New NO-Donors with Antithrombotic Activities and Vasodilating Activities, III: 3,4-Disubstituted *N*-Nitroso-5-sydnone Imines

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38 title compounds have been synthesized. They bear a wide variety in substituents including alkyl-, aryl-, arylalkyl-, and styryl groups. The antiplatelet activities elucidated in the *Born*-test with collagen cover more than two orders of magnitude (IC_{50} = 0.3-45 µmol/L). These effects depend on the presence of the *N*-NO-group. This is shown by comparison with the corresponding sydnone imines, sydnone cyanimines, and sydnones. The most suitable substituents were phenylethyl, styryl, and hexyl at either position of the molecule. Seven compounds, most of them styryl derivatives, have IC_{50} values below 1 µmol/L. It is suggested that the differences in activity are connected with the ability of the compounds to bind to the platelet membrane.

Neue NO-Pharmaka mit antithrombotischen und gefäßerweiternden Eigenschaften, 3. Mitt.: 3,4-Disubstituierte *N*-Nitroso-5-sydnon-imine

38 3,4-disubstituierte Nitrososydnonimine wurden dargestellt. Sie weisen eine große Variationsbreite von Substituenten auf. Sowohl Alkyl-, Aryl-, Arylalkyl- als auch Styrylgruppen wurden verwendet. Die im *Born*-Test mit Collagen ermittelten Hemmwirkungen auf die Thrombocytenaggregation überstreichen mehr als zwei Größenordnungen (IC_{50} = 0.3-45 µmol/L). Für diese Aktivitäten ist die *N*-Nitrosofunktion essentiell, wie der Vergleich mit den entspr. Iminen, Cyaminen oder den Sydnonen selbst zeigt. Die geeignetsten Substituenten waren 2-Phenylethyl-, Styryl- oder Hexyl-Reste sowohl in 3- wie in 4-Position. Sieben Verbindungen, vornehmlich Styrylderivate, hatten eine halbmaximale Hemmkonzentration von weniger als 1 µmol/L. Die Befunde deuten daraufhin, daß die Wirkungsdifferenzen mit der unterschiedlichen Fähigkeit der Substanzen, an die Thrombocytenmembran hydrophob zu binden, verknüpft sind.

Recently we reported on the strong platelet aggregation inhibiting activities of 3-substituted *N*-nitroso-sydnone-5 imines. The *in vitro* antiplatelet effects were accompanied by *in vivo* antithrombotic and antihypertensive properties. These results encouraged us to investigate the influence of a further substituent in position 4 of the sydnone-5 imine. The synthesis of the desired compounds was carried out in principle as described[1]. Briefly the amine R^1-NH_2 (Table 1) is reacted with an aldehyde R^2-CHO and KCN. After nitrosation and acid catalyzed ring closure the type **a** sydnone-5 imines are obtained. A second nitrosation yields the wanted type **b** compounds. The amines were selected according to the results in 3-monosubstituted derivatives. In addition the aromatic amine *p*-toluidine for type **17** compounds was assayed. A wide variety of aldehydes was used including aliphatic (**1-12, 17**), alicyclic (**13**), arylakyl (**14-16**), olefinic (**28-38**), and aromatic (**18-27**) species. The outstanding feature of the nitrosimines is their colour. It varies from yellow, (*e.g.* **11b, 12b**) *via* orange-yellow (**9b**), orange (**1b, 2b**), orange-red (**5b, 21b**), carmine (**8b, 6b, 22b**), and different reds to violet (**17b, 27b**), caused by an absorption in the electronic spectra in the range between 484 nm (**0b**) and 515 nm (*i.e.* **30b, 32-34b**). Its intensity is rather low but nevertheless characteristic. The log ε values vary from 2.06 (**1b**) to 2.55 (**38b**).

The correlation between structure and light absorption is examplified by the comparison shown in Scheme 1.

In the IR-spectra strong bands between 1350-1400 cm^{-1} indicate the presence of an -N=O group. In FAB-mass spectra the molecular ion could be shown.*). The intensities varied strongly from one to one hundred % (e.g. **2b, 8b, 22b**). In all three cases R^1 was hexyl.

Two surprising observations were made in the ^{1}H-NMR spectra: In compound **11b** the protons of the methylene group in R^2 are diastereotopic and form the AB part of an ABX_3 spin system.

This effect is even more pronounced in the corresponding imine **11a**. This effect is connected with the presence of the hydroxy group in R^1. As no diastereomeres are seen a steric fixation of R^1 by an interaction of the hydroxy group with the electron rich N-2 of the sydnone imine might be the reason the the anisochronic behaviour of the protons in the methylene group.

In compound **27b** (Scheme 2) a hindered rotation of the naphthalene ring was recognized by recording the ^{1}H-NMR spectra at various temp.

At the usual probe temp. of 310 K the methylene protons in 1'-position form the non first order AB-part of an ABX_3 spin system at 4.47 ppm which is shown in the upper panel of fig. 2. When the temp. is raised the multiplett is gradually converted in to a quartett (A → B → C). Simultaneously at 4.32 ppm a quartet arises. This signal corresponds to the formation of the sydnone **27c** by elimination of N_2.

The antiplatelet effects of all compounds are summarized in Table 1. In general the type **a** imines show low or no activity (IC_{50} between 13 (**34a**) and > 500 (**18a, 21a, 27a**)

+) Part of the Ph D thesis K.-J. Schleifer, FU Berlin, 1992.

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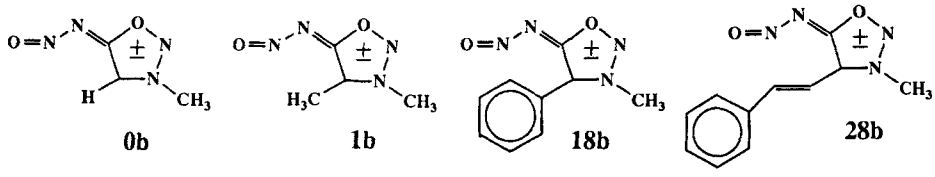
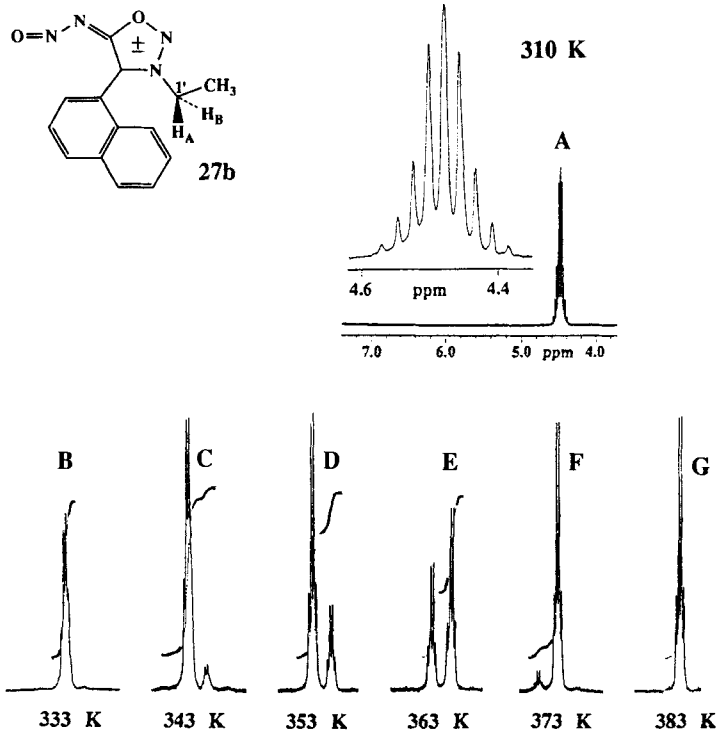


Scheme 1: Light absorption characteristics of different types of substitution in nitrososydnone imines



Scheme 2: ^{1}H-NMR spectra of **27b** (details)

μmol/L). Nitrosation of the imines to the type **b** nitrosimines is accompanied by a dramatic rise in the capability to inhibit collagen induced platelet aggregation. The IC_{50} drops down below 1 μmol/L (*e.g.* **13b**, **32b**, **34b**, **35b**, **36b**). This is most markedly expressed by the ratio of activity IC_{50a} which reaches r ≥ 250 in **27a/b**. Nevertheless there are pronounced structure activity relationships. For instance the IC_{50} of **3b** (86 μmol/L) is highly indicating lack of activity. On the other hand especially in the series of styryl derivatives (**28b-38b**) for many compounds the IC_{50} is below 1 μmol/L so that the range of activity differences covers two orders of magnitude. The sydnones of type **c** (*e.g.* **27c**) or the type **d** cyanimines (*e.g.* **4d**) show no activity. This indicates that the NO-part of the nitrosoimino group is an essential structural feature.

In more detail the following structure activity relationships emerge. Comparison of **0b** and **1b** at first gave the - wrong - impression that a second substituent in 4-position (R^2) is unfavourable. This effect is less obvious when optimal substituents in 3-position (R^1) are present (**2b**, **4b**, **7b**). When R^2 becomes more lipophilic (ethyl: **10b**, **11b**; isopropyl: **8b**, **9b**; isobutyl **12b**) more pronounced antiplatelet effects are observed. When suitable R^1 rests are present as well in R^2 very active compounds are obtained (**13b-16b**).

An aromatic substitution in 3-position is not easily obtained as the basicity of the starting aromatic amines is rather low. Nevertheless **17b** could be synthesized. As the activity was rather low and in the same range as in **18b** (R^1 = CH_3; R^2 = Ph) no further compounds of this series were designed. Having an aromatic substituent in 4-position (*i.e.* **18b**) the activity could be enhanced markedly by suitable substitution in 3-position as it is clearly shown by the rising activities in the line **18b** < **19b** < **20b** < **23b** < **22b** < **24b** < **26b**. Comparison of the pairs **20b/22b** and **23b/25b** furnishes evidence that more lipophilic substituents are more favourable. The same conclusion is suggested by compari-

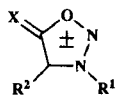
son of **19b** and **27b**, where R^2 = Ph is replaced by a 1-naphthyl residue. The activity thereby is raised by one order of magnitude. These results prompted us to introduce styryl rests in 4-position. This variation yielded the most active substances so far found in the sydnone nitrosimines. The IC_{50} of seven compounds was below 1 µmol/L (*e.g.* **28b**, **29b**, **32b-35b**). The peak activities were observed when R^1 was a 2-phenylethyl substituent (**32b**, **33b**). Interestingly the aromatic ring could be exchanged by the quasiaromatic furane without loss of activity (compare **32b** with **36b**). Polar groups (**37b**, **38b**) *i.e.* ether, ester or hydroxy moieties in the lipophilic R^1 decrease the antiplatelet effect.

We have pointed out[1)] that the *in vitro* antiplatelet activites are due to photolytic cleavage of the nitrosoimino group. Therefore, the question arises why such enormous structure dependence of this effect is observed although the nitrosimino group is the same in all type **b** compounds.

Firstly it has to be discussed whether the electronic properties especially the ability for the absorption of light are modified by the various substituents. This can be elucidated by comparison of the activities of compounds with identical electronic spectra. For instance **3b** (λ max, log ε): 347 (4.20); 498 (2.07) and **4b** (346 (4.25); 498 (2.11)) show nearly identical light absorption but differ by more than one order of magnitude in their activities (IC_{50} = 86 *vs.* 6 µmol/L). The same is true for the pairs **19b** (352 (4.14); 505 (2.15); IC_{50} = 24 µmol/L) and **22b** (352 (4.17); 507 (2.15); IC_{50} = 2 µmol/L) or **33b** (345 (4.32); 515 (2.26); IC_{50} = 0.3 µmol/L) and **37b** (344 (4.42); 514 (2.25); IC_{50} = 3.5 µmol/L). Many other examples could be added. Therefore, a different susceptibility to light cleavage can be ruled out or has a minor effect only.

