (d, $J = 6.6$ Hz, CH_2), 6.8 (t, $J = 6.6$ Hz, NH), 7.2–8.0 (m, 4 *ar* H, NH_2, 2-H) ppm.

(E)-2-Amino-N-(benzyloxycarbonyl)-N-(2-chlorobenzyl)-1-cyanoethene-1-sulfonamide (**6i**, $C_{18}H_{16}ClN_3O_4S$)
From **5h** (2.2 g), method b. Yield 0.5 g (24%); mp 152°C; IR: $\bar{\nu} = 3200$ (NH_2), 3100, 3030 (CH), 2210 (CN), 1720 (CO), 1620 (C=C), 1340, 1150 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 4.2$ (d, $J = 4.4$ Hz, CH_2), 5.3 (s, CH_2), 7.2–7.5 (m, 9 *ar* H), 8.0 (s, 2-H), 8.7 (t, $J = 4.4$ Hz, 1H, NH_2), 11.7 (s, 1H, NH_2) ppm.

(E)-2-Amino-N-(4-bromophenyl)-1-cyanoethene-1-sulfonamide (**6k**, $C_9H_8BrN_3O_2S$)
From **2l** (1.4 g, 5 mmol) in 50 cm^3 *Me*OH, method a. Yield 0.5 g (33%); mp 185°C ($CHCl_3$); IR: $\bar{\nu} = 3440$ (NH_2), 3260 (NH), 2200 (CN), 1650 (C=C), 1310, 1170 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6, 300 MHz): $\delta = 7.0$–7.5 (m, 4 *ar* H), 8.16 (d, $J = 11.3$ Hz, NH_2), 10.1 (s, 2-H) ppm; MS (70 eV): m/z (%) = 303 (31, M^+), 172 (86, C_6H_5BrN).

(E)-2-Amino-1-cyano-N-(4-fluorobenzyl)ethene-1-sulfonamide (**6l**, $C_{10}H_{10}FN_3O_2S$)
From **2k** (1.1 g, 5 mmol) in 50 cm^3 *Me*OH, method a. Yield 0.6 g (47%); mp 140°C; IR: $\bar{\nu} = 3440$ (NH_2), 3300 (NH), 2200 (CN), 1650 (C=C), 1310, 1170 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6, 300 MHz): $\delta = 4.0$ (s, CH_2), 7.1–7.4 (m, 4 *ar* H), 7.5 (s, 2-H), 8.0 (s, NH_2) ppm; MS (70 eV): $m/z = 255$ (6, M^+), 124 (100, C_7H_7FN).

(E)-N-Acetyl-2-amino-N-benzyl-1-cyanoethene-1-sulfonamide (**7**, $C_{12}H_{13}N_3O_3S$)
Compound **6a** (1.2 g, 5 mmol), 20 cm^3 *Ac*OH, and 20 cm^3 Ac_2O were refluxed for 3 h, cooled to room temperature, and evaporated *in vacuo*. The residue was dissolved in $CHCl_3$, washed with an *Ac*ONa solution, dried (Na_2SO_4), and the solvent was evaporated *in vacuo*. Yield 0.95 g (70%); mp 145°C ($CHCl_3/CCl_4$); IR: $\bar{\nu} = 3380$, (NH_2), 2210 (CN), 1680 (CONH), 1335, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 2.33$ (s, *Me*), 5.0 (s, CH_2), 7.2–8.2 (m, 5 *ar* H, NH_2, 2-H) ppm.

5-Amino-N-benzyl-N-(methoxycarbonyl)-1-phenylpyrazol-4-sulfonamide (**8a**, $C_{18}H_{18}N_4O_4S$)
Compound **3b** (2.7 g, 10 mmol) reacted with $HC(OEt)_3$ (1.5 g, 10 mmol) to **5b**. The crude product was dissolved in 30 cm^3 *Et*OH, and with stirring, phenylhydrazine (1.1 g, 10 mmol) was slowly added. After 12 h, the precipitate was separated, H_2O was added to the filtrate, and the combined precipitates were crystallized. Yield 2.7 g (70%); mp 172°C (*Me*OH); IR: $\bar{\nu} = 3460$, 3360 (NH_2), 3050, 2980, 2940 (CH), 1720 (CO), 1620 (C=N), 1350, 1180 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.78$ (s, O*Me*), 4.9–5.1 (m, CH_2, NH_2), 7.2–7.5 (m, 10 *ar* H, 3-H) ppm.

5-Amino-N-benzyl-N-(benzyloxycarbonyl)-1-phenylpyrazol-4-sulfonamide (**8b**, $C_{24}H_{22}N_4O_4S$)
From **5c** (4.0 g, 10 mmol) and 1.1 g phenylhydrazine as described for **8a**. Yield 3.3 g (70%); mp 153°C (*Me*OH); IR: $\bar{\nu} = 3450$, 3320 (NH_2), 3040, 2960 (CH), 1720 (CO), 1620 (C=N), 1340, 1140 (SO_2) cm^{-1}; ^1H NMR: $\delta = 4.6$–4.9 (br s, NH_2), 5.03, 5.16 (2s, 2 CH_2), 7.2–7.5 (m, 15 *ar* H, 3-H) ppm.

5-Amino-N-(benzyloxycarbonyl)-N-(4-fluorobenzyl)-1-phenylpyrazol-4-sulfonamide (**8c**, $C_{24}H_{21}FN_4O_4S$)
From **5g** (4.2 g, 10 mmol) and 1.1 g phenylhydrazine as described for **8a**. Yield 3.5 g (73%); mp 140°C (*Me*OH); IR: $\bar{\nu} = 3440$, 3320 (NH_2), 3040, 2960 (CH), 1720 (CO), 1620 (C=N), 1340, 1140 (SO_2) cm^{-1}; ^1H NMR: $\delta = 4.8$ (br s, NH_2), 5.00 (s, NCH_2), 5.20 (s, CH_2), 6.8–7.8 (m, 14 *ar* H, 3-H) ppm.

5-Amino-N-(benzyloxycarbonyl)-N-(4-chlorobenzyl)-1-phenylpyrazol-4-sulfonamide (**8d**, $C_{24}H_{21}ClN_4O_4S$)
From **5f** (4.3 g, 10 mmol) as described for **8a**. Yield 1.0 g (20%); mp 120°C (*Me*OH); IR: $\bar{\nu} = 3450$, 3320 (NH_2), 3040, 2960 (CH), 1720 (CO), 1620 (C=N), 1340, 1140 (SO_2) cm^{-1}; ^1H NMR: $\delta = 4.8$ (s, NH_2), 4.95 (s, NCH_2), 5.20 (s, OCH_2), 7.1–7.7 (m, 14 *ar* H, 3-H) ppm.

5-Amino-N-benzyl-1-phenylpyrazol-4-sulfonamide (**9a**, $C_{16}H_{16}N_4O_2S$)
A solution of 200 mg Na in 10 cm^3 *Et*OH was dropwise added to a suspension of **8a** (3.8 g, 10 mmol) in 50 cm^3 *Et*OH, the mixture was stirred at 50°C for 1 h, neutralized with HCl (36%), and evaporated *in vacuo*. The residue was dissolved in $CHCl_3$, washed with H_2O, dried (Na_2SO_4), and the solvent was evaporated *in vacuo*. Yield 2.3 g (70%); mp 147–148°C (*Me*OH); IR: $\bar{\nu} = 3470$, 3370 (NH_2), 3100, 2870 (CH), 1620 (C=N), 1310, 1160 (SO_2) cm^{-1}; ^1H NMR: $\delta = 4.2$ (s, CH_2), 4.5–5.2 (br s, NH, NH_2), 7.2–7.7 (m, 10 *ar* H, 3-H) ppm; MS (70 eV): m/z (%) = 328 (8.0, M^+), 159 (100, $C_9H_9N_3$), 106 (41.8, C_7H_8N), 91 (71.9, C_7H_7).

5-Amino-N-(4-fluorobenzyl)-1-phenylpyrazol-4-sulfonamide (**9b**, $C_{16}H_{15}FN_4O_2S$)
From **8c** (0.8 g, 1.8 mmol) as described for **9a**. Yield 0.2 g (33%); mp 190°C (*Me*OH); IR: $\bar{\nu} = 3467$, 3376 (NH_2), 3110, 2872 (CH), 1622 (C=N), 1310, 1157 (SO_2) cm^{-1}; ^1H NMR: $\delta = 4.1$ (d, $J = 6.6$ Hz, CH_2), 5.00 (s, NH_2), 5.6 (t, $J = 6.7$ Hz, NH), 6.8–7.5 (m, 9 *ar* H), 7.8 (s, 3-H) ppm; MS (70 eV): m/z (%) = 346 (4, M^+), 91 (100, C_6H_5N), 124 (54, C_7H_7FN).

