Cyclitol	Modification	K_i (mM)
L-inositol [a]	C-1, inversion	1.8
(+) Bornesitol [c]	C-1, *o*-methyl	0.025
scyllo-Inositol [a]	C-2, inversion	0.16
Isomitilitol [b]	C-2, C-methyl	0.37
myo-Inositol-2-P [b]	C-2, *o*-phosphate	3.84
2-Keto-*myo*-inositol [b]	C-2, keto	0.22
D-inositol [a]	C-3, inversion	1.5
(−) Bornesitol [a]	C-3, *o*-methyl	0.7
(±) Viburnitol [a]	C-1(3), deoxy	0.45
5-Deoxy-inositol [b]	C-5, deoxy	1.5
neo-Inositol [c]	C-5, inversion	0.45
Sequoyitol [c]	C-5, *o*-methyl	0.02
(±) *epi*-Inositol [a]	C-4(6), inversion	0.53
Laminitol [a]	C-6, C-methyl	0.16
(−) Galaquercitol [b]	C-6, deoxy C-3, inversion	25
(+) Taloquercitol [b]	C-6, deoxy C-5, inversion	20
(±) Alloquercitol [b]	C-5, deoxy C-4(6), inversion	20
1,3/2,5-Cyclohexanetetrol [b]	C-1, C-3, deoxy	55
(±) 2,3,5/6-Cyclohexanetetrol [b]	C-1, C-4, deoxy	262
muco-Inositol [b]	simultaneous inversion C-3, C-4; C-3, C-1; C-1, C-6	51
allo-Inositol [a]	simultaneous inversion C-4, C-5; C-5, C-6; C-3, C-6; C-1, C-4; C-1, C-5; C-3, C-5	50

[a] Indicate substances (1.1 mM) tested in the presence of various concentrations of *myo*-inositol (0.27, 0.55 and 1.1 mM). [b] Indicate substances tested at a concentration 50-fold higher than *myo*-inositol (0.55 mM). [c] Indicate substances tested as uptake inhibitor of *scyllo*-inositol (0.055, 0.11 and 0.56 mM).

represents the difference between the total *myo*-inositol taken up and the radioactivity lost by dehydrogenation. We have suggested in a previous report that, at the end of the assay period, no more than 70% of the total intracellular *myo*-inositol is present as such[1]. Substances which compete with *myo*-inositol as substrate of the dehydrogenase, or which inhibit the dehydrogenase without being substrate, are thus capable of apparently stimulating uptake, since they prevent loss of label from *myo*-inositol. Accordingly those substances ((+)bornesitol, *neo*-inositol and sequoyitol) were tested as inhibitors of *scyllo*-inositol transport. The results obtained can be related to those for *myo*-inositol because of the close correspondence of the transport properties of these two cyclitols (DESHUSSES and REBER, unpublished).

Removal of any hydroxyl group, and simultaneous inversion, is not sufficient to produce a large inhibitory effect. But after 2 simultaneous inversions or removal of hydroxyl groups, the compound is completely non-inhibitory. As a general rule, it is possible to conclude that two or more modifications in the basic structure of *myo*-inositol render the molecule non-inhibitory.

Résumé. Des quantités saturantes de *myo*-inositol sont capables de protéger les groupes SH impliqués dans le transport actif du cyclitol contre les réactifs de ces groupes chez *Aerobacter aerogenes*. La spécificité du système est restreinte aux cyclitols ne présentant pas plus d'une modification par rapport à la structure du *myo*-inositol.

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Evidence for the Mediation of Indole-3-acetic Acid Effects Through its Oxidation Products

While some workers ascribe the role of detoxification of indole-3-acetic acid (IAA) to IAA-oxidase[1], others consider that it produces oxidation products to cause physiological responses characteristic of auxin[2–5]. If this view is valid, the exogenous application of oxidation products should cause effects identical to those of auxin or chemicals like sodium metabisulfite which promote the formation of initial products of IAA oxidation[3,6], should enhance a given physiological response of IAA.

Work to test this hypothesis was undertaken in this laboratory, using adventitious root formation on mung bean hypocotyl cuttings, as a bioassay. It has been reported that these cuttings do not root in water but root in 1% sucrose and more profusely in 1% sucrose + 5 mg/l IAA[7].