More probably the differences in activity are connected with pharmacokinetic parameters. It is striking that the lowest IC_{50} values are obtained with substituents (phenylethyl, styryl, hexyl) which we have found to stand for high membrane affinity because of their hydrophobic binding properties[2)]. We, therefore, assume that in the test tube these com-

Tab. 1: Antiplatelet activities (*Born*-test, collagen) of 3,4-disubstituted nitrososydnone imines (**b**) compared to some corresponding sydnone imines (**a**), sydnones (**c**), and cyano sydnone imines (**d**). An asterix means that the test has been carried out in pure Hepes buffer without addition of DMSO.



a X = $NH_2^+Cl^-$
b X = NNO
c X = O
d X = NCN

No	R^1	R^2	IC_{50} [µmol/L]	No	R^1	R^2	IC_{50} [µmol/L]
0b	CH_3	H	2.5	**17a**	4-CH_3-Ph	CH_3	125*
1b	CH_3	CH_3	8.5	**17b**	4-CH_3-Ph	CH_3	23
2b	C_6H_{13}	CH_3	8.5	**18a**	CH_3	Ph	>500*
3b	$PhCH_2$	CH_3	86	**18b**	CH_3	Ph	45
4b	$Ph(CH_2)_2$	CH_3	6	**19b**	C_2H_5	Ph	24
4d	$Ph(CH_2)_2$	CH_3	87	**20b**	C_6H_{13}	Ph	5
5b	$Ph(CH_2)_3$	CH_3	38	**21a**	Allyl	Ph	>500*
6a	$Ph(CH_2)_4$	CH_3	>300*	**21b**	Allyl	Ph	8.5
6b	$Ph(CH_2)_4$	CH_3	18	**22b**	C_6H_3	4-Cl-Ph	2
7b	Ph-CHOH-CH-CH_3	CH_3	6	**23a**	$Ph(CH_2)_2$	Ph	53
8b	C_6H_{13}	$CH(CH_3)_2$	1.5	**23b**	$Ph(CH_2)_2$	Ph	5
9b	$Ph(CH_2)_2$	$CH(CH_3)_2$	5	**24b**	Ph-CHOH-CH-CH_3	Ph	2
10b	$Ph(CH_2)_2$	C_2H_5	3	**25a**	$Ph(CH_2)_2$	4-Cl-Ph	53
11b	Ph-CHOH-CH-CH_3	C_2H_5	4	**25b**	$Ph(CH_2)_2$	4-Cl-Ph	1.5
12b	$Ph(CH_2)_2$	CH_2-$CH(CH_3)_2$	4.5	**26b**	$Ph(CH_2)_3$	Ph	1.5
13b	$Ph(CH_2)_2$	Cyclohexyl	0.5	**27a**	C_2H_5	1-naphthyl	>500*
14a	$Ph(CH_2)_2$	$PhCH_2$	125*	**27b**	C_2H_5	1-naphthyl	2
14b	$Ph(CH_2)_2$	$PhCH_2$	2	**27c**	C_2H_5	1-naphthyl	70
15b	$Ph(CH_2)_3$	$PhCH_2$	1	**28a**	CH_3	PhCH=CH	46*
16a	$Ph(CH_2)_2$	$Ph(CH_2)_2$	119*	**28b**	CH_3	PhCH=CH	1
16b	$Ph(CH_2)_2$	$Ph(CH_2)_2$	3	**28c**	CH_3	PhCH=CH	70

Tab. 1: continued

No	R^1	R^2	IC_{50} [µmol/L]	No	R^1	R^2	IC_{50} [µmol/L]
29b	C_2H_5	PhCH=CH	0.7	**34a**	$PhCHOHCH_2$	PhCH=CH	13
30a	Allyl	PhCH=CH	34	**34b**	$PhCHOHCH_2$	PhCH=CH	0.6
30b	Allyl	PhCH=CH	1.5	**35a**	$Ph(CH_2)_3$	PhCH=CH	70
31a	Cyclohexyl	PhCH=CH	43	**35b**	$Ph(CH_2)_3$	PhCH=CH	0.7
31b	Cyclohexyl	PhCH=CH	2.5	**36a**	$Ph(CH_2)_2$	1-furanyl	70
32a	$Ph(CH_2)_2$	PhCH=CH	42*	**36b**	$Ph(CH_2)_2$	1-furanyl	0.4
32b	$Ph(CH_2)_2$	PhCH=CH	0.3	**37b**	$HO-(CH_2)_2-O-(CH_2)_2$	PhCH=CH	3.5
33a	$3,4-(CH_3O)Ph(CH)_2$	PhCH=CH	75	**38b**	$CH_3O-CO-(CH_2)_3$	PhCH=CH	1.5
33b	$3,4-(CH_3O)Ph(CH_2)_2$	PhCH=CH	0.3				

pounds concentrate at the platelet membrane. The metabolite (presumably NO) which is now released by interaction with the aggregometer light beam has an extremely short way to diffuse into the platelet. There it activates the soluble guanylat cyclase, raises the level of *c*-GMP and inhibits platelet aggregation. In summary this results in a reciprocal correlation between membrane affinity and IC_{50} values: Compounds docking best to the platelet membrane will have the highest antiplatelet activities *i.e.* the lowest IC_{50} values.

Experimental Part

Devices, synthetic procedures and test methods correspond to the previous communications of this series[1,3].

3-Methyl-N-nitroso-5-sydnone imine (**0b**)

Ochre yellow crystals (ethanol), mp. 133°C (Lit.[4]: 128°C). Yield 63%.- $C_3H_4N_4O_2$ (128.1) Calcd. C 28.1 H 3.14 N 43.7 Found C 27.9 H 3.11 N 43.5.- IR (KBr): 3417; 3052; 2953; 1646; 1565; 1468; 1445; 1416; 1403; 1360; 1347; 1235; 1107; 1087; 1067; 1017; 960; 878; 830; 678; 640 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 333 (4.26), 484 nm (1.89).- ^{1}H-NMR/250 MHz ([D_6]DMSO): δ (ppm) = 8.75 (s; 1H, syd-H), 4.39 (s; 3H, N-CH_3).- ^{13}C-NMR/75.47 MHz ([D_6]DMSO): δ (ppm) = 182.6 (s; syd-C-5), 106.5 (s; syd-C-4), 40.0 (s; N-CH_3).- MS (100°C): m/z = 128 (9%, $[M]^{+\cdot}$), 100 (33), 99 (12), 98 (15), 68 (25), 67 (47), 42 (48), 30 (100), 28 (47).- MS (+ FAB/DMSO/glycerol): m/z = 129 (21%, $[M + H]^+$), 99 (4), 93 (100%, [gly + $H]^+$), 55 (35).

3,4-Dimethyl-N-nitroso-5-sydnone imine (**1b**)

Orange powder (ethanol/ether), mp. 108°C. Yield 45%.- $C_4H_6N_4O_2$ (142.1) Calcd. C 33.8 H 4.25 N 39.4 Found C 33.9 H 4.27 N 39.1.- IR (KBr): 3429; 3044; 2956; 1618; 1583; 1559; 1473; 1433; 1401; 1383; 1371; 1353; 1341; 1173; 1150; 1115; 1075; 1008; 941; 903; 715; 662 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 268 (3.69), 342 (4.21), 493 nm (2.06).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 4.34 (s; 3H, N-CH_3), 2.40 (s; 3H, syd-CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 143 (14%, $[M + H]^+$), 129 (4), 114 (7), 93 (100%, [gly - $H]^+$), 73 (6).

3-Hexyl-4-methyl-N-nitroso-5-sydnone imine (**2b**)

Orange crystals (rosettes) (isopropanol/petrolether), mp. 37°C. Yield 78%.- $C_9H_{16}N_4O_2$ (212.3) Calcd. C 50.9 H 7.59 N 26.4 Found C 50.8 H 7.78 N 26.6.- IR (KBr): 3432; 2950; 2924; 2858; 1609; 1577; 1463; 1401; 1365; 1345; 1160; 1111; 1071; 932; 713 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 268 (3.59), 344 (4.21), 494 nm (2.09).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 4.68 (t; J = 7.3 Hz, 2H, N-CH_2), 2.42 (s; 3H, syd-CH_3), 1.95 (tt; J = 7/7 Hz, 2H, N-CH_2-$C\underline{H}_2$), 1.40-1.29 (m; 6H, $(C\underline{H}_2)_3$-CH_3), 0.87 (t; J = 7 Hz, 3H, CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 213 (100%, $[M + H]^+$), 212 (8), 184 (35), 183 (29), 170 (22), 149 (13), 126 (15), 85 (12), 78 (18).

3-Benzyl-4-methyl-N-nitroso-5-sydnone imine (**3b**)

Orange crystals (methanol), mp. 103°C (Lit.[4]: 105-106°C). Yield 80%.- $C_{10}H_{10}N_4O_2$ (218.2) Calcd. C 55.0 H 4.62 N 25.7 Found C 54.8 H 4.57 N 25.6.- IR (KBr): 2988; 2089; 1785; 1621; 1587; 1497; 1443; 1403; 1355; 1313; 1227; 1172; 1134; 1031; 1016; 961, 924; 905; 835; 715; 696; 652; 627 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 267 (3.58), 347 (4.20), 498 nm (2.07).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.53-7.46 (m; 5H aromat.), 6.01 (s; 2H, N-CH_2), 2.39 (s; 3H, syd-CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 219 (1%, $[M + H]^+$), 149 (16), 171 (4), 93 (100), 91 (16).

4-Methyl-N-nitroso-3-(2-phenylethyl)-5-sydnone imine (**4b**)

Orange needles (methanol/isopropanol), mp. 101°C. Yield 78%.- $C_{11}H_{12}N_4O_2$ (232.2) Calcd. C 56.9 H 5.21 N 24.1 Found C 56.9 H 5.17 N 24.1.- IR (KBr): 3429; 2992; 2936; 2180; 1606; 1573; 1492; 1452; 1406; 1372; 1315; 1162; 1131; 1081; 1004; 941; 900; 847; 757; 736; 702; 676; 639 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 267 (3.72), 346 (4.25), 498 nm (2.11).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.36-7.25 (m; 5H aromat.), 4.97 (t; J = 7 Hz, 2H, N-CH_2), 3.30 (t; J = 7 Hz, 2H, Ph-CH_2), 2.33 (s; 3H, syd-CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 233 (49%, $[M + H]^+$), 203 (14), 149 (20), 105 (98), 93 (100), 91 (12), 78 (14).

N-Cyano-4-methyl-3-(2-phenylethyl)-5-sydnone imine (**4d**)

Pink small crystals (methanol), mp. 117°C. Yield 35%.- $C_{12}H_{12}N_4O$ (228.3) Calcd. C 63.1 H 5.30 N 24.5 Found C 63.0 H 5.13 N 24.4.- IR (KBr): 2994; 2960; 2167; 1633; 1496; 1466; 1454; 1385; 1367; 1336; 1253; 1186; 1155; 1126; 1081; 1052; 982; 914; 843; 763; 740; 700; 657; 627 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 208 (4.30), 335 nm (4.01).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.34-7.24 (m; 5H aromat.), 4.77 (t; J = 7.1 Hz, 2H, N-CH_2), 3.20 (t; J = 7.1 Hz, 2H, Ph-CH_2), 2.08 (s; 3H, syd-CH_3).- ^{13}C-NMR/75.47 MHz ([D_6]DMSO): δ (ppm) = 167.9 (s; syd-C-5), 135.9 (s; Ph-C-1''), 128.8 (s; Ph-C-3'' and -C-5''), 128.4 (s; Ph-C-2'' and -C-6''), 127.0 (s; Ph-C-4''), 115.2 (s; -CN), 112.6 (s; syd-C-4), 52.0 (s; N-CH_2), 33.1 (s; Ph-CH_2), 6.3 (s; -CH_3).- MS (110°C): m/z = 228

(5%, $[M]^{+\cdot}$), 105 (100), 104 (29), 103 (15), 91 (80), 81 (12), 80 (15), 79 (21), 77 (25), 65 (16), 51 (16), 41 (12), 39 (14).

4-Methyl-N-nitroso-3-(3-phenylpropyl)-5-sydnone imine (**5b**)

Orange-red needles (ethanol), mp. 87°C. Yield 80%.- $C_{12}H_{14}N_4O_2$ (246.3) Calcd. C 58.5 H 5.73 N 22.7 Found C 58.2 H 5.66 N 22.5.- IR (KBr): 3437; 2995; 2958; 1578; 1479; 1452; 1407; 1348; 1329; 1221; 1177; 1132; 1107; 1011; 975; 944; 902; 779; 746; 701 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 210 (3.67), 267 (3.57), 345 (4.25), 496 (2.10).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.33-7.08 (m; 5H aromat.), 4.70 (t; J = 7 Hz, 2H, N-CH_2), 2.76 (t; J = 7 Hz, 2H, Ph-CH_2), 2.40 (s; 3H, syd-CH_3), 2.28 (tt; J = 7/7 Hz, 2H, N-CH_2-C$\underline{H}_2$).- MS (+ FAB/DMSO/glycerol): m/z = 247 (15%, $[M + H]^+$), 246 (6), 218 (5), 217 (9), 186 (12), 119 (9), 92 (10), 91 (100), 81 (16).- MS (130°C): m/z = 218 (8%, $[M - N_2]^{+\cdot}$), 119 (15), 92 (8), 91 (100).