5-Amino-N-(4-chlorobenzyl)-1-phenylpyrazol-4-sulfonamide (**9c**, $C_{16}H_{15}ClN_4O_2S$)
From **8d** (0.5 g, 1 mmol) as described for **9a**. Yield 0.2 g (55%); mp 179°C (*Me*OH); IR: $\bar{\nu} = 3463$, 3370 (NH_2), 3111, 2867 (CH), 1624 (C=N), 1312, 1161 (SO_2) cm^{-1}; ^1H NMR: $\delta = 4.1$ (d, $J = 6.7$ Hz, CH_2), 5.0 (s, NH_2), 5.8 (t, $J = 6.7$ Hz, NH), 7.0–7.6 (m, 9 *ar* H), 7.8 (s, 3-H) ppm.

2-Benzyl-5-phenylpyrazolo[3,4-e][1,2,4]thiadiazine 1,1-dioxide (**10**, $C_{17}H_{14}N_4O_2S$)
Compound **9a** (0.65 g, 2 mmol) and formamidinium acetate (0.45 g, 4 mmol) in 30 cm^3 *Bu*OH were refluxed for 2 h, and after cooling to room temperature, the mixture was evaporated *in vacuo*. The residue was dissolved in $CHCl_3$, washed with H_2O, dried (Na_2SO_4), and the solvent was evaporated *in vacuo*, purification by CC ($CHCl_3$). Yield 70 mg (10%); mp 202–203°C ($CHCl_3$); IR: $\bar{\nu} = 3115$, 2960, 2920 (CH), 1580 (C=N), 1310, 1170 (SO_2) cm^{-1}; ^1H NMR: $\delta = 5.03$ (s, CH_2), 7.2–7.8 (m, 10 *ar* H, 3-H), 8.10 (s, 7-H) ppm; MS (70 eV): m/z (%) = 338 (8.5, M^+), 91 (100, C_7H_7).

2-Amino-N-(4-chlorobenzyl)-2-(hydroxyimino)ethane-1-sulfonamide (**11a**, $C_9H_{12}ClN_3O_3S$)
A solution of **2i** (2.4 g, 10 mmol) in 60 cm^3 *Et*OH was added dropwise with stirring to a solution of $H_2NOH \times HCl$ (1.4 g, 20 mmol) and $NaHCO_3$ (1.7 g, 20 mmol) in 30 cm^3 H_2O, stirring was continued for 12 h, then, the precipitate was separated. Yield 2.2 g (80%); colorless crystals; mp 163°C (*Me*OH); IR: $\bar{\nu} = 3500$, 3400 (NH_2, OH), 3250 (NH), 3080, 2940 (CH), 1660 (C=N), 1310, 1130 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 3.8$ (s, CH_2), 4.2 (d, $J = 6.6$ Hz, CH_2), 5.45 (s, NH_2), 7.4 (s, 4 *ar* H), 7.8 (t, $J = 6.6$ Hz, NH), 9.5 (s, OH) ppm.

2-Amino-N-benzyl-2-(hydroxyimino)ethane-1-sulfonamide (**11b**, $C_9H_{13}N_3O_3S$)
From **2c** (2.1 g, 10 mmol) as described for **11a**. Yield 2.2 g (90%); mp 169–170°C (*Me*OH); IR: $\bar{\nu} = 3500$, 3400 (NH_2, OH), 3280 (NH), 3080, 2940 (CH), 1660 (C=N), 1310, 1140 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 3.82$ (s, CH_2), 4.1 (d, $J = 7$ Hz, CH_2), 5.4–5.6 (s, NH_2), 7.3 (s, 5 *ar* H), 7.6–7.8 (t, $J = 7$ Hz, NH), 9.5 (s, OH) ppm.

2-Amino-2-(hydroxyimino)-N-phenylethane-1-sulfonamide (**11c**, $C_8H_{11}N_3O_3S$)
From **2b** (2.0 g, 10 mmol) as described for **11a**. Yield 2.0 g (87%); mp 120°C (CH_2Cl_2/*Et*OH); IR: $\bar{\nu} = 3490$, 3380 (NH_2, OH), 3250 (NH), 2960 (CH), 1660 (C=N), 1320, 1130 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 3.82$ (s, CH_2), 5.4–5.6 (s, NH_2), 7.0–7.4 (m, 5 *ar* H), 9.5–9.7 (br s, NH, OH) ppm.

2-Amino-2-(hydroxyimino)-N-propylethane-1-sulfonamide (**11d**, $C_5H_{13}N_3O_3S$)
From **2g** (1.6 g, 10 mmol) as described for **11a**. Yield 1.7 g (90%); mp 130°C ($CHCl_3$); IR: $\bar{\nu} = 3500$, 3380 (NH_2, OH), 3280 (NH), 2970, 2920, 2870 (CH), 1660 (C=N), 1320, 1160 (SO_2) cm^{-1}; ^1H NMR

(acetone-d_6): $\delta = 0.8–1.0$ (t, $J = 7$ Hz, *Me*), 1.4–1.6 (m, CH_2), 2.9–3.1 (t, $J = 7$ Hz, CH_2), 3.76 (s, CH_2), 5.3 (s, NH_2), 5.9–6.3 (br s, NH), 8.5–9.0 (br s, OH) ppm.

2-Amino-N-benzyl-N-(benzyloxycarbonyl)-2-(hydroxyimino)ethane-1-sulfonamide
(**11e**, $C_{17}H_{19}N_3O_5S$)
From **3d** (0.7 g, 2 mmol) as described for **11a**. Yield 0.6 g (80%); mp 113°C ($CHCl_3$); IR: $\bar{\nu} = 3500$, 3400 (NH_2, OH), 3080, 3040, 2960 (CH), 1730 (CO), 1670 (C=N), 1360, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.27$, 4.83 (2s, 2 CH_2), 5.3–5.5 (2s, NH_2, CH_2), 7.3–7.4 (m, 10 *ar* H), 8.9 (s, OH) ppm.

2-Amino-N-benzyl-2-(hydroxyimino)-N-(methoxycarbonyl)ethane-1-sulfonamide
(**11f**, $C_{11}H_{15}N_3O_5S$)
From **3b** (2.6 g, 10 mmol) as described for **11a**. Yield 2.1 g (70%); mp 110°C ($CHCl_3$); IR: $\bar{\nu} = 3480$, 3380 (NH_2, OH), 3060, 2940 (CH), 1730 (CO), 1670 (C=N), 1340, 1140 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 3.79$ (s, *Me*), 4.28, 4.82 (2s, 2 CH_2), 5.2–5.4 (s, NH_2), 7.2–7.4 (s, 5 *ar* H), 8.0–10.0 (s, OH) ppm.

2-Amino-N-benzyl-2-(hydroxyimino)-N-(phenoxycarbonyl)ethane-1-sulfonamide
(**11g**, $C_{16}H_{17}N_3O_5S$)
From **3c** (3.3 g, 10 mmol) as described for **11a**. Yield 2.5 g (70%); mp 163–164°C ($CHCl_3$); IR: $\bar{\nu} = 3520$, 3400 (NH_2, OH), 3060, 2940 (CH), 1720 (CO), 1670 (C=N), 1360, 1170 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.46$, 4.98 (2s, 2 CH_2), 5.2–6.0 (s, NH_2), 7.2–7.6 (m, 10 *ar* H), 7.8–8.1 (s, OH) ppm.

2-Amino-N-benzyl-N-(S-ethylthiocarbonyl)-2-(hydroxyimino)ethane-1-sulfonamide
(**11h**, $C_{12}H_{17}N_3O_4S_2$)
From **3f** (3.0 g, 10 mmol) as described for **11a**. Yield 2.7 g (80%); mp 122°C (*Me*OH); IR: $\bar{\nu} = 3480–3380$ (NH_2, OH), 3020, 2970, 2930 (CH), 1670 (COS*Et*), 1660 (C=N), 1340, 1170 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 1.0–1.3$ (t, $J = 8$ Hz, *Me*), 2.7–3.0 (q, $J = 8$ Hz, CH_2), 4.33, 5.03 (2s, 2 CH_2), 5.1–5.5 (s, NH_2), 7.3–7.5 (s, 5 *ar* H, OH) ppm.

