Oxamates Derived from 5-Aminopyrazoles

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Several oxamates were prepared from ethyl oxalyl chloride and 5-amino-4-cyanopyrazoles substituted in the 1-position with aryl, aroyl and arylsulfonyl groups. Both aroyl and arylsulfonyl groups suffered chloride-induced cleavage during this process. The synthesis of 7-(6-chloro-3-pyridazinyl)-7*H*-pyrazolo[3,4-*d*]-1,2,3-triazin-4(3*H*)-one (**11**) and its reaction with methanol to give 1-(6-chloro-3-pyridazinyl)-5-methoxy-1*H*-pyrazole-4-carboxamide (**12**) are also reported. A mechanism for this interesting transformation is presented.

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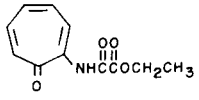
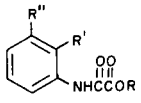
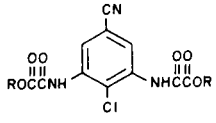
There has been a great deal of recent interest in alkyl oxamates and oxamic acids or their salts as anti-allergy agents. Representative alkyl oxamates which reached later stages of drug development include Lodoxamide Ethyl (U-42,718) [1,2], WY-16,922 [3], AY-25,674 [4,5] and MTB [6]. Examples of oxamic acids and oxamic acid salts are WY-41,195 [7,8] and Lodoxamide Tromethamine (U-42,-585E) [9], respectively. Some of these agents have undergone extensive clinical evaluation.



AY-25,674

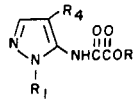


R = H, R' = CN, R'' = $NHCH_3$; WY-41,195
R = CH_2CH_3, R' = $CONH_2$, R'' = OCH_3; WY-16,922
R = n-Bu, R' = H, R'' = 5-tetrazolyl; MTB



R = CH_2CH_3, Lodoxamide Ethyl (U-42,718)
R = $NH_3C(CH_2OH)_3$, Lodoxamide Tromethamine (U-42,585E)

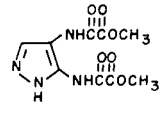
Most of these agents derive from anilines, and hence are also referred to as oxanilic acid derivatives [10]. We decided to prepare oxamates of aminopyrazoles of the following general structure, in which the cyano group is *ortho* to



R = ethyl
R_1 = aryl, aroyl, arylsulfonyl
R_4 = cyano

the oxamate functionality. An *ortho* relationship of cyano and carboxamide groups to oxamate functionality is present in WY-41,195 and WY-16,922, respectively. A feature of the planned oxamates, not present in any of the existing oxamates with anti-allergic activity, was the electron-rich character of the aromatic (pyrazole) ring. It has been suggested that with Lodoxamide-like compounds, electron-withdrawing substituents on the aromatic ring are necessary for optimal activity [1]. A primary objective of the present study, then, was to explore the effect of an electron-rich aromatic nucleus on the biological activity of oxamates.

Two literature references exist on oxamates derived from aminopyrazoles. One described dioxamate **1**, which was prepared from 4,5-diamino-1*H*-pyrazole and excess dimethyl oxalate, in a study describing 1*H*-pyrazolo[3,4-*b*]-pyrazines as purine antagonists [13]. The other describes 3-[(5-nitro-2-imidazolyl)pyrazol-5-yl)oxamic acid derivatives **2a-e** as antibacterial agents [14].



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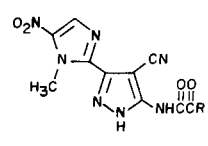
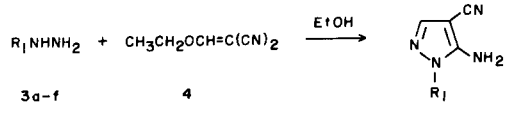