4-Methyl-3-(4-phenylbutyl)-5-sydnone imine hydrochloride (**6a**)

Powder (ethanol/ether), mp. 146°C. Yield 72%.- $C_{13}H_{18}ClN_3O$ (267.8) Calcd. C 58.3 H 6.78 N 15.7 Found C 58.0 H 6.77 N 15.7.- IR (KBr): 3006; 2624; 2087; 1669; 1598; 1501; 1469; 1450; 1399; 1345; 1257; 1218; 1153; 1092; 939; 904; 803; 757; 729; 704 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 206 (4.11), 300 nm (3.93).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 9.70 (s; 2H, =NH_2^+, D_2O exchange), 7.31-7.16 (m; 5H aromat.), 4.59 (t; J = 7.1 Hz, 2H, N-CH_2), 2.63 (t; J = 7.6 Hz, 2H, Ph-CH_2), 2.35 (s; 3H, syd-CH_3), 1.89 (m; 2H, N-CH_2-C$\underline{H}_2$), 1.66 (m; 2H, Ph-CH_2-C$\underline{H}_2$).- MS (50°C): m/z = 231 (6%, $[M]^{+\cdot}$), 133 (13), 91 (100), 36 (12).

4-Methyl-N-nitroso-3-(4-phenylbutyl)-5-sydnone imine (**6b**)

Carmine platelets (methanol/isopropanol), mp. 58°C. Yield 82%.- $C_{13}H_{16}N_4O_2$ (260.3) Calcd. C 59.9 H 6.19 N 21.5 Found C 59.5 H 6.17 N 21.5.- IR (KBr): 3439; 3019; 2927; 1671; 1610; 1577; 1493; 1465; 1451; 1382; 1346; 1163; 1134; 1087; 939; 903; 795; 750; 700 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 209 (3.53), 267 (3.38), 344 (4.17), 495 nm (2.09).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.31-7.16 (m; 5H aromat.), 4.71 (t; J = 7.2 Hz, 2H, N-CH_2), 2.65 (t; J = 7.4 Hz, 2H, Ph-CH_2), 2.40 (s; 3H, syd-CH_3), 1.97 (tt; J = 7.5/7.5 Hz, 2H, N-CH_2-C$\underline{H}_2$), 1.71 (tt; J = 7.5/7.5 Hz, 2H, Ph-CH_2-C$\underline{H}_2$).- MS (+ FAB/DMSO/glycerol): m/z = 261 (2%, $[M + H]^+$), 241 (6), 149 (25), 117 (7), 93 (100), 91 (7), 78 (5).

DL-erythro-[2-[4-Methyl-5-nitrosoimino-sydnone-3-yl]-phenyl]-propanol (**7b**)

Citrous platelets (methanol), mp. 155°C. Yield 48%.- $C_{12}H_{14}N_4O_3$ (262.3) Calcd. C 54.9 H 5.38 N 21.4 Found C 54.8 H 5.42 N 21.4.- IR (KBr): 3267; 3021; 2972; 2941; 2872; 1699; 1675; 1587; 1486; 1449; 1405; 1391; 1376; 1363; 1327; 1314; 1250; 1231; 1170; 1140; 1067; 1046; 1014; 998; 946; 903; 850; 761; 725; 702; 682; 673; 652; 622 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 266 (3.67), 348 (4.22), 498 nm (2.12).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.36 (m; 5H aromat.), 6.23 (d; J = 4.8 Hz, 1H, OH, D_2O exchange), 5.34 (m; 1H, N-C$\underline{H}$(CH_3)), 5.12 (dd; after D_2O exchange d; J = 4.5 Hz, 1H, Ph-C$\underline{H}$(OH)), 2.40 (s; 3H, syd-CH_3), 1.54 (d; J = 6.8 Hz, 3H, N-CH(C$\underline{H}_3$)).- MS (+ FAB/DMSO/glycerol): m/z = 263 (63%, $[M + H]^+$), 262 (41), 234 (12), 233 (43), 201 (14), 135 (100), 129 (40), 128 (37), 118 (12), 117 (46), 107 (27), 105 (30), 96 (29), 91 (32), 83 (65), 79 (38), 77 (34).

3-Hexyl-4-isopropyl-N-nitroso-5-sydnone imine (**8b**)

The intermediate sydnone imine cannot be isolated (very hygroscopic) and is nitrosated in the two phase system water/ether: Carmine needles (isopropanol/ether), mp. 80°C. Yield ~ 45%.- $C_{11}H_{20}N_4O_2$ (240.3) Calcd. C 55.0 H 8.38 N 23.3 Found C 54.7 H 8.47 N 23.4.- IR (KBr): 3433; 3009; 2959; 2944; 2926; 2855; 1592; 1480; 1456; 1410; 1401; 1366; 1345; 1250; 1212; 1171; 1159; 1132; 1110; 1081; 1054; 1021; 1006; 963; 941; 893; 874; 767; 743; 729; 659; 626 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 266 (3.78), 354 (4.24), 504 nm (2.22).- ^{1}H-NMR/300 MHz ($CDCl_3$): δ (ppm) = 4.53 (t; J = 7.4 Hz, 2H, N-CH_2), 3.19 (sept; J = 7 Hz, 1H, syd-C$\underline{H}$-(CH_3)$_2$), 2.06 (tt; J = 7.5/7.5 Hz, 2H, N-CH_2-C$\underline{H}_2$), 1.43-1.35 (m; 12 H, syd-CH(C$\underline{H}_3$)$_2$ and (C$\underline{H}_2$)$_3$-CH_3), 0.92 (t; J = 7.0 Hz, 3H, CH_3).- MS (+ FAB/DMSO/*m*-NO_2-benzyl alcohol): m/z = 241 (100%, $[M + H]^+$), 240 (40), 212 (15), 211 (28), 210 (29), 179 (21), 154 (32), 137 (22), 85 (12), 83 (22), 77 (10).

4-Isopropyl-N-nitroso-3-(2-phenylethyl)-5-sydnone imine (**9b**)

Orange-yellow crystals (chloroform/ether), mp. 117°C. Yield 56%.- $C_{13}H_{16}N_4O_2$ (260.3) Calcd. C 60.0 H 6.20 N 21.5 Found C 60.0 H 6.26 N 21.7.- IR (KBr): 3414; 2968; 2934; 1592; 1551; 1490; 1476; 1456; 1444; 1401; 1354; 1334; 1289; 1214; 1175; 1161; 1140; 1110; 1088; 1017; 979; 957; 947; 757; 705; 659 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 266 (3.80), 356 (4.24), 508 nm (2.24).- ^{1}H-NMR/300 MHz ($CDCl_3$): δ (ppm) = 7.34 (m; 3H aromat., H-3'', H-4'', H-5''), 7.18 (dd; J = 8/1.5 Hz, 2H aromat., H-2'', H-6''), 4.79 (t; J = 7.1 Hz, 2H, N-CH_2), 3.39 (t; J = 7.1 Hz, 2H, Ph-CH_2), 2.98 (sept; J = 7 Hz, 1H, C$\underline{H}$-(CH_3)$_2$), 1.22 (d; J = 7 Hz, 6H, J = 7 Hz, (CH_3)$_2$).- MS (+ FAB/DMSO/glycerol): m/z = 261 (11%, $[M + H]^+$), 260 (10), 231 (5), 105 (100), 91 (11), 77 (6).

4-Ethyl-N-nitroso-3-(2-phenylethyl)-5-sydnone imine (**10b**)

Orange crystals (ethanol/ether), mp. 92°C. Yield 78%.- $C_{12}H_{14}N_4O_2$ (246.3) Calcd. C 58.5 H 5.73 N 22.7 Found C 58.4 H 5.77 N 22.7.- IR (KBr): 3428; 2996; 2971; 2937; 1603; 1565; 1495; 1456; 1406; 1372; 1346; 1296; 1158; 1127; 1098; 1057; 964; 893; 840; 782; 756; 726; 700; 659; 635 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 267 (3.69), 347 (4.23), 499 nm (2.10).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.36-7.25 (m; 5H aromat.), 4.99 (t; J = 7.1 Hz, 2H, N-CH_2), 3.32 (t; J = 7.2 Hz, 2H, Ph-CH_2), 2.77 (q; J = 7.5 Hz, 2H, syd-CH_2), 1.05 (t; J = 7.3 Hz, 3H, CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 247 (14%, $[M + H]^+$), 246 (12), 217 (7), 106 (9), 105 (100), 91 (15), 78 (6).

DL-erythro-[2-[4-Ethyl-5-nitrosoimino-sydnone-3-yl]-phenyl]-propanol (**11b**)

Yellow needles (methanol/isopropanol), mp. 126°C. Yield 37%.- $C_{13}H_{16}N_4O_3$ (276.3) Calcd. C 56.5 H 5.83 N 20.3 Found C 56.2 H 5.77 N 20.2.- IR (KBr): 3404; 3239; 2974; 2920; 1605; 1568; 1494; 1452; 1428; 1380; 1371; 1329; 1295; 1236; 1192; 1175; 1118; 1104; 1053; 1031; 1000; 970; 898; 874; 846; 827; 757; 701; 678; 635 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 209 (3.57), 267 (3.55), 349 (4.20), 499 nm (2.10).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.37-7.34 (m; 5H aromat.), 6.29 (d; J = 4.7 Hz, 1H, -OH, D_2O exchange), 5.35 (m; 1H, N-C$\underline{H}$(CH_3)), 5.07 (dd; J = 5/5 Hz, 1H, Ph-C$\underline{H}$(OH)), 2.81 (q; J = 7.4 Hz, 2H, syd-CH_2), 1.59 (d; J = 6.8 Hz, 3H, N-CH(C$\underline{H}_3$)), 1.05 (t; J = 7.4 Hz, 3H, CH_2-C$\underline{H}_3$).- MS (+ FAB/DMSO/glycerol): m/z = 277 (46%, $[M + H]^+$), 276 (31), 248 (12), 247 (32), 190 (31), 135 (100), 117 (57), 105 (42), 97 (44), 91 (45), 79 (47), 77 (42).

4-Isobutyl-N-nitroso-3-(2-phenylethyl)-5-sydnone imine (**12b**)

Yellow crystals (chloroform/ether), mp. 87°C. Yield 62%.- $C_{14}H_{18}N_4O_2$ (274.3) Calcd. C 61.3 H 6.61 N 20.4 Found C 61.2 H 6.67 N 20.3.- IR (KBr): 3430; 3057; 3016; 2955; 2921; 2867; 1596; 1561; 1493; 1454; 1430; 1400; 1352; 1337; 1293; 1245; 1231; 1204; 1153; 1139; 1119; 1098; 1035; 1021; 960; 950; 923; 897; 879; 860; 758; 746; 699; 666; 639 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 206 (3.87), 268 (3.67), 352 (4.21), 504 nm

(2.16).- ^{1}H-NMR/300 MHz ($CDCl_3$): δ (ppm) = 7.34 (m; 3H aromat., H-3'', H-4'', H-5''), 7.18 (d; 2H aromat., H-2'', H-6''), 4.74 (t; J = 7 Hz, 2H, N-CH_2), 3.42 (t; J = 7 Hz, 2H, Ph-CH_2), 2.48 (d; J = 7.3 Hz, 2H, syd-CH_2), 1.95 (m; 1H, C<u>H</u>-$(CH_3)_2$), 0.87 (d; J = 6.6 Hz, 6H, $(CH_3)_2$).- MS (+ FAB/DMSO/glycerol): m/z = 275 (11%, $[M + H]^+$), 274 (10), 123 (15), 106 (9), 105 (100), 91 (9), 78 (6).