N-Benzyl-5-phenyl-1,2,4-oxadiazol-3-methanesulfonamide (**12a**, $C_{16}H_{15}N_3O_3S$)
A solution of 50 mg Na in 10 cm^3 *Et*OH was dropwise added to a mixture of **11b** (2.4 g, 10 mmol) and ethyl benzoate (1.9 g, 10 mmol) in 20 cm^3 *Et*OH. The mixture was refluxed for 4 h, cooled to room temperature, neutralized with HCl (36%), and evaporated *in vacuo*. H_2O was added to the residue, then, it was extracted with *THF*, the organic layers were dried ($MgSO_4$), and evaporated *in vacuo*. The residue was dissolved in $CHCl_3$, and cyclohexane was added until milkiness. After cooling to 0°C for some h, the precipitate was separated. Yield 1.4 g (90%); mp 86°C (*Me*OH); IR: $\bar{\nu} = 3340$ (NH), 3060, 3030 (CH), 2990, 2940 (CH_2), 1610 (C=N), 1340, 1170 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.2–4.5$ (m, 2 CH_2), 5.3–5.5 (t, $J = 6$ Hz, NH), 7.2–8.2 (m, 10 *ar* H) ppm.

N,5-Diphenyl-1,2,4-oxadiazol-3-methanesulfonamide (**12b**, $C_{15}H_{13}N_3O_3S$)
From **11c** (1.1 g, 5 mmol) and ethyl benzoate (0.95 g, 5 mmol) as described for **12a**. Yield 1.4 g (90%); mp 133°C (*Me*OH); IR: $\bar{\nu} = 3200$ (NH), 3080 (CH), 2990, 2940 (CH_2), 1600 (C=N), 1340, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.61$ (s, CH_2), 7.0–8.3 (m, 10 *ar* H), 9.0 (br s, NH) ppm.

2-Amino-N-benzyl-2-(benzoyloxyimino)ethane-1-sulfonamide (**13a**, $C_{16}H_{17}N_3O_4S$)
Benzoyl chloride (1.4 g, 10 mmol) in 10 cm^3 *THF* was slowly added with stirring to a solution of **11b** (2.4 g, 10 mmol) and Et_3N (1.0 g, 10 mmol) in 50 cm^3 *THF*. Stirring was continued for 2 h, the precipitate ($Et_3NH^+Cl^-$) was separated, and the organic phase was extracted with a satd NaCl solution, dried (Na_2SO_4), and evaporated *in vacuo*. Yield 2.7 g (80%); mp 158–160°C (*Me*OH); IR: $\bar{\nu} = 3450$, 3350 (NH_2), 3210 (NH), 3060, 3020, 2980, 2920 (CH), 1730 (CO), 1620 (C=N), 1320, 1130 (SO_2)

cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.06$ (s, CH_2), 4.3–4.5 (d, $J = 6$ Hz, CH_2), 6.5–7.0 (s, NH_2), 6.7–7.0 (t, $J = 6$ Hz, NH), 7.2–8.2 (m, 10 *ar* H) ppm.

2-(Acetoxyimino)-2-amino-N-benzylethane-1-sulfonamide (**13b**, $C_{11}H_{15}N_3O_4S$)
Compound **11b** (0.5 g, 2 mmol) in 20 cm^3 *Ac*OH and 20 cm^3 Ac_2O was stirred at room temperature for 3 h. Then the mixture was evaporated *in vacuo*, the residue was dissolved in $CHCl_3$, washed with H_2O, the organic layer was dried (Na_2SO_4), and evaporated. Yield 0.45 g (80%); mp 138–140°C (*Me*OH); IR: $\bar{\nu} = 3480$, 3350 (NH_2), 3240 (NH), 3040, 2995, 2950 (CH), 1750 (CO), 1640 (C=N), 1320, 1140 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 2.07$ (s, *Me*), 3.90, 4.18 (2s, 2 CH_2), 6.5 (s, NH_2), 7.3 (s, 5 *ar* H), 7.2–8.2 (s, NH) ppm.

2-Amino-N-benzyl-2-{[(bisethoxy)methoxy]imino}ethane-1-sulfonamide (**13c**, $C_{14}H_{23}N_3O_5S$)
Compound **11b** (0.9 g, 4 mmol) in 20 cm^3 $HC(OEt)_3$ was refluxed for 4 h. After cooling to room temperature, the mixture was concentrated *in vacuo*, the residue was dissolved in $CHCl_3$, and after addition of *n*-pentane the product was separated. Yield 0.8 g (60%); mp 72°C (toluene); IR: $\bar{\nu} = 3480$, 3380 (NH_2), 3260 (NH), 3090, 2990, 2950, 2900 (CH), 1660 (C=N), 1320, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 1.0$–1.2 (t, $J = 7$ Hz, 2 *Me*), 3.5–3.8 (q, $J = 7$ Hz, 2 CH_2), 3.87, 4.35 (2s, 2 CH_2), 5.4–5.7 (s, NH_2), 6.5–6.8 (s, NH), 7.2–7.5 (m, 5 *ar* H, CH) ppm.

2-Amino-N-benzyl-2-(methoxycarbonyloxyimino)ethane-1-sulfonamide (**13d**, $C_{11}H_{15}N_3O_5S$)
$HC(OMe)_3$ (0.4 g, 4 mmol) in 10 cm^3 $CHCl_3$ was dropwise added to a mixture of **11b** (0.9 g, 4 mmol) and Et_3N (0.4 g, 4 mmol) in 10 cm^3 $CHCl_3$. The mixture was refluxed for 4 h, cooled to room temperature, the precipitate was separated, and the organic solvent was evaporated *in vacuo*. Yield 0.8 g (80%); mp 122–123°C (toluene); IR: $\bar{\nu} = 3480$, 3360 (NH_2), 3250 (NH), 3015, 2990, 2930 (CH), 1750 (CO), 1310, 1130 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.86$ (s, O*Me*), 3.97 (s, CH_2), 4.3–4.4 (d, $J = 7$ Hz, CH_2), 5.3–5.7 (s, t, NH_2, NH), 7.4–7.5 (s, 5 *ar* H) ppm.

2-Amino-N-benzyl-2-(benzyloxycarbonyloxyimino)ethane-1-sulfonamide (**13e**, $C_{17}H_{19}N_3O_5S$)
From **11b** (2.4 g, 10 mmol) and benzyl chloroformate (1.7 g, 10 mmol) as described for **13a**. Yield 3.0 g (80%); mp 155°C (toluene); IR: $\bar{\nu} = 3460$, 3350 (NH_2), 3240 (NH), 1760 (CO), 1630 (C=N), 1310, 1140 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 3.9$ (s, CH_2), 4.3 (d, CH_2), 5.2 (s, CH_2), 6.5–6.7 (s, NH_2), 7.4 (m, 10 *ar* H), 8.6–8.8 (s, NH) ppm.

N-Benzyl-5-methyl-1,2,4-oxadiazol-3-methanesulfonamide (**14**, $C_{11}H_{13}N_3O_3S$)
A solution of 100 mg Na in 10 cm^3 *Et*OH was dropwise added to a suspension of **13b** (1.4 g, 5 mmol) in 50 cm^3 *Et*OH, the mixture was refluxed for 2 h, cooled to room temperature, and evaporated *in vacuo*. The residue was dissolved in a few cm^3 H_2O, neutralized with HCl (36%), and extracted with $CHCl_3$. The combined organic layers were dried (Na_2SO_4), and evaporated *in vacuo*. Yield 1.1 g (80%); mp 74°C (*Me*OH); IR: $\bar{\nu} = 3240$ (NH), 2940, 2980 (CH_2), 1580 (C=N), 1320, 1140 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.54$ (s, *Me*), 4.33, 4.3–4.5 (s, d, 2 CH_2), 5.2–5.4 (t, $J = 7$ Hz, NH), 7.4 (s, 5 *ar* H) ppm.

N-Benzyl-4,5-dihydro-5-oxo-1,2,4-oxadiazol-3-methanesulfonamide (**15**, $C_{10}H_{11}N_3O_4S$)
From **11b** (0.5 g, 2 mmol) and diethyl carbonate (0.24 g, 2 mmol) as described for **12a**. Yield 0.45 g (80%); mp 149°C ($CHCl_3$/cyclohexane); IR: $\bar{\nu} = 3400$, 3360, 3300, (NH), 2980, 2920 (CH_2), 1810, 1790 (CO), 1600 (C=N), 1330, 1160 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.37$ (d, CH_2), 4.4 (s, CH_2), 7.0–8.5 (s, 5 *ar* H, 2 NH) ppm.