2a, R = OCH_3
b, R = OCH_2CH_3
c, R = OC_6H_5
d, R = $NHNH_2$
e, R = NHOH

Scheme I



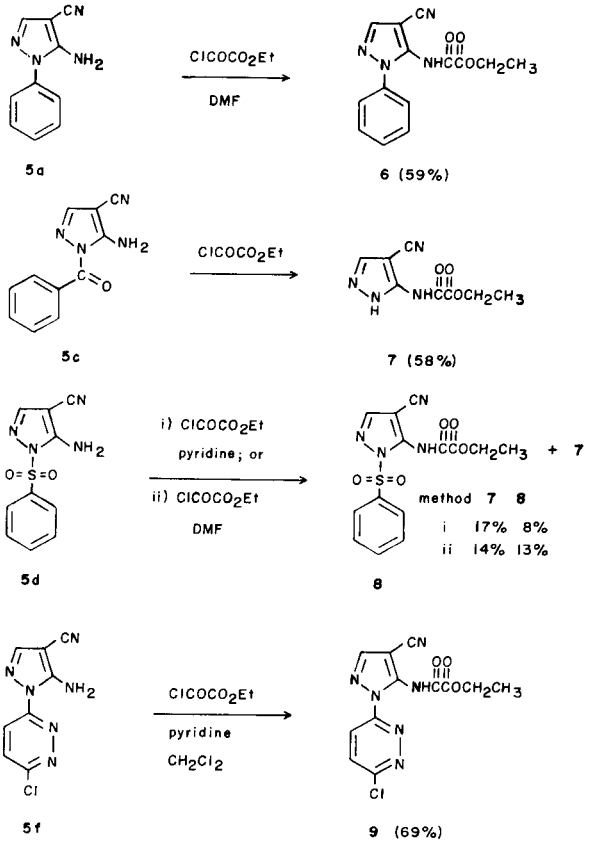
3a-f **4** **5a-f**

a, R_1 = C_6H_5
b, R_1 = 4-$CH_3SO_2C_6H_4$
c, R_1 = C_6H_5CO
d, R_1 = $C_6H_5SO_2$
e, R_1 = 4-$CH_3C_6H_4SO_2$
f, R_1 =

1-Substituted-4-cyano-5-aminopyrazoles can be prepared from substituted hydrazines or hydrazides and ethoxymethylenemalononitrile (**4**). We have previously described pyrazoles from **4** and 3-chloro-6-hydrazinopyridazine [15] and 2-nitrophenylhydrazine [16]. Thus, we were able to prepare trisubstituted pyrazoles **3a-f** as shown in Scheme I.

We next selected certain aminopyrazoles for acylation with ethyl oxalyl chloride (Scheme II). Acylation of **5a** using dimethylformamide as the solvent proceeded smoothly to give oxamate **6**. However, when we treated 5-amino-1-benzoyl-1*H*-pyrazole-4-carbonitrile (**5c**) with excess, neat ethyl oxalyl chloride [17], we obtained the debenzoylated oxamate **7**. Apparently, chloride ion quite efficiently displaces the pyrazole, and benzoyl chloride is a byproduct [18].

Scheme II



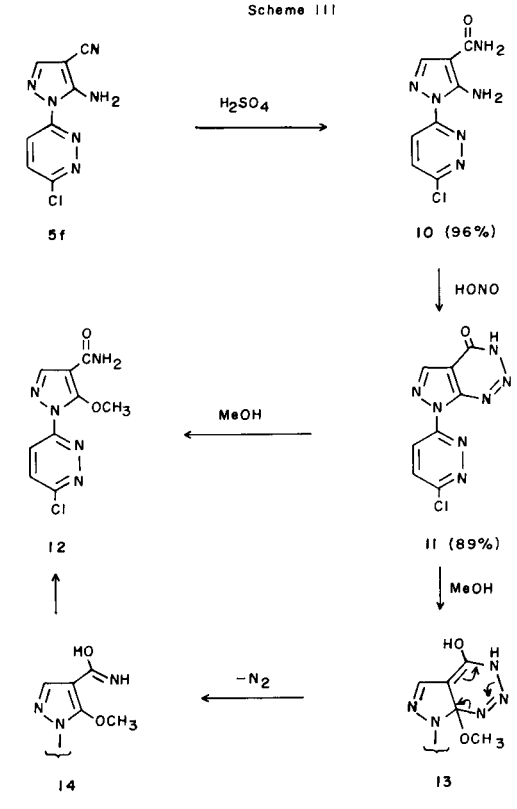
We felt that phenylsulfonylpyrazole **5d** should be less susceptible to cleavage by chloride ion, and next examined the acylation of **5d**. When pyridine was the reaction medium, **5d** and ethyl oxalyl chloride produced a mixture of the expected oxamate **8** (8%) and **7** (17%). Thus, the major isolated product was one in which the phenylsulfonyl group had been cleaved. Hoping to reduce the amount of nucleophilic chloride ion present in the reaction medium, we repeated the acylation using dimethylformamide as the solvent. Low yields of both **8** (13%) and **7** (14%) were again isolated. However, the relative amount of isolated **8** had increased, which may have resulted from a reduced chloride ion concentration.