4-Cyclohexyl-N-nitroso-3-(2-phenylethyl)-5-sydnone imine (**13b**)

Carmine crystals (methanol), mp. 117°C. Yield 53%.- $C_{16}H_{20}N_4O_2$ (300.4) Calcd. C 64.0 H 6.71 N 18.7 Found C 63.7 H 6.76 N 18.6.- IR (KBr): 3428; 3051; 3019; 2980; 2926; 2851; 1587; 1494; 1467; 1447; 1401; 1365; 1355; 1340; 1268; 1233; 1153; 1105; 1051; 994; 967; 946; 890; 880; 813; 763; 740; 700; 669; 644 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 268 (3.83), 358 (4.22), 509 nm (2.23).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.30 (m; 5H aromat.), 5.05 (t; J = 6.8 Hz, 2H, N-CH_2), 3.29 (t; J = 6.8 Hz, 2H, Ph-CH_2), 2.83 (m; 1H, cyclohexyl-H-1'' ax), 1.70-1.03 (m; 10 H, cyclohexyl-H).- MS (+ FAB/DMSO/glycerol): m/z = 301 (13%, $[M + H]^+$), 300 (8), 149 (12), 106 (9), 105 (100), 91 (7), 76 (8).

4-Benzyl-3-(2-phenylethyl)-5-sydnone imine hydrochloride (**14a**)

Crystals (ethanol/aceton), mp. 161°C (decompn.). Yield 43%.- $C_{17}H_{18}ClN_3O$ · 1/4 H_2O (320.3) Calcd. C 63.8 H 5.82 N 13.1 Found C 64.1 H 5.74 N 13.2.- IR (KBr): 3421; 3274; 3230; 3108; 2963; 1590; 1560; 1490; 1430; 1388; 1362; 1229; 1211; 1189; 1062; 1027; 1005; 930; 912; 895; 845; 770; 716; 690 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 206 (4.33), 303 nm (3.92).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 10.07 (s; 2H, $=NH_2^+$, D_2O exchange), 7.41-7.07 (m; 10 H aromat.), 4.79 (t; J = 7.1 Hz, 2H, N-CH_2), 4.39 (s; 2H, syd-CH_2), 2.96 (t; J = 7.1 Hz, 2H, N-CH_2-C<u>H</u>$_2$).- MS (110°C): m/z = 279 (3%, $[M]^{+\cdot}$), 105 (93), 104 (32), 103 (14), 91 (100), 79 (13), 77 (17), 65 (16), 36 (16).

4-Benzyl-N-nitroso-3-(2-phenylethyl)-5-sydnone imine (**14b**)

Orange powder (methanol), mp. 116°C. Yield 47%.- $C_{17}H_{16}N_4O_2$ (308.3) Calcd. C 66.2 H 5.23 N 18.2 Found C 66.1 H 5.18 N 18.2.- IR (KBr): 3418; 3057; 3022; 2998; 2952; 2934; 1954; 1885; 1603; 1582; 1570; 1493; 1462; 1452; 1429; 1403; 1375, 1349; 1342; 1334; 1314; 1287; 1276; 1190; 1157; 1149; 1107; 1080; 1028; 1002; 985; 953; 922; 901; 886; 844; 805; 779; 757; 737; 727; 698; 686; 649; 617 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 268 (3.85), 348 (4.22), 503 nm (2.12).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.36-7.27 (m; 8H aromat.), 7.13 (d; J = 6.2 Hz, 2H, syd-CH_2-Ph-H-2'' and -H-6''), 4.97 (t; J = 7.3 Hz, 2H, N-CH_2), 4.28 (s; 2H, syd-CH_2), 3.10 (t; J = 7.3 Hz, 2H, Ph-C<u>H</u>$_2$-CH_2).- MS (+ FAB/DMSO/glycerol): m/z = 309 (3%, $[M + H]^+$), 157 (8), 105 (100), 103 (11), 91 (27), 79 (19), 77 (16).

4-Benzyl-N-nitroso-3-(3-phenylpropyl)-5-sydnone imine (**15b**)

Orange needles (methanol/ether), mp. 78°C. Yield 41%.- $C_{18}H_{18}N_4O_2$ (322.4) Calcd. C 67.1 H 5.63 N 17.4 Found C 67.1 H 5.52 N 17.5.- IR (KBr): 3436; 3020; 2992; 2953; 1571; 1492; 1476; 1450; 1399; 1377; 1354; 1323; 1277; 1222; 1162; 1102; 1080; 1041; 998; 923; 906; 775; 726; 695 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 269 (3.74), 346 (4.21), 500 nm (2.10).- ^{1}H-NMR/300 MHz ($CDCl_3$): δ (ppm) = 7.36-7.04 (m; 10 H aromat.), 4.30 (t; J = 7.6 Hz, 2H, N-CH_2), 4.17 (s; 2H, syd-CH_2), 2.71 (t; J = 7.1 Hz, 2H, Ph-C<u>H</u>$_2$-CH_2), 2.22 (tt; J = 7.4/7.1 Hz, 2H, N-CH_2-C<u>H</u>$_2$).- MS (+ FAB/DMSO/*m*-NO_2-benzyl alcohol): m/z = 323 (17%, $[M + H]^+$), 322 (9), 294 (6), 293 (7), 171 (33), 119 (11), 103 (8), 91 (100), 76 (6).

3,4-Bis-(2-phenylethyl)-5-sydnone imine hydrochloride (**16a**)

Crystals (ethanol), mp. 155°C. Yield 32%.- $C_{18}H_{20}ClN_3O$ (329.8) Calcd. C 65.5 H 6.11 N 12.7 Found C 65.5 H 6.18 N 12.6.- IR (KBr): 2964; 2702; 2612; 1673; 1598; 1495; 1450; 1420; 1403; 1361; 1307; 1280; 1189; 1162; 1084; 1062; 1029; 982; 958; 949; 920; 889; 841; 769; 760; 749; 730; 706 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 207 (4.28), 304 nm (3.92).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 9.94 (s; 2H, $=NH_2^+$, D_2O exchange), 7.35-7.20 (m; 10 H aromat.), 4.77 (t; J = 7 Hz, 2H, N-CH_2), 3.16 (t; J = 7 Hz, 2H, N-CH_2-C<u>H</u>$_2$), 3.06 (t; J = 7 Hz, 2H, syd-CH_2), 2.77 (t; J = 7 Hz, 2H, syd-CH_2-C<u>H</u>$_2$).- MS (60°C): m/z = 293 (2%, $[M]^{+\cdot}$), 181 (18), 105 (52), 104 (50), 91 (100), 77 (10), 68 (12), 65 (11), 44 (10), 42 (10).

N-Nitroso-3,4-bis-(2-phenylethyl)-5-sydnone imine (**16b**)

Bright red, hygroscopic crystals (ethanol), mp. 95°C. Yield 45%.- $C_{18}H_{18}N_4O_2$ (322.4) Calcd. C 67.1 H 5.63 N 17.4 Found C 67.0 H 5.57 N 17.4.- IR (KBr): 3421; 3020; 2927; 1596; 1567; 1494; 1452; 1404; 1365; 1339; 1222; 1166; 1116; 1076; 1055; 968; 943; 924; 753; 702; 645 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 268 (3.78), 346 (4.22), 500 nm (2.07).- ^{1}H-NMR/300 MHz ($CDCl_3$): δ (ppm) = 7.33-7.01 (m; 10 H aromat.), 3.98 (t; J = 7.4 Hz, 2H, N-CH_2), 3.06 (t; J = 7.4 Hz, 2H, N-CH_2-C<u>H</u>$_2$), 2.89 (m; 4H, syd-$(CH_2)_2$).- MS (+ FAB/DMSO/*m*-NO_2-benzyl alcohol): m/z = 323 (11%, $[M + H]^+$), 322 (8) 293 (5), 171 (13), 106 (9), 105 (100), 91 (23), 79 (7), 77 (6).

4-Methyl-3-(p-tolyl)-5-sydnone imine hydrochloride (**17a**)

Needles (ethanol), mp. 191°C (decompn.). Yield 31%.- $C_{10}H_{12}ClN_3O$ (225.7) Calcd. C 53.2 H 5.36 N 18.6 Found C 53.5 H 5.37 N 18.8.- IR (KBr): 3124; 3029; 2954; 1954; 1671; 1594; 1488; 1450; 1411; 1399; 1317; 1295; 1238; 1213; 1191; 1130; 1043; 1011; 994; 918; 831; 802; 779; 711; 648 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 206 (4.04), 312 nm (3.97).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 10.06 (s; 2H, $=NH_2^+$, D_2O exchange), 7.72 (d; J = 8.4 Hz, 2H aromat., Ph-H-2', Ph-H-6'), 7.57 (d; J = 8.4 Hz, 2H aromat., Ph-H-3', Ph-H-6'), 2.46 (s; 3H, syd-CH_3), 2.29 (s; 3H, Ph-CH_3).- MS (140°C): m/z = 189 (16%, $[M]^{+\cdot}$), 133 (12), 132 (100), 91 (83), 65 (31), 38 (10), 36 (32).

4-Methyl-N-nitroso-3-(p-tolyl)-5-sydnone imine (**17b**)

Purple powder (methanol), mp. 131°C. Yield 43%.- $C_{10}H_{10}N_4O_2$ (218.2) Calcd. C 55.0 H 4.62 N 25.7 Found C 55.0 H 4.56 N 25.9.- IR (KBr): 3033; 2920; 1673; 1606; 1584; 1505; 1456; 1378; 1359; 1312; 1296; 1240; 1208; 1156; 1114; 1069; 1040; 1014; 955; 934; 843; 830; 800; 715; 682; 662 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 272 (3.90), 354 (4.25), 507 nm (2.15).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.81 (d; J = 8.3 Hz, 2H aromat., H-2', H-6'), 7.60 (d; J = 8.3 Hz, 2H aromat., H-3', H-5'), 2.47 (s; 3H, syd-CH_3), 2.32 (s; 3H, Ph-CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 219 (66%, $[M + H]^+$), 218 (12), 190 (64), 189 (28), 158 (24), 132 (100), 107 (26), 91 (71), 78 (27), 74 (25), 64 (20).- MS (100°C): m/z = 190 (9%, $[M - N_2]^{+\cdot}$), 158 (10), 132 (88), 91 (100), 89 (10), 65 (36), 63 (12), 51 (10), 39 (21).

3-Methyl-4-phenyl-6-sydnone imine monohydrochloride (**18a**)

Crystals (isopropanol/ether), mp. 153°C. Yield 70%.- $C_9H_9ClN_3O$ (211.7) Calcd. C 51.1 H 4.76 N 19.8 Found C 51.1 H 4.80 N 19.7.- IR (KBr): 3327; 3182; 3115; 2994; 1903; 1660; 1612; 1575; 1519; 1482; 1450; 1424; 1374; 1327; 1273; 1164; 1128; 1103; 1083; 1009; 977; 948; 798; 757; 722; 696; 645; 617 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 205 (3.98), 242 (3.69), 307 nm (3.73).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ

(ppm) = 9.78 (s; 2H, $=NH_2^+$, D_2O exchange), 7.65 (bs; 5H aromat.), 4.19 (s; 3H, N-CH_3).- MS (140°C): m/z = 175 (14%, $[M]^{+\cdot}$), 144 (13), 143 (22), 129 (22), 120 (25), 118 (54), 116 (100), 91 (12), 89 (20), 77 (41), 69 (19), 51 (28), 43 (24), 42 (28), 30 (16).

3-Methyl-N-nitroso-4-phenyl-5-sydnone imine (**18b**)

Red crystals (ethanol/ether), mp. 106°C. Yield 58%.- $C_9H_8N_4O_2$ (204.2) Calcd. C 52.9 H 3.95 N 27.4 Found C 53.2 H 3.80 N 27.3.- IR (KBr): 3435; 3047; 3018; 2950; 1680; 1618; 1594; 1499; 1470; 1443; 1422; 1379; 1358; 1317; 1189; 1145; 1084; 1066; 1030; 1007; 953; 869; 853; 775; 733; 696; 631 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 291 (3.96), 354 (4.12), 506 nm (2.14).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.69-7.55 (m; 5H aromat.), 4.33 (s; 3H, CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 205 (20%, $[M + H]^+$), 204 (10), 176 (13), 175 (14), 174 (17), 144 (9), 118 (100), 105 (13), 91 (10), 77 (27).- MS (80°C): m/z = 176 (40%, $[M - N_2]^{+\cdot}$), 118 (100), 103 (20), 77 (51), 76 (11), 69 (10), 55 (19), 51 (18), 50 (10), 44 (14), 39 (11).