2-Amino-N-benzyl-2-(benzyloxycarbonyloxyimino)-N-(S-ethylthiocarbonyl)ethane-1-sulfonamide (**16**, $C_{20}H_{23}N_3O_6S_2$)
From **11h** (1.65 g, 5 mmol) and benzyl chloroformate (0.85 g, 5 mmol) as described for **13a**. Yield 1.8 g (80%); mp 74°C (*Me*OH); IR: $\bar{\nu} = 3480$ (NH), 3050, 2840 (CH), 1660 (COS*Et*), 1310, 1125 (SO_2)

cm^{-1}; ^1H NMR: $\delta = 1.1–1.3$ (t, $J = 7$ Hz, *Me*), 2.8–3.1 (q, $J = 8$ Hz, CH_2), 4.31, 4.88, 5.15 (3s, 3 CH_2), 5.3–5.5 (s, NH_2), 7.2–7.4 (m, 10 *ar* H) ppm.

2-Amino-2-(benzoyloxyimino)-N-benzyl-N-(ethoxycarbonyl)ethane-1-sulfonamide
(**17a**, $C_{19}H_{21}N_3O_6S$)
From **13a** (1.1 g, 3 mmol) and ethyl chloroformate (0.35 g, 3 mmol) as described for **3a**. Purification by CC (CH_2Cl_2/*Ac*O*Et*). Yield 0.75 g (60%); mp 157–158°C (CH_2Cl_2/*n*-pentane); IR: $\bar{\nu} = 3400$ (NH_2), 1720 (CO), 1640 (C=N), 1360, 1170 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 1.1–1.4$ (t, $J = 7$ Hz, *Me*), 4.1–4.5 (q, $J = 8$ Hz, CH_2), 4.56, 4.93 (2s, 2 CH_2), 6.0–6.2 (m, NH_2), 7.0–8.3 (m, 10 *ar* H) ppm.

2-Amino-2-(benzoyloxyimino)-N-benzyl-N-(phenoxycarbonyl)ethane-1-sulfonamide
(**17b**, $C_{23}H_{21}H_3O_6S$)
From **13a** (3.4 g, 10 mmol) and phenyl chloroformate (1.56 g, 10 mmol) as described for **13a**. Yield 2.8 g (60%); mp 156–157°C (*Me*OH); IR: $\bar{\nu} = 3460$, 3380 (NH_2), 1725 (CO), 1630 (C=N), 1360, 1170 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.65$, 5.07 (2s, 2 CH_2), 6.3–6.6 (s, NH_2), 7.0–8.3 (m, 15 *ar* H) ppm.

2-Amino-2-(benzoyloxyimino)-N-benzyl-N-(4-nitrophenoxycarbonyl)ethane-1-sulfonamide
(**17c**, $C_{23}H_{20}N_4O_8S$)
From **13a** (1.7 g, 5 mmol) and 4-nitrophenyl chloroformate (1.0 g, 5 mmol) as described for **13a**. Purification by CC ($CHCl_3$/*Ac*O*Et* = 10/1). Yield 1.3 g (50%); mp 78–81°C ($CHCl_3$/*Ac*O*Et*); IR: $\bar{\nu} = 3480$, 3380 (NH_2), 3080, 3030, 2920 (CH), 1730 (CO), 1640 (C=N), 1520 (NO_2), 1350, 1160 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.45$, 5.1 (2s, 2 CH_2), 5.2–5.4 (s, NH_2), 7.4–8.5 (m, 14 *ar* H) ppm.

N-Benzyl-cyano(hydroxyimino)methanesulfonamide (**18a**, $C_9H_9N_3O_3S$)
An ice-cold solution of $NaNO_2$ (2.1 g, 30 mmol) in 50 cm^3 H_2O was added with vigorous stirring and cooling to a solution of **2c** (2.1 g, 10 mmol) in 30 cm^3 *Ac*OH. After stirring at room temperature for 12 h 1.25 cm^3 HCl (36%) were added, the mixture was extracted with *THF*, the organic layer was dried ($MgSO_4$), and evaporated *in vacuo*. The residue was dissolved in a few cm^3 $CHCl_3$, and stored at 0°C. Yield 1.4 g (58%); mp 108–109°C ($CHCl_3$); IR: $\bar{\nu} = 3400$, 3280 (OH, NH), 3070 (CH), 1330, 1165 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.4$ (d, $J = 6$ Hz, CH_2), 7.3 (s, 5 *ar* H), 7.9–8.1 (t, NH), 15.9 (s, OH) ppm.

Cyano(hydroxyimino)-N-phenylmethanesulfonamide (**18b**, $C_8H_7N_3O_3S$)
From **2b** (2.0 g, 10 mmol) as described for **18a**. Yield 1.4 g (65%); mp 128°C (*Me*OH); IR: $\bar{\nu} = 3260$ (OH, NH), 1370, 1180 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 7.3$ (s, 5 *ar* H), 9.6–9.8 (s, NH), 13.5–14.0 (s, OH) ppm.

Cyano(hydroxyimino)methanesulfonylmorpholide (**18c**, $C_6H_9N_3O_4S$)
From **2n** (1.9 g, 10 mmol) as described for **18a**. Yield 1.3 g (60%); mp 142–146°C (dec, *Me*OH); IR: $\bar{\nu} = 3420$ (OH), 2920, 2800 (CH), 1360, 1180 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 3.2–3.5$ (m, 2 CH_2), 3.6–3.8 (m, 2 CH_2), 14.0–14.02 (s, OH) ppm.

N-Benzyl-N-(benzyloxycarbonyl)cyano(4-methylphenylhydrazono)methane-sulfonamide
(**20a**, $C_{24}H_{22}N_4O_4S$)
At 0°C, a solution of $NaNO_2$ (0.7 g) in 3 cm^3 H_2O was added with stirring to a solution of *p*-toluidine (1.1 g, 10 mmol) in 3.5 cm^3 HCl (36%). This solution was dropwise added with stirring to a suspension of **3d** (3.45 g, 10 mmol) and *Ac*ONa (4.55 g) in 8 cm^3 H_2O at max 5°C. After stirring for 12 h at room temperature, the precipitate was separated and dried *in vacuo*. Yield 3.2 g (70%); mp 118°C (*Me*OH); IR: $\bar{\nu} = 3230$ (NH), 3030 (CH), 2200 (CN), 1740 (CO), 1530 (C=N–NH–), 1380, 1170 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.31$ (s, *Me*), 5.00 (s, CH_2), 5.2 (s, CH_2), 7.0–7.4 (m, 14 *ar* H), 9.8 (s, NH) ppm.

N-(Benzyloxycarbonyl)cyano-N-(4-methoxybenzyl)-(4-methyl-phenylhydrazono)methanesulfonamide (**20b**, $C_{25}H_{24}N_4O_5S$)
From **3e** (3.75 g, 10 mmol) and *p*-toluidine (1.1 g, 10 mmol) as described for **20a**. Yield 3.9 g (80%); mp 134–135°C (*Me*OH); IR: $\bar{\nu} = 3220$ (NH), 3050, 2930 (CH), 2200 (CN), 1740 (CO), 1530 (C=N–NH–), 1380, 1165 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.33$ (s, *Me*), 3.73 (s, O*Me*), 4.97 (s, CH_2), 5.26 (s, CH_2), 6.8–7.5 (m, 13 *ar* H), 9.4 (s, NH) ppm.

N-Benzyl-N-(benzyloxycarbonyl)cyano(phenylhydrazono)methanesulfonamide (**20c**, $C_{23}H_{20}N_4O_4S$)
From **3d** (3.45 g, 10 mmol) and aniline (1.0 g, 10 mmol) as described for **20a**. Yield 3.1 g (70%); mp 137°C (*Me*OH); IR: $\bar{\nu} = 3240$ (NH), 3060 (CH), 2200 (CN), 1760 (CO), 1530 (C=N–NH–), 1385, 1165 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 5.07$ (s, CH_2), 5.28 (s, CH_2), 7.1–7.5 (m, 15 *ar* H), 11.5 (s, NH) ppm.