Acylation of **5f** with ethyl oxalyl chloride occurred smoothly in pyridine and methylene chloride to give oxamate **9** in good yield.

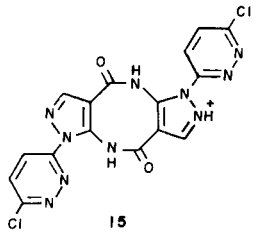
Oxamates **6-9** were all evaluated for anti-allergic activity as measured by the rat Passive Cutaneous Anaphylaxis (PCA) test [20]. None of these compounds was active. We conclude that an electron-rich aromatic nucleus is detrimental to the activity of oxamates, as was suggested by others [1].

Since certain triazinones display anti-allergic activity [22], we prepared a pyrazolotriazinone from pyrazole **5f** as shown in Scheme III. Hydration of the cyano group with sulfuric acid gave a 96% yield of amide **10** [23]. Nitrosation of **10** gave triazinone **11**, which was obtained analytically pure directly from the reaction mixture, in 89% yield. However, recrystallization of **11** from methanol gave a new material, which we found to be 1-(6-chloro-3-pyridazinyl)-5-methoxy-1*H*-pyrazole-4-carboxamide (**12**).

Scheme III



Thermal instability of **11** was also apparent from its mass spectrum. We observed two molecular ions in the methane chemical ionization mass spectrum. One at m/e 250 corresponded to protonated **11**, and another at m/e 433 resulted from **11** by loss of nitrogen, dimerization and protonation. We suggest structure **15** for the latter.



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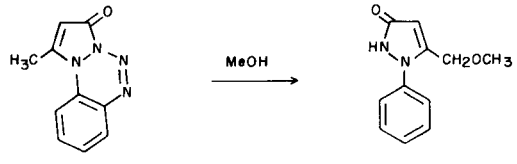
We feel the mechanism of the interesting **11** to **12** transformation involves the Michael addition of methanol to the triazinone as shown at the bottom of Scheme III. This addition could be initiated by protonation of the carbonyl group, which would result in a nicely stabilized carbonium ion at position 7a, which upon trapping with methanol would give intermediate **13**. A retro Diels-Alder cycloaddition would produce intermediate **14**, a tautomer of carboxamide **12**.

The decomposition of **11** in methanol is somewhat similar to the alcohol-induced decomposition of 1-methyl-3*H*-pyrazolo[1,2-*a*]benzotetrazin-3-one (**16**), which was recently reported by Almerico and Boulton [24]. These authors found that methoxymethylpyrazolone **17** resulted from decomposition of **16** with methanol, and postulated that the carbonyl group was protonated in the first step. Loss of nitrogen, followed by intramolecular quenching of the phenyl cation by a hydrogen from the methyl group and methanol trapping of the resulting carbonium ion gave **17**.



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Pyrazolotriazinone **11**, in contrast to oxamates **6-9**, was active in the rat PCA test [25]. We attempted to modify **11**, by displacement of chlorine with a secondary amine. However, treatment of **11** with pyrrolidine caused a very rapid decomposition, and we did not further pursue the chemistry of **11**.

EXPERIMENTAL

All melting points are uncorrected. The ir spectra were recorded with a Perkin-Elmer Model 727B Spectrophotometer, nmr spectra with Varian EM-360A and Perkin-Elmer R-32 (90 MHz) spectrometers, and mass spectra with Finnigan gc/ms Model 4023 (electron impact and chemical ionization) mass spectrometer. Combustion analysis for C, H and N were performed by Dow Analytical Laboratories, Midland, MI.

5-Amino-1-phenyl-1*H*-pyrazole-4-carbonitrile (**5a**).

A solution of 108 g (1.00 mole) of phenylhydrazine (**3a**) and 128 g (1.05 moles) of ethoxymethylenemalononitrile (**4**) in 750 ml of ethanol was heated at reflux for 17 hours. The clear, dark solution was diluted with 750 ml of water, while still warm. Tan prisms deposited which were collected and oven-dried to yield 130 g (70%) of **5a**, mp 131-137° (lit [26] mp 135-137°).