3-Ethyl-N-nitroso-4-phenyl-5-sydnone imine (**19b**)

Orange crystals (ethanol/ether), mp. 114°C. Yield 63%.- $C_{10}H_{10}N_4O_2$ (218.2) Calcd. C 55.0 H 4.62 N 25.7 Found C 55.0 H 4.50 N 25.7.- IR (KBr): 3417; 3045; 2982; 1607; 1579; 1570; 1495; 1457; 1381; 1339; 1240; 1173; 1126; 1109; 1093; 1082; 1021; 997; 992; 938; 893; 770; 739; 707; 696; 674; 655; 618 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 289 (3.88), 352 (4.14), 505 nm (2.15).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.67-7.57 (m; 5H aromat.), 4.69 (q; J = 7.2 Hz, 2H, CH_2), 1.48 (t; J = 7.2 Hz, 3H, CH_3).- MS (70°C): 190 (47%, $[M - N_2]^{+\cdot}$), 132 (84), 104 (100), 91 (10), 77 (69), 63 (27), 51 (46), 36 (61).- MS (+ FAB/DMSO/glycerol): m/z = 219 (15%, $[M + H]^+$), 190 (9), 149 (32), 117 (9), 104 (8), 93 (100).

3-Hexyl-N-nitroso-4-phenyl-5-sydnone imine (**20b**)

Dark-red crystals (methanol/ether), mp. 76.5°C. Yield 51%.- $C_{14}H_{18}N_4O_2$ (274.3) Calcd. C 61.3 H 6.61 N 20.4 Found C 61.3 H 6.61 N 20.6.- IR (KBr): 2952; 2925; 2858; 1609; 1591; 1501; 1449; 1395; 1348; 1215; 1186; 1106; 1074; 1056; 1026; 989; 944; 754; 696; 664 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 285 (3.94), 352 (4.16), 506 nm (2.15).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.65-7.57 (m; 5H aromat.), 4.65 (t; J = 7.2 Hz, 2H, N-CH_2), 1.81 (tt; J = 7.2/7.2 Hz, 2H, N-CH_2-$C\underline{H}_2$), 1.30-1.17 (m; 6H, $(C\underline{H}_2)_3$-CH_3), 0.80 (t; J = 6.6 Hz, 3H, CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 275 (39%, $[M + H]^+$), 274 (33), 246 (19), 245 (29), 244 (17), 213 (34), 188 (29), 185 (12), 131 (11), 118 (11), 117 (12), 105 (36), 104 (100), 103 (10), 91 (13), 89 (15), 85 (13), 78 (22), 77 (24).

3-Allyl-4-phenyl-5-sydnone imine hydrochloride (**21a**)

Crystals (ethanol/ether), mp. 110.5°C. Yield 80%.- $C_{11}H_{12}ClN_3O$ (237.7) Calcd. C 55.6 H 5.09 N 17.7 Found C 55.7 H 5.08 N 17.7.- IR (KBr): 3180; 2934; 2860; 1666; 1636; 1595; 1575; 1503; 1492; 1448; 1387; 1340; 1305; 1278; 1256; 1232; 1190; 1156; 1089; 1077; 1004; 951; 901; 848; 817; 797; 768; 747; 710; 687; 628 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 205 (4.02), 243 (3.79), 309 nm (3.90).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 9.82 (s; 2H, $=NH_2^+$, D_2O exchange), 7.64 (m; 5H aromat.), 5.90 (m; 1H, CH=), 5.36 (d; J = 17.1 Hz, 1H, *cis* $=CH_2$), 5.33 (d; J = 10.3 Hz, 1H, *trans* $=CH_2$), 5.24 (d; J = 5.8 Hz, 2H, N-CH_2).- MS (100°C): m/z = 201 (38%, $[M]^{+\cdot}$), 145 (11), 144 (100), 116 (35), 104 (30), 89 (15), 77 (36), 76 (15), 63 (20), 51 (24), 50 (10).

3-Allyl-N-nitroso-4-phenyl-5-sydnone imine (**21b**)

Orange-red needles (ethanol), mp. 104°C. Yield 71%.- $C_{11}H_{10}N_4O_2$ (230.2) Calcd. C 57.4 H 4.37 N 24.3 Found C 57.4 H 4.24 N 24.3.- IR (KBr): 3039; 1719; 1605; 1578; 1566; 1495; 1448; 1433; 1421; 1384; 1366; 1342; 1194; 1173; 1117; 1096; 1071; 1019; 990; 982; 932; 920; 887; 775; 757; 732; 706; 686; 652; 607 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 289 (3.92), 355 (4.15), 509 nm (2.16).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.66-7.55 (m; 5H aromat.), 6.01 (m; 1H, CH=), 5.40 (m; 4H, $C\underline{H}_2$-CH=$C\underline{H}_2$).- MS (+ FAB/DMSO/glycerol): m/z = 231 (79%, $[M + H]^+$), 230 (14), 202 (59), 201 (45), 200 (9), 169 (26), 157 (12), 144 (54), 130 (16), 129 (22), 117 (14), 115 (17), 105 (78), 104 (41), 93 (100%, [gly + H]$^+$), 91 (28), 78 (45), 76 (31).

4-(4-Chlorphenyl)-3-hexyl-N-nitroso-5-sydnone imine (**22b**)

Carmine needles (ethanol), mp. 87°C. Yield 54%.- $C_{14}H_{17}ClN_4O_2$ (308.8) Calcd. C 54.5 H 5.55 N 18.2 Found C 54.3 H 5.54 N 18.3.- IR (KBr): 3437; 3042; 2954; 2924; 2856; 1619; 1608; 1588; 1577; 1562; 1497; 1463; 1386; 1342; 1242; 1188; 1105; 1088; 1057; 1018; 999; 966; 954; 943; 892; 834; 739; 731; 711; 653 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 220 (4.08), 295 (3.99), 352 (4.17), 507 nm (2.15).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.68 (s; 4H aromat.), 4.64 (t; J = 7.2 Hz, 2H, N-CH_2), 1.81 (tt; J = 7.2/7.2 Hz, 2H, N-CH_2-$C\underline{H}_2$), 1.33-1.17 (m; 6H, $(C\underline{H}_2)_3$-CH_3), 0.81 (t; J = 6.8 Hz, 3H, CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 311 (28%, $[M + H]^+[^{37}Cl]$), 310 (28%, $[M]^{+\cdot}[^{37}Cl]$), 309 (100%, $[M + H]^+[^{35}Cl]$), 308 (100%, $[M]^{+\cdot}[^{35}Cl]$), 280 (34), 279 (41), 278 (17), 222 (30), 154 (91), 138 (71), 136 (59), 91 (12), 89 (47), 77 (44).

4-Phenyl-3-(2-phenylethyl)-5-sydnone imine hydrochloride (**23a**)

Crystals (ethanol/ether), mp. 142°C. Yield 55%.- $C_{16}H_{16}ClN_3O$ (301.8) Calcd. C 63.7 H 5.34 N 13.9 Found C 63.8 H 5.25 N 13.9.- IR (KBr): 3043; 3020; 2943; 1665; 1600; 1515; 1494; 1476; 1462; 1450; 1386; 1355; 1330; 1257; 1172; 1153; 1091; 1081; 1040; 1026; 1004; 947; 861; 840; 798; 769; 748; 701; 659; 620 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 208 (4.17), 240 (3.83), 310 nm (3.93).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 9.81 (s; 2H, $=NH_2^+$, D_2O exchange), 7.65-7.59 (m; 5H aromat., syd-Ph), 7.27 (m; 3H aromat., CH_2-Ph-H-3'', H-4'', H-5''), 7.10 (''d''; 2H aromat., CH_2-Ph-H-2'' and H-6''), 4.80 (t; J = 7 Hz, 2H, N-CH_2), 3.05 (t; J = 7 Hz, 2H, Ph-CH_2).- MS (+ FAB/DMSO/glycerol): m/z = 266 (29%, $[M + H]^+$), 117 (6), 106 (12), 105 (100), 91 (18), 78 (12), 76 (10).

N-Nitroso-4-phenyl-3-(2-phenylethyl)-5-sydnone imine (**23b**)

Red platelets (methanol), mp. 110°C (decompn.). Yield 83%.- $C_{16}H_{14}N_4O_2$ (294.3) Calcd. C 65.3 H 4.79 N 19.0 Found C 65.4 H 4.53 N 19.0.- IR (KBr): 3411; 3053; 3017; 2966; 1612; 1594; 1496; 1454; 1448; 1434; 1371; 1348; 1235; 1189; 1147; 1105; 1077; 1068; 1031; 1004; 966; 874; 857; 773; 756; 732; 696; 630 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 289 (3.83), 355 (4.12), 509 (2.16).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.57 (bs; 5H aromat., syd-Ph), 7.26 (m; 3H aromat., CH_2-Ph-H-3'', H-4'', H-5''), 7.13 (''d'', J = 6.1 Hz, 2H aromat., CH_2-Ph-H-2'' and H-6''), 4.94 (t; J = 7.1 Hz, 2H, N-CH_2), 3.15 (t; J = 7.1 Hz, 2H, Ph-CH_2).- MS (+ FAB/DMSO/glycerol): m/z = 295 (8%, $[M + H]^+$), 266 (10), 105 (100), 91 (18), 76 (11).

DL-erythro-[2-[5-Nitrosoimino-4-phenyl-sydnone-3-yl]-phenyl]-propanol (**24b**)

Orange powder (methanol), mp. 131°C. Yield 64%.- $C_{17}H_{16}N_4O_3$ (324.3) Calcd. C 63.0 H 4.97 N 17.3 Found C 63.0 H 4.95 N 17.3.- IR (KBr): 3407; 3052; 1614; 1592; 1495; 1447; 1398; 1375; 1335; 1256; 1206; 1179; 1104; 1084; 1036; 1009; 991; 954; 877; 760; 701 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 285 (3.86), 354 (4.16), 507 nm (2.19).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.64-7.52 (m; 5H aromat., syd-Ph), 7.27 (m; 3H aromat., CH(OH)-Ph-H-3', H-4', H-5'), 6.90 (m, 2H aromat., CH(OH)-Ph-H-2' and H-6'), 6.15 (d; J = 5.3 Hz, 1H, OH, D_2O

exchange), 5.09 (m; 1H, C<u>H</u>(CH_3)), 4.84 (dd; J = 4.7/4.7 Hz, 1H, C<u>H</u>(OH)), 1.59 (d; J = 6.8 Hz, 3H, CH(C<u>H</u>$_3$)).- MS (+ FAB/DMSO/glycerol): m/z = 325 (21%, $[M + H]^+$), 324 (17), 295 (17), 158 (16), 135 (56), 132 (35), 120 (42), 118 (49), 117 (59), 105 (100), 91 (47), 77 (79).

4-(4-Chlorphenyl)-3-(2-phenylethyl)-5-sydnone imine hydrochloride (**25a**)

Crystals (ethanol/ether), mp. 152°C. Yield 31%.- $C_{16}H_{15}Cl_2N_3O$ (336.2) Calcd. C 57.1 H 4.49 N 12.5 Found C 56.9 H 4.44 N 12.5.- IR (KBr): 3417; 3018; 2992; 2922; 1666; 1589; 1509; 1473; 1454; 1438; 1426; 1405; 1364; 1329; 1263; 1221; 1165; 1090; 1029; 1005; 966; 945; 843; 790; 770; 754; 707; 651 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 206 (4.20), 248 (3.87), 310 nm (3.88).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 9.77 (s; 2H, $=NH_2^+$, D_2O exchange), 7.71 (d; J = 8.4 Hz, 2H aromat., syd-Ph-H-2', H-6'), 7.59 (d; J = 8.4 Hz, 2H aromat., syd-Ph-H-3', H-5'), 7.29-7.23 (m; 3H aromat., CH_2-Ph-H-3''', -H-4''', -H-5'''), 7.14 (d; 2H aromat., CH_2-Ph-H-2''', H-6'''), 4.79 (t; 2H, N-CH_2), 3.07 (t; 2H, Ph-CH_2).- MS (+ FAB/DMSO/*m*-NO_2-benzyl alcohol): m/z = 302 (12%, $[M + H]^+[^{37}Cl]$), 300 (34%, $[M + H]^+[^{35}Cl]$), 154 (5), 136 (4), 106 (9), 105 (100), 91 (9), 79 (6), 77 (11).