Cyano-N-(methoxycarbonyl)(4-methylphenylhydrazono)-N-phenylmethanesulfonamide (**20d**, $C_{17}H_{16}N_4O_4S$)
From **3a** (2.5 g, 10 mmol) and *p*-toluidine (1.1 g, 10 mmol) as described for **20a**. Yield 2.2 g (60%); mp 151°C (*Me*OH); IR: $\bar{\nu} = 3180$ (NH), 2950 (CH), 2200 (CN), 1720 (CO), 1540 (C=N–NH–), 1380, 1180 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.38$ (s, *Me*), 3.85 (s, O*Me*), 7.2–7.8 (m, 9 *ar* H), 12.8 (s, NH) ppm.

N-Benzylcyano-N-(methoxycarbonyl)-4-(methylphenylhydrazono)methanesulfonamide (**20e**, $C_{18}H_{18}N_4O_4S$)
From **3b** (2.6 g, 10 mmol) and *p*-toluidine (1.1 g, 10 mmol) as described for **20a**. Yield 2.8 g (70%); mp 140°C (*Me*OH); IR: $\bar{\nu} = 3200$ (NH), 3030, 2950 (CH), 2200 (CN), 1730 (CO), 1540 (C=N–NH–), 1370, 1170 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.30$ (s, *Me*), 3.81 (s, O*Me*), 5.00 (s, CH_2), 7.0–7.5 (m, 9 *ar* H), 9.5–10.0 (s, NH) ppm.

N-Benzylcyano-N-(phenylcarbamoyl)(phenylhydrazono)methanesulfonamide (**20f**, $C_{22}H_{19}N_5O_3S$)
From **4b** (3.3 g, 10 mmol) and aniline (1.0 g, 10 mmol) as described for **20a**. Yield 3.3 g (78%); mp 132°C (*Me*OH); IR: $\bar{\nu} = 3370$ (NH), 3070, 2970 (CH), 2200 (CN), 1710 (CO), 1530 (C=N–NH–), 1370, 1160 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 5.07$ (s, CH_2), 7.0–7.6 (m, 15 *ar* H), 9.2 (s, NH), 11.4 (s, NH) ppm.

N-Carbamoylcyano-N-phenyl(phenylhydrazono)methanesulfonamide (**20g**, $C_{15}H_{13}N_5O_3S$)
From **4a** (2.4 g, 10 mmol) and aniline (1.0 g, 10 mmol) as described for **20a**. Yield 2.9 g (72%); mp 131°C (*Me*OH); IR: $\bar{\nu} = 3470$, 3360 (NH), 3010, 2970 (CH), 2205 (CN), 1700 (CO), 1530 (C=N–NH–), 1370, 1180 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 6.8$ (s, NH_2), 7.2–7.7 (m, 10 *ar* H) 11.4 (s, NH) ppm.

N-Benzylcyano-(phenylhydrazono)methanesulfonamide (**20h**, $C_{15}H_{14}N_4O_2S$)
A solution of 0.45 g Na in 50 cm^3 *Me*OH was slowly added to a solution of **20f** (4.3 g, 10 mmol) in 50 cm^3 *Me*OH. The mixture was refluxed for 6 h, hydrolyzed with HCl (36%), and evaporated *in vacuo*. The residue was dissolved in Et_2O, washed with H_2O, dried (Na_2SO_4), and the solvent was evaporated *in vacuo*. Yield 2.5 g (79%); mp 108°C ($CHCl_3/CCl_4$); IR: $\bar{\nu} = 3250$ (NH), 3070 (CH), 2200 (CN), 1330, 1170 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.4$ (s, CH_2), 7.1–7.5 (m, 10 *ar* H), 7.3–7.7 (s, NH), 10.4–11.1 (s, NH) ppm.

2-Amino-N-benzyl-1,2-bis(hydroxyimino)ethane-1-sulfonamide (**21**, $C_9H_{12}N_4O_4S$)
From **18a** (2.4 g, 10 mmol) and $H_2NOH \times HCl$ (1.4 g, 20 mmol) as described for **2i**. The viscous residue was purified by CC (*Ac*O*Et*). Yield 1.3 g (50%); mp 120°C (*Ac*O*Et*); IR: $\bar{\nu} = 3480$, 3390 (NH_2, OH),

3270 (NH), 3010, 2930 (CH), 1350, 1170 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.33$ (d, $J = 7$ Hz, CH_2), 5.7–5.9 (br s, NH_2), 6.9–7.1 (t, NH), 7.2–7.5 (m, 5 *ar* H), 9.0–16.0 (br s, 2 OH) ppm.

4-Amino-N-benzyl-1,2,5-oxadiazol-3-sulfonamide (**22**, $C_9H_{10}N_4O_3S$)
Method a. A solution of 0.2 g Na in 10 cm^3 *Et*OH was slowly added to a suspension of **21** (1.35 g, 5 mmol) in 20 cm^3 *Et*OH, the mixture was refluxed for 4 h, cooled to room temperature, neutralized with HCl (36%), and evaporated *in vacuo*. The residue was dissolved in $CHCl_3$, washed with H_2O, dried (Na_2SO_4), and evaporated *in vacuo*. The residue was purified by CC ($CHCl_3$/*Ac*O*Et* = 5/1).

Method b. Compound **21** (0.27 g, 1 mmol) in 20 cm^3 $POCl_3$ was stirred at room temperature for 2 h, the solvent was evaporated *in vacuo*, the residue was dissolved in *THF*, washed with a satd NaCl solution, dried (Na_2SO_4), and the solvent was evaporated *in vacuo*.

Yield a. 0.6 g (50%), b. 0.1 g (40%); mp 76°C ($CHCl_3$/*Ac*O*Et*); IR: $\bar{\nu} = 3480$, 3340, 3300 (NH_2, NH), 3060, 2920 (CH), 1630 (C=N), 1350, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.5$ (d, $J = 6$ Hz, CH_2), 5.3–5.9 (br s, NH_2), 7.4 (s, 5 *ar* H), 7.9–8.1 (br s, NH) ppm; MS (70 eV): m/z (%) = 255 (9.56, M^++1), 91 (100, $C_7H_7^+$).

N-Benzyl-4-formylamino-1,2,5-oxadiazol-3-sulfonamide (**23**, $C_{10}H_{10}N_4O_4S$)
The crude **24** was dissolved in $CHCl_3$, the solution was washed with H_2O, dried (Na_2SO_4), and the solvent was evaporated *in vacuo*. Yield 1.15 g (80%); mp 84–85°C ($CHCl_3$); IR: $\bar{\nu} = 3340$ (NH), 3090, 2890, 2870 (CH), 1700 (CO), 1360, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.3$ (s, CH_2), 7.2 (s, 5 *ar* H), 7.5–8.0 (br s, NH), 8.6–8.8 (br s, NH, CHO) ppm; MS (70 eV): m/z (%) = 283 (13.91, M^+), 91 (100, $C_7H_7^+$).

*N-Benzyl-4-(ethoxymethylimino)-1,2,5-oxadiazol-3-sulfonamide (***24**, $C_{12}H_{14}N_4O_4S$)
Compound **21** (1.35 g, 5 mmol) in 20 cm^3 HC(O*Et*)$_3$ was refluxed for 4 h, formed *Et*OH was distilled off, then the mixture was cooled to room temperature, and the solvent was evaporated *in vacuo*. The crude product, ^1H NMR: $\delta = 1.2$–1.5 (t, $J = 7$ Hz, *Me*), 4.0–4.5 (m, 2 CH_2), 5.9–6.1 (br s, NH), 7.2–7.4 (s, 5 *ar* H), 8.12 (s, N=CH) ppm, was immediately used for the synthesis of **23**.

4-Acetylamino-N-benzyl-1,2,5-oxadiazol-3-sulfonamide (**25**, $C_{11}H_{12}N_4O_4S$)
Compound **21** (1.35 g, 5 mmol) in 30 cm^3 Ac_2O was refluxed for 4 h, cooled to room temperature, concentrated *in vacuo*, dissolved in $CHCl_3$, washed with H_2O, dried (Na_2SO_4), and the solvent was evaporated *in vacuo*. Yield 1.35 g (80%); mp 90°C ($CHCl_3$); IR: $\bar{\nu} = 3340$ (NH), 3040, 2980, 2930 (CH), 1720 (CO), 1360, 1150 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 2.28$ (s, *Me*), 4.5 (s, CH_2), 7.3 (s, 5 *ar* H), 7.6–7.9 (br s, NH). 9.3–9.6 (br s, NH) ppm.