The seedlings were raised from uniform seeds in Petridishes lined with cotton pads in the dark in growth chambers maintained at 28 ± 2°C. 480 uniform 7-day-old seedlings were selected for experimentation. These were made into cuttings by excising the cotyledons and also

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Effect of different concentrations of sodium metabisulfite, IAA and sucrose alone and in combinations, on the number of mung bean hypocotyl cuttings that rooted out of 10 and the number of roots produced per cutting (figures in parentheses)

Treatment	Concentration of sodium metabisulfite (mg/l)					
	0	10	20	40	80	100
IAA (0, 1, 3 or 5 mg/l)	0	0	0	0	0	0
Sucrose (1%)	10 (5.4 ± 0.2)	10 (6.1 ± 0.4)	10 (8.0 ± 0.8)	10 (9.2 ± 0.9)	10 (13.7 ± 1.5)	10 (11.3 ± 1.0)
IAA (1 mg/l + sucrose 1%)	10 (15.9 ± 1.7)	10 (26.5 ± 2.1)	10 (38.3 ± 2.1)	10 (36.8 ± 2.1)	10 (26.4 ± 1.5)	10 (21.9 ± 1.8)
IAA (3 mg/l + sucrose 1%)	10 (29.8 ± 0.2)	10 (38.1 ± 2.3)	10 (40.2 ± 1.2)	10 (37.5 ± 4.8)	10 (31.7 ± 1.8)	10 (25.4 ± 2.2)
IAA (5 mg/l + sucrose 1%)	10 (33.4 ± 1.2)	10 (42.0 ± 1.7)	10 (48.0 ± 2.5)	10 (33.9 ± 2.4)	10 (18.7 ± 1.2)	10 (18.3 ± 1.8)

± Standard error

the epicotylar and hypocotylar portions, leaving behind only 6 cm in each case with 3 cm length of epicotyl and of hypocotyl. The cuttings were divided into 48 groups of 10 each, to be cultured in grade tubes, each containing 30 ml of test solution and only hypocotylar portion was dipped in the medium. The test solutions consisted of varying concentrations of IAA, sucrose and metabisulfite, singly and in different combinations, and were prepared in 30 μM chloramphenicol to prevent microbial infection, an equivalent being added to water to serve as control. Observations of the number of rooted cuttings and roots produced were recorded after 7 days. The experiment was repeated three times with similar results.

The results, together with the treatments, are presented in the Table. Cuttings did not root either in water or in IAA alone but rooted in sucrose and more profusely in IAA + sucrose, showing that the production of adventitious roots was limited by the level of endogenous nutrition and that a proper balance between auxin and nutrition was necessary for optimal effect [7–10].

Sodium metabisulfite acted synergistically with IAA. Thus, the number of roots produced on cuttings cultured in 1 mg/l IAA + 1% sucrose + 20 mg/l sodium metabisulfite was higher than on those cultured in 5 mg/l IAA + 1% sucrose, the highest being on cuttings grown in 5 mg/l IAA + 1% sucrose + 10 or 20 mg/l sodium metabisulfite. These results clearly show that enhancement in the enzymatically produced oxidative products of IAA stimulated by sodium metabisulfite[3,6] considerably increased the production of adventitious roots. The inhibitory effect of higher concentrations of sodium metabisulfite in the medium may be ascribed to the supra-optimal concentrations of oxidation products. It is thus apparent that these oxidation products exhibit, like all growth regulators, a diphasic concentration response. A high synergism of monophenols that enhance the activity of IAA oxidase with applied auxins has also been demonstrated earlier[11]. The reduction in Avena coleoptile curvature with chlorogenic acid[12], a polyphenol that inhibits, but its enhancement by monophenol parahydroxybenzoic acid[13] that promotes the activity of IAA oxidase, lends support to the postulate that enzymatic oxidation of IAA is essential for a positive growth response and refute the detoxification role ascribed to IAA-oxidase.

The complete suppression of rooting on mung bean hypocotyl cuttings by even as low as 100 µg of a specific proteinaceous inhibitor of IAA-oxidase, that has been isolated in this laboratory from stem cuttings of *Ipomoea fistulosa*[14] when it is added to the medium containing IAA + sucrose, lends further support to this postulate.

Zusammenfassung. Nachweis, dass die Adventivwurzelbildung an Bohnenhypocotylen (*Phaseolus mungo*) in Anwesenheit von Indolylessigsäure gefördert wird bei gleichzeitigem Na-metabisulfit Angebot. IES und Na-bisulfit haben einen synergistischen Effekt, welcher Oxidationsprodukten der ersteren zugeschrieben wird.

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Adenosine, a Sex-Linked Excretory Product of a Lepidopteran, *Pieris brassicae*

The main excretory purine compounds of insects are known as uric acid (and its metabolites) and pteridines. Some minor compounds, intermediates in uric acid production have also been detected, e.g. hypoxanthine and xanthine[1,2]. All these compounds may be present simultaneously, but their relative importance may vary among species. In the case of the pupal/adult stages of the Lepidopteran *Pieris brassicae*, the most abundant products are uric acid in the body[3,4], leucopterin and isoxanthopterin in the wings[4–7]. HARMSEN[4] described an important accumulation of xanthine in the body (1,200 µg/animal) prior to adult emergence. We tried various metabolic