5-Amino-1-[4-(methylsulfonyl)phenyl]-1*H*-pyrazole-4-carbonitrile (**5b**).

A solution of 50.0 g (0.268 mole) of 4-(methylsulfonyl)phenylhydrazine (**3b**) and 34.3 g (0.281 mole) of ethoxymethylenemalononitrile (**4**) in 250 ml of ethanol was heated at reflux. A precipitate was noted after 15 minutes. After 15 hours, the mixture was cooled and the yellow solid was collected and air-dried to yield 51.4 g (73%) of **5b**, mp 236-238°; ir (Nujol): 3450, 3315 and 3170 (NH); 2225 (CN), 1635 cm^{-1}; nmr (dimethylsulfoxide-d_6): δ 8.11 (d, J = 8 Hz, 2H, phenyl), 7.89 (s, 1H, C3-H), 7.84 (d, J = 8 Hz, 2H, phenyl), 6.94 (broad s, 2H, NH_2, deuterium oxide-exchangeable), 3.25 (s, 3H, CH_3); ms: (70 eV, electron impact) m/e 262 (molecular ion).

Anal. Calcd. for $C_{11}H_{10}N_4O_2S$: C, 50.37; H, 3.84; N, 21.36. Found: C, 50.40; H, 3.87; N, 21.57.

5-Amino-1-benzoyl-1*H*-pyrazole-4-carbonitrile (**5c**).

A mixture of 13.6 g (0.100 mole) of benzoylhydrazine (**3c**), 13.4 g (0.110 mole) of ethoxymethylenemalononitrile (**4**) and 100 ml of ethanol was heated at reflux. Solution resulted, but after 1 hour a voluminous precipitate was present. The mixture was cooled and the solid was collected and air-dried to give 14.6 g (69%) of **5c**, mp 188-192°, mp 191-193° (methanol); ir (Nujol): 3430, 3300 and 3230 (NH_2), 2220 (CN), 1695 (C=O), 1640 cm^{-1}; nmr (dimethylsulfoxide-d_6): δ 8.20-7.80 (m, 5H, phenyl protons *ortho* to carbonyl, C3-H s at 7.95, and NH_2 s, exchangeable with tetradeuteriomethanol, at 8.05), 7.80-7.40 (m, 3H, remaining aromatic); ms: (70 eV, electron impact) m/e 212 (molecular ion).

Anal. Calcd. for $C_{11}H_8N_4O$: C, 62.25; H, 3.80; N, 26.40. Found: C, 62.00; H, 3.89; N, 26.45.

5-Amino-1-(phenylsulfonyl)-1*H*-pyrazole-4-carbonitrile (**5d**).

A mixture of 100 g (0.581 mole) of benzenesulfonylhydrazine (**3d**), 78.0 g (0.639 mole) of ethoxymethylenemalononitrile (**4**) and 500 ml of ethanol was heated, and solution resulted before reflux temperature was attained. A precipitate appeared shortly thereafter. After 1 hour, the mixture was cooled and the tan solid was collected, washed with ethanol and air-dried to afford 85.0 g (59%) of **5d**, mp 193-194°; ir (Nujol): 3470, 3300, 3220, 3180, 3140, 2225 (CN), 1625 cm^{-1}; nmr (dimethylsulfoxide-d_6): δ 8.04-7.55 (m, all protons); ms: (70 eV, chemical ionization, methane) 249 ($M^+ + 1$), 277 ($M^+ + 29$), 289 ($M^+ + 41$).

Anal. Calcd. for $C_{10}H_8N_4O_2S$: C, 48.38; H, 3.25; N, 22.57. Found: C, 48.40; H, 3.28; N, 22.80.

5-Amino-1-[(4-methylphenyl)sulfonyl]-1*H*-pyrazole-4-carbonitrile (**5e**).