4-Amino-N-benzyl-N-(methoxycarbonyl)-1,2,5-oxadiazol-3-sulfonamide (**26**, $C_{11}H_{12}N_4O_5S$)
Under N_2 and with stirring, methyl chloroformate (0.2 g, 2 mmol) in 5 cm^3 *THF* was added to a solution of **21** (0.54 g, 2 mmol) in 50 cm^3 *THF*, stirring was continued for 30 min, then Et_3N (0.4 g, 4 mmol) and additional methyl chloroformate (0.2 g, 2 mmol) in 5 cm^3 *THF* were added. The mixture was refluxed for 1 h, cooled to room temperature, washed with a satd NaCl solution, dried ($MgSO_4$), and evaporated *in vacuo*. The residue was purified by CC ($CHCl_3$). Yield 0.3 g (50%); mp 110–111°C ($CHCl_3$); IR: $\bar{\nu} = 3490$, 3360 (NH_2), 1720 (CO), 1330, 1140 (SO_2) cm^{-1}; ^1H NMR: $\delta = 3.76$ (s, O*Me*), 4.6–5.1 (br s, NH_2, CH_2), 7.4 (m, 5 *ar* H) ppm; MS (70 eV): m/z (%) = 313 (5.16, M^++1), 164 (100, $C_9H_{10}NO_2$).

2-Amino-N-benzyl-N-(benzyloxycarbonyl)-2-hydroxyimino-1-(4-methylphenylhydrazono)ethane-1-sulfonamide (**27a**, $C_{24}H_{25}N_5O_5S$)
From **20a** (4.6 g, 10 mmol) and 1.4 g $H_2NOH \times HCl$ as described for **11a**. Yield 4.4 g (90%); mp 109°C (*Me*OH); IR: $\bar{\nu} = 3460$–3260 (NH_2, NH, OH), 3030 (CH), 1700 (CO), 1360, 1160 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 2.28$ (s, *Me*), 5.03 (s, CH_2), 5.13 (s, CH_2), 5.8–6.0 (br s, NH_2), 7.0–7.6 (m, 14 *ar* H, OH), 12.9–13.1 (br s, NH) ppm.

2-Amino-N-(benzyloxycarbonyl)-2-hydroxyimino-N-(4-methoxybenzyl)-1-(4-methylphenylhydrazono)ethane-1-sulfonamide (**27b**, $C_{25}H_{27}N_5O_6S$)
From **20b** (4.9 g, 10 mmol) and 1.4 g $H_2NOH\times HCl$ as described for **11a**, 2 h at 50°C, 12 h of room temperature. Yield 4.4 g (85%); mp 114–116°C (*Me*OH/H_2O = 9/1); IR: $\bar{\nu}$ = 3520, 3420, 3300 (NH), 3050, 2950, 2850 (CH), 1720 (CO), 1620 (C=N), 1520 (C=N–NH–) 1340, 1170 (SO_2) cm^{-1}; ^1H NMR: δ = 2.4 (s, *Me*), 3.8 (s, O*Me*), 5.0 (s, CH_2), 5.2 (s, CH_2), 5.6–5.8 (br s, NH_2), 6.8–7.4 (m, 13 *ar* H, OH), 11.9–12.1 (br s, NH) ppm.

2-Amino-N-benzyl-2-hydroxyimino-N-(methoxycarbonyl)-1-(4-methylphenylhydrazono)ethane-1-sulfonamide (**27c**, $C_{18}H_{21}N_5O_5S$)
From **20e** (3.8 g, 10 mmol) and 1.4 g $H_2NOH\times HCl$ as described for **11a**. Yield 3.8 g (90%); mp 155°C (*Me*OH); IR: $\bar{\nu}$ = 3500, 3250 (NH), 3030, 2960, 2920, 2860 (CH), 1730 (CO), 1350, 1170 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): δ = 2.4 (s, *Me*), 3.71 (s, O*Me*), 5.06 (s, CH_2), 5.8–6.1 (br s, NH_2), 7.0–7.6 (m, 9 *ar* H, OH). 13.9–14.1 (br s, NH) ppm.

2-Amino-N-benzyl-N-(benzyloxycarbonyl)-2-hydroxyimino-1-phenylhydrazonoethane-1-sulfonamide (**27d**, $C_{23}H_{23}N_5O_5S$)
From **20c** (4.5 g, 10 mmol) and 1.4 g $H_2NOH\times HCl$ as described for **11a**. Purification by CC ($CHCl_3$/*Ac*O*Et* 20/1). Yield 0.48 g (10%); mp 133–136°C ($CHCl_3$/*Ac*O*Et*); IR: $\bar{\nu}$ = 3480–3260 (NH_2, NH, OH), 3060, 3020, 2970 (CH), 1730 (CO), 1330, 1150 (SO_2) cm^{-1}; ^1H NMR: δ = 5.15 (s, CH_2), 5.22 (s, CH_2), 5.6–5.8 (br s, NH_2), 6.0–7.0 (br s, OH), 7.0–7.5 (m, 15 *ar* H), 12.5–12.7 (br s, NH) ppm.

5-Amino-N-benzyl-N-(benzyloxycarbonyl)-2-(4-methylphenyl)-2H-1,2,3-triazol-4-sulfonamide (**28a**, $C_{24}H_{23}N_5O_4S$)
At 0°C, **27a** (1.0 g, 2 mmol) and 30 cm^3 $POCl_3$ were stirred for 1 h, the mixture was concentrated *in vacuo*, the residue was dissolved in $CHCl_3$, washed with an aqueous $NaHCO_3$ solution, dried (Na_2SO_4), and the solvent was evaporated *in vacuo*. Yield 0.95 g (90%); mp 168–169°C (*Me*OH); IR: $\bar{\nu}$ = 3380, 3280 (NH_2), 3030, 2990 (CH), 1730 (CO), 1630 (C=N), 1380, 1170 (SO_2) cm^{-1}; ^1H NMR: δ = 2.35 (s, *Me*), 5.02 (s, CH_2), 5.16 (s, CH_2), 5.3–5.5 (br s, NH_2), 7.0–7.5 (m, 14 *ar* H) ppm.

5-Amino-N-(benzyloxycarbonyl)-N-(4-methoxybenzyl)-2-(4-methylphenyl)-2H-1,2,3-triazol-4-sulfonamide (**28b**, $C_{25}H_{25}N_5O_5S$)
From **27b** (2.2 g, 4 mmol) as described for **28a**. Yield 1.7 g (80%); mp 157–158°C (*Me*OH); IR: $\bar{\nu}$ = 3460 (NH_2), 3040, 2980 (CH), 1730 (CO), 1635 (C=N), 1385, 1165 (SO_2) cm^{-1}; ^1H NMR: δ = 2.42 (s, *Me*), 3.75 (s, O*Me*), 5.00 (s, CH_2), 5.15 (s, CH_2), 5.2–5.4 (br s, NH_2), 6.7–7.5 (m, 13 *ar* H) ppm.

5-Amino-N-benzyl-N-(methoxycarbonyl)-2-(4-methylphenyl)-2H-1,2,3-triazol-4-sulfonamide (**28c**, $C_{18}H_{19}N_5O_4S$)
From **27c** (4.2 g, 10 mmol) as described for **28a**. Yield 3.6 g (90%); mp 142°C (*Me*OH); IR: $\bar{\nu}$ = 3400 (NH_2), 3020, 2920 (CH), 1730 (CO), 1630 (C=N), 1380, 1170 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): δ = 2.36 (s, *Me*), 3.66 (s, O*Me*), 5.03 (s, CH_2), 6.2–6.4 (br s, NH_2), 7.2–7.6 (m, 9 *ar* H) ppm.

5-Amino-N-benzyl-N-(benzyloxycarbonyl)-2-phenyl-2H-1,2,3-triazol-4-sulfonamide (**28d**, $C_{23}H_{21}N_5O_4S$)
From **27d** (1.0 g, 2 mmol) as described for **28a**. Yield 0.9 g (90%); mp 120°C (*Me*OH); IR: $\bar{\nu}$ = 3450 (NH_2), 3060, 3030, 2950 (CH), 1730 (CO), 1630 (C=N), 1380, 1160 (SO_2) cm^{-1}; ^1H NMR: δ = 5.01 (s, CH_2), 5.12 (s, CH_2), 5.7–5.9 (br s, NH_2), 7.1–7.5 (m, 15 *ar* H) ppm.