4-(4-Chlorphenyl)-3-(2-phenylethyl)-N-nitroso-5-sydnone imine (**25b**)

Orange crystals (methanol), mp. 104°C. Yield 62%.- $C_{16}H_{13}ClN_4O_2$ (328.8) Calcd. C 58.4 H 3.99 N 17.0 Found C 58.1 H 3.94 N 17.0.- IR (KBr): 3420; 3052; 3015; 1601; 1587; 1572; 1494; 1453; 1390; 1352; 1343; 1226; 1181; 1165; 1098; 1092; 1077; 1013; 991; 963; 890; 829; 764; 751; 720; 699; 653; 631 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 295 (3.92), 355 (4.12), 511 (2.14).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.66 (d; J = 8.5 Hz, 2H aromat., syd-Ph-H-2', H-6'), 7.58 (d; J = 8.5 Hz, 2H aromat., syd-Ph-H-3', H-5'), 7.26 (m; 3H aromat., CH_2-Ph-H-3''', H-4''', H-5'''), 7.17 (d; J = 7.5 Hz, 2H aromat., CH_2-Ph-H-2''', H-6'''), 4.94 (t; J = 7.1 Hz, 2H, N-CH_2), 3.17 (t; J = 7.1 Hz, 2H, Ph-CH_2).- MS (+ FAB/DMSO/*m*-NO_2-benzyl alcohol): m/z = 331 (2%, $[M + H]^+[^{37}Cl]$), 329 (8%, $[M + H]^+[^{35}Cl]$), 299 (3), 154 (11), 136 (9), 106 (10), 105 (100), 91 (25), 77 (16).

N-Nitroso-4-phenyl-3-(3-phenylpropyl)-sydnone imine (**26b**)

Red crystals, mp. 104°C. Yield 50%.- $C_{17}H_{16}N_4O_2$ (308.3) Calcd. C 66.2 H 5.23 N 18.2 Found C 66.1 H 5.08 N 18.2.- IR (KBr): 3052; 2911; 1614; 1597; 1499; 1469; 1446; 1385; 1366; 1355; 1194; 1148; 1078; 1066; 1032; 1007; 982; 962; 912; 857; 772; 750; 726; 698; 655; 605 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 204 (4.29), 275 (3.91), 346 (4.03).- ^{1}H-NMR/250 MHz ([D_6]DMSO): δ (ppm) = 7.7-7.5 (m; 5H, aromat.), 7.3-7.1 (m; 5H, aromat.), 4.66 (t; J = 7 Hz, 2H, syd-C<u>H</u>$_2$), 2.67 (t; J = 7 Hz, C<u>H</u>$_2$-Ph), 2.14 (tt; J = 7/7 Hz, 2H, CH_2-C<u>H</u>$_2$-CH_2).- MS (+ FAB/DMSO/glycerol): 309 (18%, $[M + H]^+$), 280 (16), 279 (11), 144 (13), 133 (31), 117 (11), 105 (26), 91 (100).- MS (100°C): m/z = 280 (15%, $[M - N_2]^{+\cdot}$), 235 (6), 222 (17), 119 (17), 104 (28), 91 (100).

3-Ethyl-4-naphthyl-5-sydnone imine hydrochloride (**27a**)

Powder (isopropanol/ether), mp. 151°C (decompn.). Yield 74%.- $C_{14}H_{14}ClN_3O$ (275.7) Calcd. C 61.0 H 5.11 N 15.2 Found C 60.7 H 5.10 N 15.2.- IR (KBr): 3402; 3040; 3008; 2995; 2936; 2867; 2838; 2822; 1667; 1591; 1512; 1496; 1459; 1397; 1355; 1236; 1191; 1161; 1143; 1119; 1089; 1018; 980; 958; 934; 921; 868; 808; 778; 769; 726; 665; 646 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 222 (4.78), 292 nm (4.07).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 9.58 (bs; 2H, $=NH_2^+$, D_2O exchange), 8.29-7.63 (m; 7H, aromat.), 4.39 (q; J = 7.2 Hz, 2H, N-CH_2), 1.28 (t; J = 7 Hz, 3H, CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 240 (100%, $[M + H]^+$), 182 (8), 167 (7), 155 (11), 154 (28), 141 (6), 127 (12), 115 (6).

3-Ethyl-4-naphthyl-N-nitroso-5-sydnone imine (**27b**)

Violett crystals (ethanol), mp. 104°C. Yield 82%.- $C_{14}H_{12}N_4O_2$ (268.3) Calcd. C 62.6 H 4.50 N 20.9 Found C 62.4 H 4.45 N 20.8.- IR (KBr): 3418; 3044; 2986; 2939; 1966; 1733; 1605; 1584; 1573; 1508; 1474; 1461; 1443; 1386; 1365; 1344; 1256; 1239; 1209; 1170; 1160; 1112; 1080; 1058; 1028; 1016; 976; 956; 918; 868; 808; 792; 777; 740; 706; 661; 631 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 220 (4.69), 343 (4.16), 501 nm (2.07).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 8.21-7.53 (m; 7H, aromat.), 4.47 (m; 2H, N-CH_2), 1.34 (t; J = 7.3 Hz, 3H, CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 269 (16%, $[M + H]^+$), 241 (6), 215 (11), 182 (12), 155 (14), 154 (11), 149 (21), 93 (100%, $[gly + H]^+$), 78 (6), 72 (6).

3-Ethyl-4-naphthyl-sydnone (**27c**)

Light yellow crystals (isopropanol), mp. 90°C. Yield 57%.- $C_{14}H_{12}N_2O_2$ (240.3) Calcd. C 70.0 H 5.03 N 11.7 Found C 70.1 H 5.03 N 11.7.- IR (KBr): 3437; 3050; 2974; 1722; 1590; 1514; 1499; 1456; 1443; 1371; 1334; 1240; 1142; 1119; 1103; 1073; 1030; 1014; 974; 954; 887; 800; 776; 745; 666; 608 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 216 (4.62), 309 nm (4.01).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 8.15-7.56 (m; 7H, aromat.), 4.32 (m; 2H, N-CH_2, AB-spin system), 1.23 (t; J = 7.3 Hz, 3H, CH_3).- MS (120°C): m/z = 240 (38%, $[M]^{+\cdot}$), 182 (43), 155 (11), 154 (100), 153 (19), 127 (27), 126 (10), 77 (4), 29 (16).

E-3-Methyl-4-styryl-5-sydnone imine hydrochloride (**28a**)

Yellow crystals (methanol/isopropanol), mp. 192°C. Yield 57%.- $C_{11}H_{12}ClN_3O$ (237.7) Calcd. C 55.6 H 5.09 N 17.7 Found C 55.5 H 5.06 N 17.7.- IR (KBr): 3422; 3178; 2969; 1660; 1631; 1591; 1508; 1486; 1442; 1348; 1317; 1269; 1201; 1103; 1079; 957; 851; 805; 748; 690; 669; 607 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 204 (4.34), 294 (4.15), 342 nm (4.18).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 10.18 (bs; 2H, $=NH_2^+$, D_2O exchange), 7.79 (d; J = 7.6 Hz, 2H aromat., Ph-H-2'', Ph-H-6''), 7.52 (d; J = 17 Hz, 1H, Ph-CH=), 7.45-7.37 (m; 3H, aromat.), 7.26 (d; J = 17 Hz, 1H, syd-CH=), 4.40 (s; 3H, -CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 202 (100%, $[M + H]^+$), 185 (13), 144 (8), 115 (12), 91 (6), 77 (6).

E-3-Methyl-N-nitroso-4-styryl-5-sydnone imine (**28b**)

Bright red crystals (methanol), mp. 162°C (decompn.). Yield 38%.- $C_{11}H_{10}N_4O_2$ (230.2) Calcd. C 57.4 H 4.37 N 24.3 Found C 57.1 H 4.38 N 24.1.- IR (KBr): 3411; 3050; 3022; 2996; 2941; 1724; 1598; 1583; 1492; 1481; 1440; 1406; 1364; 1338; 1325; 1313; 1295; 1275; 1208; 1156; 1109; 1082; 1024; 995; 965; 941; 918; 846; 778; 761; 720; 691; 612 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 230 (3.95), 259 (4.03), 343 (4.43), 512 nm (2.22).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.69 (d; J = 7.6 Hz, 2H aromat., H-2'', H-6''), 7.46-7.30 (m; 5H, Ph-H-3'', H-4'', H-5'', C<u>H</u>=C<u>H</u>), 4.48 (s; 3H, CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 231 (25%, $[M + H]^+$), 202 (16), 201 (16), 185 (10), 171 (11), 170 (15), 169 (17), 157 (52), 145 (11), 144 (87), 116 (11), 115 (33), 103 (16), 91 (19), 78 (100), 77 (18), 76 (16).- MS (90°C): m/z = 202 (45%, $[M - N_2]^{+\cdot}$), 169 (18), 145 (11), 144 (100), 129 (13), 115 (29), 103 (25), 102 (15), 77 (27), 51 (12), 28 (13).

E-3-Methyl-4-styryl-sydnone (**28c**)

Light yellow crystals (isopropanol/aceton), mp. 163°C. Yield 58%.- $C_{11}H_{10}N_2O_2$ (202.2) Calcd. C 65.3 H 4.98 N 13.8 Found C 65.4 H 4.97 N 13.8.- IR (KBr): 3418; 3019; 1793; 1726; 1621; 1515; 1483; 1441; 1327; 1292; 1269; 1202; 1115; 1065; 1047; 967; 921; 750; 728; 690; 619 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 270 (3.95), 346 nm (4.46).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.62 (d; J = 7.6 Hz, 2H aromat., Ph-H-2'', H-6''), 7.44-7.29 (m; 4H, 3H aromat., Ph-CH=), 7.18 (d; J = 16.1 Hz, 1H,

syd-CH=), 4.20 (s; 3H, N-CH_3).- MS (200°C): m/z = 202 (55%, $[M]^{+\cdot}$), 145 (11), 144 (100), 129 (11), 115 (30), 103 (25), 102 (14), 77 (25), 63 (8), 51 (11), 39 (7).

E-3-Ethyl-N-nitroso-4-styryl-5-sydnone imine (**29b**)

Bright red crystals (methanol), mp. 109°C. Yield 43%.- $C_{12}H_{12}N_4O_2$ (244.3) Calcd. C 59.0 H 4.95 N 22.9 Found C 59.2 H 4.83 N 22.8.- IR (KBr): 2984; 1625; 1597; 1581; 1469; 1444; 1415; 1382; 1376; 1364; 1349; 1234; 1207; 1161; 1119; 1110; 1080; 1039; 1008; 980; 960; 922; 813; 771; 750; 723; 690 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 259 (3.88), 344 (4.33), 512 nm (2.24).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.70 (d; J = 7.2 Hz, 2H aromat., Ph-H-2'', H-6''), 7.48-7.34 (m; 5H, C<u>H</u>=C<u>H</u>, Ph-H-3'', H-4'', H-5''), 4.93 (q; J = 7.2 Hz, 2H, CH_2), 1.61 (t; J = 7.2 Hz, 3H, CH_3).- MS (+ FAB/DMSO/glycerol): m/z = 245 (54%, $[M + H]^+$), 217 (11), 216 (28), 215 (14), 199 (19), 158 (32), 149 (100), 131 (59), 130 (42), 117 (46), 103 (29), 91 (29), 78 (88), 77 (16), 73 (37), 60 (54).- MS (110°C): m/z = 216 (58%, $[M - N_2]^{+\cdot}$), 183 (11), 158 (41), 131 (11), 130 (100). 115 (12), 105 (21), 103 (29), 91 (10), 77 (23), 29 (18), 28 (51).