A mixture of 107 g (0.573 mole) of *p*-toluenesulfonylhydrazine (**3e**), 76.9 g (0.630 mole) of ethoxymethylenemalononitrile (**4**) and 500 ml of ethanol was heated to reflux. Solution resulted prior to reflux, but after the reflux temperature was attained, a precipitate formed. After 75 minutes at reflux the mixture was cooled and the solid was collected and air-dried to yield 76.2 g (51%) of **5e**, mp 195-198°, mp 198-201° (2-methoxyethanol); ir (Nujol): 3460, 3290, 3230, 3180, 3150, 2220 (CN), 1625 cm^{-1}; nmr (dimethylsulfoxide-d_6): δ 7.93 (d, J = 8 Hz, 2H, phenyl), 7.89 (s, 1H, C3-H), 7.62 (s, 2H, NH_2, deuterium oxide-exchangeable), 7.52 (d, J = 8 Hz, 2H, phenyl), 2.40 (s, 3H, CH_3); ms: (70 eV, electron impact) m/e 262 (molecular ion).

Anal. Calcd. for $C_{11}H_{10}N_4O_2S$: C, 50.37; H, 3.84; N, 21.36. Found: C, 50.44; H, 3.90; N, 21.43.

5-Amino-1-(6-chloro-3-pyridazinyl)-1*H*-pyrazole-4-carbonitrile (**5f**).

A mixture of 14.5 g (0.100 mole) of 3-chloro-6-hydrazinopyridazine (**3f**), 13.4 g (0.110 mole) of ethoxymethylenemalononitrile (**4**) and 150 ml of ethanol was heated to reflux. The color of the mixture changed from orange to yellow and a voluminous solid was present. An additional 150 ml of ethanol was added. The mixture was heated at reflux for 1 hour, cooled, and the white solid was collected and oven-dried to give 20.0 g (91%) of **5f** [27], mp 245-247° (methanol); ir (Nujol): 3400, 3300, 2240 (CN), 1630 cm^{-1}; nmr (dimethylsulfoxide-d_6): δ 8.25-7.90 (m).

Anal. Calcd. for $C_8H_5ClN_6$: C, 43.55; H, 2.28; N, 38.10. Found: C, 43.50; H, 2.32; N, 38.36.

N-(4-Cyano-1-phenyl-1*H*-pyrazol-5-yl)-2-oxoglycine Ethyl Ester (**6**).

To a solution of 10.0 g (54.3 mmoles) of **5a** in 50 ml of dimethylformamide was added 10.0 g (73.2 mmoles) of ethyl oxalyl chloride, over a 4-minute period, without cooling. The addition was mildly exothermic. After 15 minutes the solution was quenched with cold water (200 ml). Upon scratching, the oily portion of the mixture solidified. The solid was collected, washed with water and air-dried to give 13.0 g of **6**. Recrystallization from ethanol (50 ml) afforded 9.16 g (59%) of pure **6**, mp 132-133°; ir (Nujol): 3220 (NH), 3130, 3080, 2240 (CN), 1760 (ester C=O), 1725 (amide C=O) cm^{-1}; nmr (deuteriochloroform): δ 9.30 (broad s, 1H, NH, deuterium oxide-exchangeable), 7.91 (s, 1H, C3-H), 7.48 (s, 5H, phenyl), 4.36 (q, J = 7 Hz, 2H, CH_2), 1.34 (t, J = 7 Hz, 3H, CH_3); ms: (70 eV, electron impact) m/e 284 (molecular ion).

Anal. Calcd. for $C_{14}H_{12}N_4O_3$: C, 59.15; H, 4.26; N, 19.71. Found: C, 59.12; H, 4.29; N, 19.79.

N-(4-Cyano-1*H*-pyrazol-5-yl)-2-oxoglycine Ethyl Ester (**7**).

A mixture of 5.00 g (23.6 mmoles) of **5c** and 25 ml of ethyl oxalyl chloride was heated. Solution resulted, followed by gas evolution. Further heating initiated reflux, which was maintained for 5 minutes. The solution was cooled and treated with hexane (150 ml). The cloudy supernatant was removed and the residual oil was once more washed with hexane (50 ml). The oil was then dissolved in ethanol (50 ml). This dissolution was slightly exothermic, probably due to the reaction of ethanol with some remaining ethyl oxalyl chloride. A yellow, crystalline product appeared, which was collected, washed with ethanol and air-dried to yield 2.88 g (58%) of **7**, mp 204-205°; ir (Nujol): 3340 (NH), 3300 (NH), 2240 (CN), 1710 (C=O) cm^{-1}; nmr (deuteriochloroform-dimethylsulfoxide-d_6): δ 10.90 (s, 1H, amide NH, slow exchange with tetradeuteriomethanol), 10.83 (broad s, 1H, N1-H, rapid exchange with tetradeuteriomethanol), 8.04 (s, 1H, C3-H), 4.40 (q, J = 7.5 Hz, 2H, CH_2), 1.38 (t, J = 7.5 Hz, 3H, CH_3).