5-Amino-N-benzyl-2-(4-methylphenyl)-2H-1,2,3-triazol-4-sulfonamide (**29a**, $C_{16}H_{17}N_5O_2S$)
A solution of 0.2 g Na in 10 cm^3 *Et*OH was added to a solution of **28a** (0.5 g, 1 mmol) in 20 cm^3 *Et*OH. The mixture was stirred at room temperature for 1 h, neutralized with HCl (36%), evaporated *in vacuo*,

and the residue was purified by CC ($CHCl_3$/*Ac*O*Et*). Yield 0.17 g (50%); mp 103–105°C (*Me*OH); IR: $\bar{\nu} = 3450$, 3280 (NH), 3020, 2830 (CH), 1630 (C=N), 1340, 1160 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.35$ (s, *Me*), 4.3 (d, $J = 7$ Hz, CH_2), 5.4–5.6 (br s, NH_2), 6.0–6.1 (t, $J = 7$ Hz, NH), 7.2–7.4 (m, 9 *ar* H) ppm; MS (70 eV): m/z (%) = 344 (1.57, M^+), 106 (100, C_7H_8N).

5-Amino-N-(4-methoxybenzyl)-2-(4-methylphenyl)-2H-1,2,3-triazol-4-sulfonamide (**29b**, $C_{17}H_{19}N_5O_3S$)
From **28a** (0.5 g, 1 mmol) as described for **29a**. Yield 0.21 g (60%); mp 183–184°C ($CHCl_3$/cyclohexane); IR: $\bar{\nu} = 3490$, 3260 (NH), 3030, 2830 (CH), 1635 (C=N), 1350, 1165 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.42$ (s, *Me*), 3.72 (s, O*Me*), 4.4 (d, $J = 7$ Hz, CH_2), 5.9–6.0 (br s, NH_2), 6.6–7.3 (m, 8 *ar* H, NH) ppm; MS (70 eV): m/z (%) = 372 (3.8, $M^+ - 1$); 136 (100, $C_8H_{10}NO$).

5-Amino-N-benzyl-2-phenyl-2H-1,2,3-triazol-4-sulfonamide (**29c**, $C_{15}H_{15}N_5O_2S$)
From **28d** (0.46 g, 1 mmol) as described for **29a**. Yield 0.16 g (50%); mp 120–121°C ($CHCl_3$/cyclo-cyclohexane); IR: $\bar{\nu} = 3450$–3350 (NH), 3020 (CH), 1620 (C=N), 1340, 1160 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 4.4$ (d, $J = 6$ Hz, CH_2), 6.0–6.3 (br s, NH_2), 7.0–7.6 (m, 10 *ar* H, NH) ppm.

2-Acetoximino-2-amino-N-benzyl-N-(benzyloxycarbonyl)-1-phenylhydrazonoethane-1-sulfonamide (**30**, $C_{25}H_{25}N_5O_6S$)
Compound **27d** (0.5 g, 1 mmol) in 20 cm^3 Ac_2O was refluxed for 1 h. The mixture was evaporated *in vacuo*, the residue was dissolved in $CHCl_3$, washed with a $NaHCO_3$ solution, dried (Na_2SO_4), and evaporated *in vacuo*. Yield 0.25 g (50%); mp 84°C (*Me*OH); IR: $\bar{\nu} = 3480$, 3380, 3260 (NH_2, NH), 3060, 3030 (CH), 1760, 1730 (CO), 1620 (C=N), 1530 (C=N–NH), 1340, 1160 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.17$ (s, *Me*), 5.04 (s, CH_2), 5.11 (s, CH_2), 5.8–6.0 (br s, NH_2), 7.0–7.5 (m, 15 *ar* H), 13.4–13.6 (s, NH) ppm.

5-Acetylamino-N-benzyl-N-(benzyloxycarbonyl)-2-(4-methylphenyl)-2H-1,2,3-triazol-4-sulfonamide (**31**, $C_{26}H_{25}N_5O_5S$)
Compound **28a** (0.47 g, 1 mmol), 20 cm^3 *Ac*OH, and 20 cm^3 Ac_2O were refluxed for 2 h, cooled to room temperature, and evaporated *in vacuo*. The residue was dissolved in $CHCl_3$, washed with an aqueous $NaHCO_3$ solution, dried (Na_2SO_4), and evaporated *in vacuo*. Yield 0.4 g (80%); mp 157°C (*Me*OH); IR: $\bar{\nu} = 3380$, 3280 (NH), 3060, 3030 (CH), 1730 (CO), 1370, 1165 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.13$ (s, *Me*), 2.41 (s, *Me*), 5.0–5.2 (2s, 2 CH_2), 5.4–5.6 (br s, NH), 7.0–7.5 (m, 14 *ar* H) ppm.

5-(S-Ethylthiocarbonylamino)-N-(4-methoxybenzyl)-2-(4-methylphenyl)-2H-1,2,3-triazol-4-sulfonamide (**32**, $C_{20}H_{23}N_5O_4S_2$)
Under N_2 at −78°C, 0.65 cm^3 *Bu*Li were added to **29b** (0.35 g, 1 mmol) in 50 cm^3 *THF*, then, after 10 min *S*-ethyl chlorothioformate (0.12 g, 1 mmol) in 10 cm^3 *THF* was added, and after stirring for 1 h 0.2 cm^3 *Bu*Li were added. The mixture was warmed to room temperature, washed with a satd NaCl solution, dried ($MgSO_4$), and evaporated *in vacuo*. Yield 0.35 g (80%); mp 165–167°C (*Me*OH); IR: $\bar{\nu} = 3420$ (NH_2), 1680 (COS*Et*), 2960, 2920 (CH), 1630 (C=N), 1370, 1155 (SO_2) cm^{-1}; ^1H NMR: $\delta = 1.0$–1.3 (t, $J = 7$ Hz, *Me*), 2.39 (s, *Me*), 2.7–3.0 (q, $J = 7$ Hz, CH_2), 3.75 (s, O*Me*), 5.05 (s, CH_2), 5.6 (br s, 2 NH), 6.8–7.5 (m, 8 *ar* H) ppm.

4-Amino-N-benzylpyrimidine-5-sulfonamide (**33a**, $C_{11}H_{12}N_4O_2S$)
Compound **2c** (2.1 g, 10 mmol) and formamidinium acetate (6.3 g, 60 mmol) in 50 cm^3 *Bu*OH were refluxed for 6 h, the mixture was cooled to room temperature, the precipitate was separated, and the filtrate was concentrated yielding more precipitate. The combined precipitates were crystallized. Yield 2.1 g (80%); mp 210°C (*THF*); IR: $\bar{\nu} = 3420$, 3300 (NH), 3120, 3020, 2920 (CH), 1650 (C=N), 1320, 1130 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 4.2$ (s, CH_2), 7.2–7.5 (m, 5 *ar* H, NH_2), 8.3–8.5 (m, 2 *ar* H, NH) ppm.

4-Amino-N-(4-methoxybenzyl)pyrimidine-5-sulfonamide (**33b**, $C_{12}H_{14}N_4O_3S$)
From **2d** (2.4 g, 10 mmol) as described for **33a**. Yield 2.35 g (80%); mp 197–199°C (*THF*); IR: $\bar{\nu} = 3430$, 3300 (NH), 3120, 2990 (CH), 1660 (C=N), 1330, 1170 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 3.9$ (s, O*Me*), 4.2 (s, CH_2), 3.9–5.0 (br s, NH_2), 6.8–7.5 (m, 4 *ar* H), 7.0–8.0 (br s, NH), 8.50, 8.51 (2s, 2 *ar* H) ppm.

4-Amino-N-phenylpyrimidine-5-sulfonamide (**33c**, $C_{10}H_{10}N_4O_2S$)
From **2b** (2.0 g, 10 mmol) as described for **33a**. Yield 2.0 g (80%); mp >250°C (dec, *THF*); IR: $\bar{\nu} = 3430$, 3310 (NH_2, NH), 3160, 3060, 3020, 2950, 2880 (CH), 1650 (C=N), 1330, 1140 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 7.0$–7.4 (s, 5 *ar* H), 6.5–8.5 (br s, NH_2), 8.5 (s, 2 *ar* H), 10.3–10.5 (br s, NH) ppm.

4-Amino-N-(4-methoxyphenyl)pyrimidine-5-sulfonamide (**33d**, $C_{11}H_{12}N_4O_2S$)
From **2f** (2.1 g, 10 mmol) as described for **33a**. Yield 2.3 g (80%); mp 291°C (*THF*); IR: $\bar{\nu} = 3490$, 3290 (NH_2), 3120, 2995, 2900 (CH), 1640 (C=N), 1320, 1160 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6): $\delta = 3.65$ (s, O*Me*), 6.8–7.2 (m, 4 *ar* H), 8.30, 8.45 (2s, 2 *ar* H), 9.0–6.5 (br s, NH_2), 10.0 (br s, NH) ppm.