E-3-Allyl-4-styryl-5-sydnone imine hydrochloride (**30a**)

Yellow needles (isopropanol), mp. 156°C. Yield 48%.- $C_{13}H_{14}ClN_3O$ (263.7) Calcd. C 59.2 H 5.35 N 15.9 Found C 59.2 H 5.33 N 15.9.- IR (KBr): 3185; 2993; 1660; 1636; 1590; 1504; 1492; 1445; 1428; 1389; 1359; 1330; 1241; 1212; 1153; 1077; 995; 982; 952; 941; 853; 811; 780; 747; 688; 613 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 204 (4.24), 295 (4.11), 345 nm (4.14).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 10.38 (bs; 2H, $=NH_2^+$, D_2O exchange), 7.81 (d; J = 7 Hz, 2H aromat., Ph-H-2'', H-6''), 7.61 (d; J = 17 Hz, 1H, Ph-CH=), 7.43 (dd; J = 7/7 Hz, 2H aromat., Ph-H-3'', H-5''), 7.36 (dd; J = 7/7 Hz, 1H aromat., Ph-H-4''), 7.29 (d; J = 17 Hz, 1H, syd-CH=), 6.06 (m; 1H, CH=), 5.61 (d; J = 18.6 Hz, 1H, $=CH_2$), 5.57 (d; J = 6 Hz, 2H, N-CH_2), 5.49 (d; J = 10.4 Hz, 1H, $=CH_2$).- MS (60°C): m/z = 227 (100%, $[M]^{+\cdot}$), 195 (40), 170 (74), 155 (48), 142 (80), 115 (91), 91 (29), 77 (45), 63 (23), 51 (30).

E-3-Allyl-N-nitroso-4-styryl-5-sydnone imine (**30b**)

Bright red crystals (ethanol), mp. 100°C. Yield 67%.- $C_{13}H_{12}N_4O_2$ (256.3) Calcd. C 60.9 H 4.72 N 21.8 Found C 60.8 H 4.57 N 21.5.- IR (KBr): 3425; 2995; 1717; 1625; 1599; 1578; 1489; 1468; 1445; 1393; 1358; 1327; 1203; 1167; 1113; 1074; 1048; 998; 964; 938; 917; 847; 791; 759; 718; 694 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 259 (4.05), 345 (4.40), 515 nm (2.23).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.68 (d; J = 7 Hz, 2H aromat., H-2'', H-6''), 7.58-7.37 (m; 4H, Ph-H-3'', H-4'', H-5'', Ph-CH=), 7.33 (d; J = 16.3 Hz, 1H, syd-CH=), 6.16 (m; 1H, Ph-CH=), 5.65 (m; 3H, CH_2, $=CH_2$), 5.52 (d; J = 11 Hz, 1H, $=CH_2$).- MS (+ FAB/DMSO/glycerol): m/z = 257 (58%, $[M + H]^+$), 229 (27), 228 (70), 227 (30), 170 (42), 131 (39), 116 (33), 115 (100), 103 (25), 91 (48), 78 (94), 77 (24).

E-3-Cyclohexyl-4-styryl-5-sydnone imine hydrochloride (**31a**)

Small yellow crystals (ethanol), mp. 183°C. Yield 66%.- $C_{16}H_{20}ClN_3O$ (305.8) Calcd. C 62.8 H 6.59 N 13.7 Found C 62.8 H 6.75 N 13.7.- IR (KBr): 3414; 2933; 2860; 1664; 1593; 1486; 1448; 1341; 1277; 1257; 1232; 1189; 1144; 1077; 1006; 955; 900; 817; 798; 750; 689; 630 cm^{-1}.- UV (CH_3OH): λ max/nm (log ε) = 204 (4.34), 295 (4.11), 340 (4.15).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 10.20 (bs; 2H, $=NH_2^+$, D_2O exchange), 7.86 (d; J = 7.4 Hz, 2H aromat., Ph-H-2'', H-6''), 7.56 (d; J = 16.8 Hz, 1H, Ph-CH=), 7.44 (m; 2H aromat., Ph-H-3'', H-5''), 7.39-7.31 (m; 2H, Ph-H-4'', syd-CH=), 5.30 (m; 1H, N-CH(R_1)ax), 2.25-1.25 (m; 10 H, cyclohexyl-H).- MS (220°C): m/z = 269 (18%, $[M]^{+\cdot}$), 159 (13), 143 (13), 142 (22), 130 (59), 116 (33), 115 (34), 91 (6), 83 (37), 77 (10), 55 (100).

E-3-Cyclohexyl-N-nitroso-4-styryl-5-sydnone imine (**31b**)

Cobalt red crystals (methanol), mp. 101°C. Yield 67%.- $C_{16}H_{18}N_4O_2$ (298.3) Calcd. C 64.4 H 6.08 N 18.8 Found C 64.4 H 6.14 N 19.0.- IR (KBr): 3431; 3019; 2940; 2859; 1621; 1598; 1580; 1490; 1448; 1401; 1383; 1359; 1348; 1343; 1301; 1276; 1265; 1225; 1209; 1189; 1157; 1098; 1074; 1024; 1003; 971; 952; 891; 842; 773; 757; 734; 718; 691; 639; 629 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 259 (4.12), 344 (4.42), 511 nm (2.29).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.71 (d; J = 7.3 Hz, 2H aromat., Ph-H-2'', H-6''), 7.51-7.35 (m; 5H, C<u>H</u>=C<u>H</u>, Ph-H-3'', H-4'', H-5''), 5.32 (m; 1H, N-CH(R_1)ax), 2.33-1.28 (m; 10 H, cyclohexyl-H).- MS (+ FAB/DMSO/glycerol): m/z = 299 (6%, $[M + H]^+$), 270 (7), 269 (6), 239 (16), 238 (14), 157 (19), 140 (12), 131 (18), 130 (83), 128 (10), 117 (11), 116 (13), 115 (45), 103 (11), 100 (10), 91 (24), 82 (42), 80 (33), 78 (87), 77 (100).

E-3-(2-Phenylethyl)-4-styryl-5-sydnone imine hydrochloride (**32a**)

Yellow crystals (ethanol), mp. 173°C. Yield 39%.- $C_{18}H_{18}ClN_3O$ (327.8) Calcd. C 65.9 H 5.53 N 12.8 Found C 65.8 H 5.55 N 12.8.- IR (KBr): 3394; 2935; 1659; 1631; 1493; 1451; 1320; 1233; 1169; 1079; 1028; 952; 837; 803; 748; 698 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 205 (4.55), 295 (4.10), 348 (4.11).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 10.11 (bs; 2H, $=NH_2^+$, D_2O exchange), 7.76 (d; J = 7 Hz, 2H, aromat., =CH-Ph-H-2'', H-6''), 7.47-7.17 (m; 10 H, 8H aromat., 2H olef.), 5.12 (t; J = 7 Hz, 2H, N-CH_2), 3.27 (t; J = 7 Hz, 2H, Ph-CH_2).- MS (+ FAB/DMSO/*m*-NO_2-benzyl alcohol): m/z = 292 (33%, $[M + H]^+$), 115 (8), 106 (9), 105 (100), 91 (10), 78 (10), 76 (10).

E-N-Nitroso-3-(2-phenylethyl)-4-styryl-5-sydnone imine (**32b**)

Bright carmine crystals (methanol/ethanol), mp. 107°C. Yield 52%.- $C_{18}H_{16}N_4O_2$ (320.4) Calcd. C 67.5 H 5.03 N 17.5 Found C 67.5 H 4.88 N 17.3.- IR (KBr): 3429; 3020; 2220; 1659; 1623; 1577; 1493; 1469; 1449; 1399; 1381; 1353; 1333; 1219; 1198; 1153; 1098; 1077; 1023; 971; 935; 895; 852; 747; 721; 699; 633 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 206 (4.05), 259 (4.06), 345 (4.40), 515 nm (2.24).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.66 (d; J = 7.2 Hz, 2H aromat., =CH-Ph-H-2'', H-6''), 7.45-7.23 (m; 10 H, 8H aromat., C<u>H</u>=C<u>H</u>), 5.20 (t; J = 7.1 Hz, 2H, N-CH_2), 3.36 (t; J = 7 Hz, 2H, Ph-CH_2).- MS (+ FAB/DMSO/*m*-NO_2-benzyl alcohol): m/z = 321 (12%, $[M + H]^+$), 291 (7), 260 (10), 115 (10), 105 (100), 91 (18), 76 (14).

E-3-[2-(3,4-Dimethoxyphenyl)-ethyl]-4-styryl-5-sydnone imine hydrochloride (**33a**)

Light yellow crystals (methanol/ether), mp. 183°C (decompn.). Yield 43%.- $C_{20}H_{22}ClN_3O_3$ (387.9) Calcd. C 61.9 H 5.72 N 10.8 Found C 61.5 H 5.72 N 10.9.- IR (KBr): 2940; 1659; 1630; 1591; 1513; 1462; 1440; 1422; 1357; 1336; 1263; 1253; 1228; 1188; 1169; 1151; 1139; 1078; 1038; 1023; 957; 846; 823; 809; 752; 712; 690; 629 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 204 (4.61), 283 (4.15), 349 nm (4.11).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 10.27 (s; 2H, $=NH_2^+$, D_2O exchange), 7.76 (d; J = 7.1 Hz, 2H aromat., =CH-Ph-H-2'', H-6''), 7.49 (d; J = 17 Hz, 1H, Ph-CH=), 7.43-7.34 (m; 3H aromat., =CH-Ph-H-3'', H-4'', H-5''), 7.15 (d; J = 17 Hz, 1H, syd-CH=), 6.93 (s; 1H aromat., CH_2-Ph-H-2''), 6.83 (d; J = 8.2 Hz, 1H aromat., CH_2-Ph-H-5''), 6.75 (dd; J = 8/2 Hz, 1H aromat., CH_2-Ph-H-6''), 5.12 (t; 2H, N-CH_2), 3.71 (s; 3H, 4''-OCH_3), 3.63 (s; 3H, 3''-OCH_3), 3.18 (t; 2H, Ph-CH_2).- MS (+ FAB/DMSO/glycerol): m/z =

352 (50%, [M + H]$^+$), 166 (20), 165 (100), 164 (17), 151 (22), 150 (14), 115 (11), 91 (14), 76 (10).

E-3-[2-(3,4-Dimethoxyphenyl)-ethyl]-N-nitroso-4-styryl-5-sydnone imine (**33b**)

Small orange crystals (methanol), mp. 105°C. Yield 30%.- $C_{20}H_{20}N_4O_4 \cdot 1/4\ H_2O$ (384.9) Calcd. C 62.4 H 5.42 N 14.5 Found C 62.5 H 5.29 N 14.1.- IR (KBr): 3490; 2996; 2932; 2831; 1626; 1578; 1514; 1464; 1446; 1383; 1347; 1253; 1235; 1148; 1096; 1075; 1028; 960; 842; 811; 760; 719; 694 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 201 (4.53), 232 (4.08), 261 (3.96), 345 (4.32), 515 nm (2.26).- ^{1}H-NMR/300 MHz ([D$_6$]DMSO): δ (ppm) = 7.62 (d; J = 7.1 Hz, 2H aromat., =CH-Ph-H-2'''', H-6''''), 7.42-7.33 (m; 4H, 3H aromat., =CH-Ph-H-3'''', H-4'''', H-5'''', Ph-CH=), 7.20 (d; J = 16.2 Hz, 1H, syd-CH=), 6.93 (s; 1H aromat., CH_2-Ph-H-2''), 6.84-6.76 (m; 2H aromat., CH_2-Ph-H-5'', H-6''), 5.18 (t; 2H, N-CH_2), 3.69 (s; 3H, OCH_3), 3.61 (s; 3H, OCH_3), 3.26 (t; 2H, Ph-CH_2).- MS (+ FAB/DMSO/glycerol): m/z = 381 (4%, [M + H]$^+$), 352 (6), 165 (100), 151 (30), 149 (23), 131 (14), 103 (9), 91 (11), 78 (16).

E-[2-[5-Imino-4-styryl-sydnone-3-yl]-phenyl]-ethanol hydrochloride (**34a**)

Yellow green small crystals (ethanol), mp. 191°C (decompn.). Yield 35%.- $C_{18}H_{18}ClN_3O$ (343.8) Calcd. C 62.8 H 5.28 N 12.2 Found C 62.5 H 5.28 N 12.1.- IR (KBr): 3254; 3042; 1659; 1636; 1505; 1492; 1448; 1396; 1359; 1267; 1201; 1103; 1067; 1027; 950; 891; 847; 805; 752; 714; 699; 604 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 205 (4.30), 296 (4.08), 350 nm (4.11).- ^{1}H-NMR/300 MHz ([D$_6$]DMSO): δ (ppm) = 10.15 (s; 2H, =NH_2^+, D_2O exchange), 7.78 (d; J = 7.4 Hz, 2H aromat., =CH-Ph-H-2''', H-6'''), 7.52-7.30 (m; 10 H, 8 aromat., CH=CH), 6.31 (d; J = 4.1 Hz, 1H, OH, D_2O exchange), 5.15 (m; 2H, C<u>H</u>(OH)-C<u>H</u>$_2$ [X- and A-part]), 4.99 (dd; J = 13.9/9 Hz, 1H, CH(OH)-C<u>H</u>$_2$ [B-part]).- MS (200°C): m/z = 307 (8%, [M]$^{+\cdot}$), 171 (68), 143 (52), 142 (97), 115 (77), 107 (100), 91 (70), 79 (82), 77 (84), 51 (35).