Anal. Calcd. for $C_8H_8N_4O_3$: C, 46.15; H, 3.87; N, 26.92. Found: C, 46.10; H, 3.95; N, 26.94.

N-[4-Cyano-1-(phenylsulfonyl)-1*H*-pyrazol-5-yl]-2-oxoglycine Ethyl Ester (**8**). A. Pyridine Method.

To a slurry of 5.00 g (20.1 mmoles) of pyrazole **5d** and 25 ml of pyridine was added 5.00 g (36.6 mmoles) of ethyl oxalyl chloride quite rapidly without cooling. The addition was exothermic. Solution resulted, and a precipitate appeared later. After 1 hour the mixture was diluted with water and the oily mixture was extracted with methylene chloride. The organic extracts were washed with dilute hydrochloric acid, dried (sodium sulfate) and concentrated to leave 1.44 g of yellow solid which was a mixture of two materials by tlc. Recrystallization from ethanol (40 ml) gave 0.53 g (8%) of **8** as white needles, mp 175-177°; ir (Nujol): 3320 (NH), 3135 (CH), 2240 (CN), 1710 (C=O) cm^{-1}; nmr (deuteriochloroform): δ 9.24 (broad s, 1H, NH, deuterium oxide-exchangeable), 8.51 (s, 1H, C3-H), 8.15-8.00 (m, 2H, aromatic), 7.90-7.50 (m, 3H, aromatic), 4.41 (q, J = 7 Hz, 2H, CH_2), 1.38 (t, J = 7 Hz, 3H, CH_3); ms: (70 eV, electron impact) m/e 348 (molecular ion).

Anal. Calcd. for $C_{14}H_{12}N_4SO_5$: C, 48.27; H, 3.47; N, 16.08. Found: C, 48.10; H, 3.51; N, 16.27.

The acidic, aqueous wash deposited a white, crystalline solid. Collection and air-drying gave 0.70 g (17%) of **7**, as shown by tlc and ir.

B. Dimethylformamide Method.

To a solution of 5.00 g (20.1 mmoles) of pyrazole **5d** in 25 ml of dimethylformamide in an ice bath was added 5.00 g (36.6 mmoles) of ethyl oxalyl chloride, dropwise, over a 4-minute period. After 1 hour of stirring in the ice bath the solution was diluted with water (200 ml) and the resulting solid was collected and air-dried to give 4.95 g. Recrystallization from toluene (50 ml) gave 2.38 g of white solid, which was a mixture of two materials by tlc. This material was treated with hot toluene (75 ml), and the insoluble, pale yellow solid was collected to give 0.60 g (14%) of **7**, as shown by tlc and ir. The toluene filtrate deposited a white, crystalline solid which was collected and dried to give 0.90 g (13%) of **8**, as shown by tlc and ir.

N-[1-(6-Chloro-3-pyridazinyl)-4-cyano-1*H*-pyrazol-5-yl]-2-oxoglycine Ethyl Ester (**9**).

To a slurry of 11.0 g (50.0 mmoles) of pyrazole **5f**, 7.91 g (0.100 mole) of pyridine and 200 ml of methylene chloride was added (dropwise) 7.51 g (55.0 mmoles) of ethyl oxalyl chloride. The mixture darkened, exothermed mildly, and solution (almost) resulted. After 3 hours, a voluminous precipitate was present. The mixture was concentrated, slurried with water and the solid was collected, washed with water and ether and air-dried to give 19.4 g of material. Recrystallization from 2-methoxyethanol (250 ml) gave 11.1 g (69%) of **9**, mp 225.5-226.5°; ir (Nujol): 2245 (CN), 1730 (C=O) cm^{-1}; nmr (dimethylsulfoxide-d_6): δ 12.28 (broad s, 1H, NH), 8.45 (s, 1H, C3-H), 8.35 (d, J = 10.5 Hz, 1H, pyridazine H), 8.20 (d, J = 10.5 Hz, 1H, pyridazine H), 4.37 (q, J = 7.5 Hz, 2H, CH_2), 1.34 (t, J = 7.5 Hz, 3H, CH_3); ms: (70 eV, chemical ionization, methane) 321 ($M^+ + 1$).