4-Amino-N-propylpyrimidine-5-sulfonamide (**33e**, $C_7H_{12}N_4O_2S$)
From **2g** (1.6 g, 10 mmol) as described for **33a**. Purification by CC (*Ac*O*Et*) yielded 0.1 g (5%) **35** as a by-product. Yield 1.5 g (70%); mp 164°C (*Ac*O*Et*); IR: $\bar{\nu} = 3430$, 3300 (NH_2), 3120, 3020, 2960 (CH), 1650 (C=N), 1325, 1160 (SO_2) cm^{-1}; ^1H NMR (acetone-d_6): $\delta = 1.0$ (m, *Me*), 1.4–1.8 (m, CH_2), 2.9–3.2 (m, CH_2), 6.3–7.5 (br s, NH_2, NH), 8.4–8.5 (2s, 2 *ar* H) ppm.

4-Amino-N-(2-chlorobenzyl)pyrimidine-5-sulfonamide (**33f**, $C_{11}H_{11}ClN_4O_2S$)
From **2h** (2.4 g, 10 mmol) as described for **33a**. Yield 2.2 g (80%); mp 222°C (*Me*OH); IR: $\bar{\nu} = 3411$, 3319 (NH), 1657 (C=N), 1331, 1135 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6, 400 MHz): $\delta = 4.15$ (s, CH_2), 7.2–7.5 (m, 4 *ar* H), 8.40, 8.45 (2s, 2 *ar* H) ppm; MS (70 eV): m/z (%) = 299 (80, M^+).

4-Amino-N-(4-chlorobenzyl)pyrimidine-5-sulfonamide (**33g**, $C_{11}H_{11}ClN_4O_2S$)
From **2i** (2.4 g, 10 mmol) as described for **33a**. Yield 2.3 g (80%); mp 244°C (*Me*OH); IR: $\bar{\nu} = 3411$, 3319 (NH), 1657 (C=N), 1331, 1135 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6, 90 MHz): $\delta = 4.1$ (s, CH_2), 7.1–7.5 (m, 4 *ar* H), 8.4, 8.5 (2s, 2 *ar* H) ppm.

4-Amino-N-(4-fluorobenzyl)pyrimidine-5-sulfonamide (**33h**, $C_{11}H_{11}FN_4O_2S$)
From **2k** (2.3 g, 10 mmol) as described for **33a**. Yield 2.2 g (80%); mp 197°C (*Me*OH); IR: $\bar{\nu} = 3400$, 3300 (NH), 1650 (C=N), 1330, 1135 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6, 90 MHz): $\delta = 4.1$ (s, CH_2), 6.97–7.4 (m, 4 *ar* H), 8.4, 8.5 (2s, 2 *ar* H) ppm.

4-Amino-N-(4-bromophenyl)pyrimidine-5-sulfonamide (**33i**, $C_{10}H_9BrN_4O_2S$)
From **2l** (2.7 g, 10 mmol) as described for **33a**. Yield 2.0 g (60%); mp 300°C (*Me*OH); IR: $\bar{\nu} = 3436$, 3305 (NH), 1650 (C=N), 1329, 1135 (SO_2) cm^{-1}; ^1H NMR (*DMSO*-d_6, 90 MHz): $\delta = 7.0$–7.6 (m, 4 *ar* H), 8.5 (s, 2 *ar* H) ppm.

4-Acetylamino-N-benzylpyrimidine-5-sulfonamide (**34a**, $C_{13}H_{14}N_4O_3S$)
Compound **33a** (1.3 g, 5 mmol), 20 cm^3 *Ac*OH, and 20 cm^3 Ac_2O were refluxed for 3 h, cooled to room temperature, and evaporated *in vacuo*. The residue was dissolved in $CHCl_3$, washed with an aqueous *Ac*ONa solution, dried (Na_2SO_4), and the solvent was evaporated *in vacuo*. Yield 1.0 g (65%); mp 218°C ($CHCl_3/CCl_4$); IR: $\bar{\nu} = 3360$ (NH), 3120, 2950 (CH), 1650 (C=N), 1320, 1140 (SO_2) cm^{-1}; ^1H NMR: $\delta = 2.4$ (s, *Me*), 3.2–3.6 (br s, NH), 4.2 (s, CH_2), 7.2 (s, 5 *ar* H), 8.8–9.3 (m, 2 *ar* H, NH) ppm.

4-Acetylamino-N-acetyl-N-(4-chlorobenzyl)pyrimidine-5-sulfonamide (**34b**, $C_{15}H_{15}ClN_4O_4S$)
From **33g** (1.5 g, 5 mmol) as described for **34a**. Yield 0.8 g (42%); mp 180°C (acetone); IR: $\bar{\nu} = 3341$ (NH), 1703 (CO), 1571 (C=N), 1374, 1147 (SO_2) cm^{-1}; ^1H NMR (90 MHz): $\delta = 2.2$ (s, *Me*), 2.5 (s, *Me*), 5.1 (s, CH_2), 7.1–7.5 (m, 4 *ar* H), 8.7, 9.0 (2s, 2 *ar* H), 9.6 (s, NH) ppm.

4-Acetylamino-N-acetyl-N-phenylpyrimidine-5-sulfonamide (**34c**, $C_{14}H_{14}N_4O_4S$)
From **33c** (1.3 g, 5 mmol) as described for **34a**. Yield 0.5 g (30%); mp 160°C (acetone); IR: $\bar{\nu} = 3345$ (NH), 1710 (CO), 1570 (C=N), 1375, 1150 (SO_2) cm^{-1}; ^1H NMR: $\delta = 1.9$ (s, *Me*), 2.5 (s, *Me*), 7.2–7.7 (m, 5 *ar* H), 8.9, 9.1 (2s, 2 *ar* H), 9.7 (s, NH) ppm.

2-Amino-N-propyl-1-cyanoethene-1-sulfonamide (**35**, $C_6H_{11}N_3O_2S$)
Compound **35** was isolated as by-product from the synthesis of **33e**. Yield 0.1 g (5%); IR: $\bar{\nu} = 3440$, 3280 (NH), 2200 (CN), 1650 (C=C), 1310, 1160 (SO_2) cm^{-1}.

(RS)-2-(4-Chlorobenzyl)-3-ethoxy-3,4-dihydro-2H-pyrimido[4,5-e][1,2,4]thiadiazine 1,1-dioxide (**36a**, $C_{14}H_{15}ClN_4O_3S$)
Compound **33g** (0.3 g, 1 mmol), 2 cm^3 $HC(OEt)_3$, and 3 drops *Ac*OH were refluxed for 6 h, cooled to room temperature, and the precipitate was isolated. Yield 0.2 g (56%); mp 179°C (*Me*OH); IR: $\bar{\nu} = 3180$, 2983 (CH), 1593 (C=N), 1346, 1176 (SO_2), 1121 (C–O) cm^{-1}; ^1H NMR (*DMSO*-d_6, 90 MHz): $\delta = 1.1$ (t, $J = 5.8$ Hz, *Me*), 3.6 (q, $J = 11.6$ Hz, CH_2), 4.3 (d, $J = 5.8$ Hz, CH_2), 5.96 (s, 3-H), 7.4 (s, 4 *ar* H), 8.7, 8.8 (2s, 2 *ar* H), 9.6 (br s, NH) ppm.

(RS)-2-(4-Fluorobenzyl)-3-ethoxy-3,4-dihydro-2H-pyrimido[4,5-e][1,2,4]thiadiazine 1,1-dioxide (**36b**, $C_{14}H_{15}FN_4O_3S$)
From **33h** (0.3 g, 1 mmol) as described for **36a**. Yield 0.22 g (65%); mp 170°C (*Me*OH); IR: $\bar{\nu} = 3179$, 2984 (CH), 1593 (C=N), 1345, 1182 (SO_2), 1125 (C–O) cm^{-1}; ^1H NMR (*DMSO*-d_6, 300 MHz): $\delta = 1.03$ (t, $J = 6.6$ Hz, *Me*), 3.56 (q, $J = 9.9$ Hz, CH_2), 4.2 (d, CH_2), 5.8 (s, 3-H), 7.1–7.3 (m, 4 *ar* H), 8.70, 8.74 (2s, 2 *ar* H), 9.6 (br s, NH) ppm.

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