E-[2-[5-Nitrosoimino-4-styryl-sydnone-3-yl]-phenyl]-ethanol (**34b**)

Small orange crystals (washed with methanol and water), mp. 97°C. Yield 41%.- $C_{18}H_{16}N_4O_3 \cdot 1/2\ H_2O$ (345.4) Calcd. C 62.6 H 4.93 N 16.2 Found C 62.9 H 4.70 N 16.2.- IR (KBr): 3418; 3050; 1625; 1582; 1491; 1448; 1363; 1171; 1110; 1059; 964; 846; 754; 696 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 230 (4.04), 259 (4.13), 345 (4.41), 515 nm (2.29).- ^{1}H-NMR/300 MHz ([D$_6$]DMSO): δ (ppm) = 7.67 (d; J = 7.2 Hz, 2H aromat., Ph-H-2''', H-6'''), 7.55 (d; J = 7.2 Hz, 2H aromat., Ph-H-2'''', H-6''''), 7.47-7.33 (m; 8H, 6H aromat., C<u>H</u>=C<u>H</u>), 6.23 (d; J = 4.6 Hz, 1H, OH, D_2O exchange), 5.22-5.07 (m; 3H, C<u>H</u>$_2$-C<u>H</u>(OH)).- MS (+ FAB/DMSO/glycerol): m/z = 337 (28%, [M + H]$^+$), 308 (15), 307 (13), 171 (11), 170 (11), 149 (16), 131 (34), 130 (39), 121 (18), 117 (18), 115 (45), 103 (41), 93 (100), 91 (39), 78 (24), 76 (25).

E-3-(3-Phenylpropyl)-4-styryl-5-sydnone imine hydrochloride (**35a**)

Yellow crystals (ethanol), mp. 164°C (decompn.). Yield 31%.- $C_{19}H_{20}ClN_3O$ (341.8) Calcd. C 66.8 H 5.89 N 12.3 Found C 66.8 H 5.91 N 12.5.- IR (KBr): 2952; 1655; 1632; 1592; 1494; 1452; 1403; 1341; 1304; 1273; 1253; 1219; 1181; 1089; 1028; 951; 921; 851; 802; 776; 747; 702; 690 cm^{-1}.- UV (CH_3OH): λ max/nm (log ε) = 205 (4.29), 296 (4.09), 344 (4.14).- ^{1}H-NMR/300 MHz ([D$_6$]DMSO): δ (ppm) = 10.28 (bs; 2H, =NH_2^+, D_2O exchange), 7.82 (d; J = 7.5 Hz, 2H aromat., =CH-Ph-H-2'', =CH-Ph-H-6''), 7.58 (d; J = 17 Hz, 1H, Ph-CH=), 7.44 (m; 2H aromat., =CH-Ph-H-3'', =CH-Ph-H-5''), 7.38 (m; 1H aromat., =CH-Ph-H-4''), 7.32-7.18 (m; 6H, 5 Phenyl-H, syd-CH=), 4.86 (t; J = 6.9 Hz, 2H, N-CH_2), 2.76 (t; J = 7.6 Hz, 2H, Ph-CH_2), 2.23 (m; 2H, Ph-CH_2-C<u>H</u>$_2$).- MS (120°C): m/z = 305 (8%, [M]$^{+\cdot}$), 261 (20), 201 (12), 200 (26), 171 (13), 170 (17), 169 (11), 143 (12), 142 (55), 130 (12), 117 (18), 115 (31), 91 (100), 77 (10), 41 (15).

E-N-Nitroso-3-(3-phenylpropyl)-4-styryl-5-sydnone imine (**35b**)

Cherry red crystals (methanol), mp. 97°C. Yield 49%.- $C_{19}H_{18}N_4O_2$ (334.4) Calcd. C 68.2 H 5.42 N 16.8 Found C 68.0 H 5.38 N 16.8.- IR (KBr): 2996; 2942; 2872; 1724; 1666; 1584; 1494; 1474; 1464; 1453; 1444; 1406; 1381; 1358; 1271; 1257; 1208; 1157; 1107; 1082; 1070; 1056; 1027; 999; 979; 964; 942; 885; 866; 849; 806; 784; 752; 733; 714; 701; 686; 628 cm^{-1}.- UV CH_3CN): λ max (log ε) = 207 (4.05), 259 (4.04), 345 (4.40), 513 nm (2.24).- ^{1}H-NMR/300 MHz ([D$_6$]DMSO): δ (ppm) = 7.67 (d; J = 7 Hz, 2H aromat., =CH-Ph-H-2'', H-6''), 7.48-7.18 (m; 10 H, 8H aromat., C<u>H</u>=C<u>H</u>), 4.92 (t; J = 7 Hz, 2H, N-CH_2), 2.80 (t; 2H, Ph-CH_2), 2.31 (tt; J = 7/7 Hz, 2H, Ph-CH_2-C<u>H</u>$_2$).- MS (+ FAB/DMSO/glycerol): m/z = 335 (2%, [M + H]$^+$), 170 (6), 131 (7), 117 (11), 115 (15), 103 (8), 91 (100), 78 (22), 76 (13).- MS (120°C): m/z = 306 (53%, [M - N_2]$^{+\cdot}$), 276 (3), 170 (6), 130 (17), 119 (18), 91 (100), 77 (6), 41 (10).

E-4-[2-(2-Furanylethenyl)]-3-(2-phenylethyl)-5-sydnone imine hydrochloride (**36a**)

Yellow green small crystals (ethanol/chloroform), mp. 175°C. Yield 34%.- $C_{16}H_{16}ClN_3O_2$ (317.8) Calcd. C 60.5 H 5.07 N 13.2 Found C 60.4 H 5.04 N 13.2.- IR (KBr): 3185; 2982; 1665; 1637; 1598; 1504; 1495; 1471; 1453; 1389; 1323; 1290; 1229; 1199; 1176; 1076; 1041; 1010; 961; 938; 883; 807; 736; 695; 651 cm^{-1}.- UV (CH_3OH): λ max (log ε) = 205 (4.14), 307 (4.16), 368 nm (4.15).- ^{1}H-NMR/300 MHz ([D$_6$]DMSO): δ (ppm) = 10.15 (bs; 2H, =NH_2^+, D_2O exchange), 7.85 (s; 1H aromat., Fu-H-5''), 7.39 (d; J = 16.6 Hz, 1H, syd-CH=), 7.33-7.23 (m; 5H aromat., Phenyl-H), 6.86 (d; J = 16.6 Hz, 1H, Fu-CH=), 6.80 (d; J = 3.5 Hz, 1H aromat., Fu-H-3''), 6.65 (dd; J = 3/1 Hz, 1H aromat., Fu-H-4''), 5.06 (t; J = 7 Hz, 2H, N-CH_2), 3.24 (t; J = 7 Hz, 2H, Ph-CH_2).- MS (120°C): m/z = 281 (23%, [M]$^{+\cdot}$), 177 (12), 159 (23), 132 (22), 105 (100), 91 (21), 79 (12), 77 (14).

E-4-[2-(2-Furanylethenyl)]-N-nitroso-3-(2-phenylethyl)-5-sydnone imine (**36b**)

Blood red needles (methanol), mp. 112°C. Yield 48%.- $C_{16}H_{14}N_4O_3$ (310.3) Calcd. C 61.9 H 4.54 N 18.0 Found C 61.5 H 4.52 N 17.9.- IR (KBr): 3430; 3106; 3049; 3023; 1720; 1629; 1585; 1484; 1451; 1405; 1387; 1364; 1354; 1336; 1219; 1160; 1141; 1098; 1077; 1021; 958; 936; 892; 807; 744; 707; 676; 633 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 272 (4.00), 357 (4.43), 508 nm (2.32).- ^{1}H-NMR/300 MHz ([D$_6$]DMSO): δ (ppm) = 7.83 (d; J = 1.5 Hz, 1H aromat., Fu-H-5''), 7.32-7.22 (m; 6H, 5 Ph-H, syd-CH=), 6.98 (d; J = 16 Hz, 1H, Fu-CH=), 6.85 (d; J = 3.4 Hz, 1H, Fu-H-3''), 6.63 (dd; J = 3.4/1.5 Hz, 1H, Fu-H-4''), 5.15 (t; J = 6.5 Hz, 2H, N-CH_2), 3.33 (t; J = 6.5 Hz, 2H, Ph-CH_2).- MS (+ FAB/DMSO/glycerol): m/z = 311 (2%, [M + H]$^+$), 159 (7), 106 (9), 105 (100), 91 (18), 78 (28), 77 (9), 76 (12).

E-2-[2-[5-Nitrosoimino-4-styryl-sydnone-3-yl]-ethoxy]-ethanol (**37b**)

Red crystals (methanol/ethanol), mp. 107°C (decompn.). Yield 42%.- $C_{14}H_{16}N_4O_4$ (304.3) Calcd. C 55.3 H 5.30 N 18.4 Found C 55.3 H 5.37 N 17.8.- IR (KBr): 3415; 3047; 3009; 2893; 1626; 1571; 1496; 1474; 1447; 1409; 1395; 1372; 1343; 1282; 1261; 1196; 1165; 1158; 1119; 1098; 1081; 1055; 1028; 983; 968; 952; 920; 849; 821; 752; 721; 688; 679; 640 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 259 (4.18), 344 (4.42), 514 nm (2.25).- ^{1}H-NMR/300 MHz ([D$_6$]DMSO): δ (ppm) = 7.68 (d; J = 7 Hz, 2H aromat., Ph-H-2'''', H-6''''), 7.44-7.36 (m; 5H, Ph-H-3'''', H-4'''', H-5'''', C<u>H</u>-C<u>H</u>), 5.14 (t; J = 4.8 Hz, 2H, N-CH_2), 4.63 (t; J = 5 Hz, 1H, D_2O

exchange, OH), 4.02 (t; J = 4.8 Hz, 2H, N-CH_2-$C\underline{H}_2$), 3.53-3.44 (m; 4H, O-($C\underline{H}_2$)$_2$-OH).- MS (+ FAB/DMSO/glycerol): m/z = 305 (9%, $[M + H]^+$), 276 (3), 245 (8), 218 (3), 149 (14), 131 (14), 115 (10), 75 (64).

Methyl E-4-[5-Nitrosoimino-4-styryl-sydnone-3-yl]-butanoate (**38b**)

Blood red needles (methanol), mp. 102°C. Yield 33%.- $C_{15}H_{16}N_4O_4$ (316.3) Calcd. C 57.0 H 5.09 N 17.7 Found C 57.1 H 5.09 N 17.5.- IR (KBr): 2944; 1718; 1576; 1473; 1413; 1383; 1361; 1257; 1207; 1152; 1100; 1071; 1009; 964; 935; 876; 843; 757; 731; 711; 691; 639 cm^{-1}.- UV (CH_3CN): λ max (log ε) = 230 (4.27), 259 (4.36), 345 (4.72), 514 nm (2.55).- ^{1}H-NMR/300 MHz ([D_6]DMSO): δ (ppm) = 7.70 (d; J = 7.1 Hz, 2H aromat., Ph-H-2'', H-6''), 7.50-7.35 (m; 5H, 3H aromat., $C\underline{H}$=$C\underline{H}$), 4.93 (t; J = 7 Hz, 2H, N-CH_2), 3.60 (s; 3H, OCH_3), 2.61 (t; J = 7 Hz, 2H, CH_2-CO), 2.24 (tt; J = 7/7 Hz, 2H, CH_2-$C\underline{H}_2$).- MS (+ FAB/DMSO/glycerol): m/z = 317 (1%, $[M + H]^+$), 140 (5), 130 (6), 115 (19), 101 (100), 91 (8), 78 (8), 77 (6).

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