Anal. Calcd. for $C_{12}H_9ClN_6O_3$: C, 44.94; H, 2.83; N, 26.21. Found: C, 44.70; H, 2.95; N, 26.29.

5-Amino-1-(6-chloro-3-pyridazinyl)-1*H*-pyrazole-4-carboxamide (**10**).

To 40 ml of cold, concentrated sulfuric acid was added 5.00 g (22.7 mmoles) of pyrazole **5f**, over a 5-minute period with ice bath cooling and stirring. After 10 minutes, the ice bath was removed and the mixture was stirred for an additional 15 minutes. The resulting pale yellow solution was carefully poured onto ice chips and the resulting precipitate was collected, washed with water and air-dried to give 5.21 g (96%) of **10**, mp 286-288° (dimethylformamide-water); ir (Nujol): 3430, 3330, 3260, 3160, 1655 (C=O); nmr (dimethylsulfoxide-d_6): δ 8.24 (d, J = 9 Hz, 1H, pyridazine H), 8.11 (s, 1H, C3-H), 8.05 (d, J = 9 Hz, 1H, pyridazine H), 7.60 (broad s, 2H, NH_2, tetradeuteriomethanol-exchangeable), 7.23 (broad s, 2H, NH_2, tetradeuteriomethanol-exchangeable); ms: (70 eV, electron impact) m/e 238 (molecular ion).

Anal. Calcd. for $C_8H_7ClN_6O$: C, 40.26; H, 2.96; N, 35.22. Found: C, 40.20; H, 3.03; N, 35.43.

7-(6-Chloro-3-pyridazinyl)-7*H*-pyrazolo[3,4-*d*]-1,2,3-triazin-4(3*H*)-one (**11**).

To a mixture of 5.00 g (21.0 mmoles) of **10**, 25 ml of concentrated hydrochloric acid and 25 ml of acetic acid at 5° was added a solution of 5.00 g of sodium nitrite in 10 ml of water over 20 minutes. After 1.5 hours of stirring at room temperature the foamy mixture was diluted with water. The resulting solid was collected and air-dried to give 4.64 g (89%) of pure **11**, mp 157° dec; ir (Nujol): 3130, 3100, 3080, 1735, 1665 cm^{-1}; nmr (dimethylsulfoxide-d_6): δ 15.45 (broad s, 1H, NH), 8.79 (s, 1H, C5-H), 8.49 (d, J = 9 Hz, 1H, pyridazine H), 8.29 (d, J = 9 Hz, 1H, pyridazine H); ms: (70 eV, chemical ionization, methane) 250 ($M^+ + 1$); 443 ($2M^+ - 56 + 1$), 471 ($2M^+ - 56 + 29$).

Anal. Calcd. for $C_8H_4ClN_7O$: C, 38.49; H, 1.61; N, 39.28. Found: C, 38.24; H, 1.75; N, 39.16.

1-(6-Chloro-3-pyridazinyl)-5-methoxy-1*H*-pyrazole-4-carboxamide (**12**).

Recrystallization of 4.64 g (18.6 mmoles) of **11** from methanol (600 ml concentrated to 300 ml) gave 2.24 g (48%) of **11**, mp 192-193°; ir (Nujol): 3440 and 3320 (NH), 1695 (C=O) cm^{-1}; nmr (dimethylsulfoxide-d_6): δ 8.22 (d, J = 9.5 Hz, 1H, pyridazine H), 8.01 (d, J = 9.5 Hz, 1H, pyridazine H), 7.60 (broad s, 2H, NH_2), 3.75 (s, 3H, OCH_3); ms: (70 eV, electron impact) m/e 253 (molecular ion).

Anal. Calcd. for $C_9H_8ClN_5O_2$: C, 42.61; H, 3.18; N, 27.61. Found: C, 42.64; H, 3.08; N, 27.53.

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[17] When we attempted the acylation of **5c** with ethyl oxalyl chloride in pyridine, a mixture of products resulted which, by tlc, appeared to be mostly unchanged **5c**.

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