

Only proteins characterized by at least 2 closely neighbouring-SO₃ groups, about 4–5 Å apart react metachromatically. Such a configuration of groups occurs in the A chain of the insulin molecule after oxidation of the -SH groups.

The difference in the time of response of lampreys and rabbits supports the view of BERN and NANDI²², that the response to insulin and the restoration of altered blood sugar levels to normal values is much slower in poikilotherms than in homiotherms.

FALKNER and WILSON²³ found that insulins from poikilothermic species the daddy sculpin (*Cottus scorpius*) and the hagfish (*Myxine glutinosa*) were effective in homologous species at lower doses than those required when ox and cod insulin were used, thus indicating a degree of species specificity. Similarly, although the lamprey 'insulin like' factor is effective in mammalian species it is probable that the molecules are not identical. ERMISH⁸ suggested that this was because that portion of the insulin molecule, producing its immunological specificity was different from that responsible for its physiological characteristics.

Résumé. L'existence d'un facteur pseudo-isocyanine positif semblable à l'insuline est constatée dans les coupes histologiques et dans les extraits chromatogrammes des cordons cellulaires du pancréas de *Lampetra fluviatilis*. En outre, l'extrait acide de ces cordons, injecté au lapin et la lamproie produit un effet hypoglycémique significatif.

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²² H. A. BERN and J. NANDI, in *The Hormones* (Eds. G. PINCUS, K. V. THIMAN and E. B. ASTWOOD; Academic Press, New York 1964), vol. 4, p. 199.

²³ S. FALKNER and S. WILSON, *Gen. comp. Endocr.* 5, 676 (1965).

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Pineal Inhibition of Compensatory Testicular Enlargement in Light-Deprived Hamsters¹

Recently, many studies have been performed to determine the influence of the pineal gland or pineal substances on compensatory enlargement of the remaining gonad after unilateral castration^{2–6}. The majority of these studies utilized the albino rat as the experimental animal. Because the pineal gland (epiphysis cerebri) of the golden hamster (*Mesocricetus auratus*) exhibits a strong antigonadotropic influence^{7–8}, the author decided to test the ability of this organ to inhibit compensatory testicular enlargement in this species.

Materials and methods. Since in adult male golden hamsters unilateral gonadectomy usually does not cause a significant hypertrophic response of the remaining testis, the following experimental design was used. 30 adult male hamsters, weighing between 94 and 115 g, were blinded by bilateral orbital enucleation. This procedure characteristically leads to total gonadal involution within 8 weeks; the atrophic response of the gonads is a result of an activated pineal since its removal prevents the involution⁹. Thus, whereas normal and blinded pinealectomized have testes weighing approximately 3000 mg, if animals are blinded only, the gonads weigh about 400 mg within 2 months. After 8 weeks the 30 blinded hamsters were divided into 3 groups. The first group (11 animals) was unilaterally castrated and sham pinealectomized; the removed testis was weighed to the nearest mg. The second group (10 animals) was unilaterally castrated and pinealectomized; the weights of the excised testes were again recorded. The third group (9 animals) was subjected to pinealectomy only and the weight of 1 testis was estimated in the following manner. The testis was exposed through an incision in the lower abdominal wall and its size was compared to a similarly atrophic testis of known weight. In this manner the weight of the exposed testis could be accurately predicted; previous experience had shown that, using this procedure, it was relatively easy to estimate the weight within ± 10 mg.

After the operations the animals from each group were housed, 4–6 per cage, and were allowed free access to

food and water. The animals were maintained under these conditions for 21 days. At necropsy, the remaining testis from each of the hamsters of the first two experimental groups and 1 testis from each animal in group 3 were weighed to the nearest mg. All testes were retained for histological study.

Results and discussion. Unilateral gonadectomy in blinded hamsters failed to elicit a significant hypertrophic response within 3 weeks (Figure). In fact, the remaining testes in these animals exhibited, on the average, only a 2% increase in weight. By comparison, unilaterally castrated hamsters that were also pinealectomized showed a highly significant ($p < 0.001$) incremental change in the size of the remaining gonad; in this group there was a 105% increase in the size of the remaining testes. By comparing the initial and final testicular weights, it was obvious that in each of the 10 animals in this group, the remaining testes underwent some hypertrophy. Pinealectomy alone caused a slight (31%), but statistically insignificant, enlargement of the gonads. All testes examined were histologically atrophic.

The results clearly indicate that the activated pineal gland of the blinded hamster is capable of suppressing compensatory testicular enlargement since the removal of this organ allows for a substantial growth of the intact gonad after unilateral castration. These findings agree with studies in the rat where the injection of pineal

¹ Supported by grant No. HD-02937 United States Public Health Service.

² A. MOSZKOWSKA, *Ann. Endocr.* 24, 215 (1963).

³ M. REISS, R. H. DAVID, M. B. SIDEMAN, I. MAUER and E. S. PLICHTA, *J. Endocr.* 27, 107 (1963).

⁴ S. SORRENTINO JR., *Anat. Rec.* 160, 432 (1968).

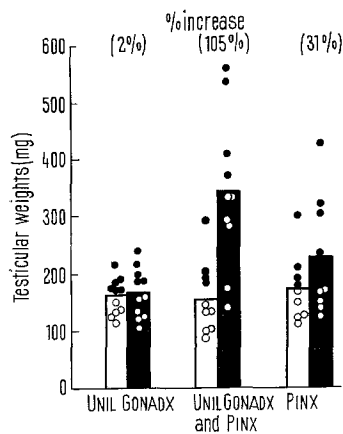
⁵ J. T. NORRIS, *Anat. Rec.* 166, 355 (1970).

⁶ M. K. VAUGHN and B. BENSON, *Anat. Rec.* 166, 393 (1970).

⁷ R. A. HOFFMAN and R. J. REITER, *Science* 148, 1609 (1965).

⁸ R. J. REITER and F. FRASCHINI, *Neuroendocr.* 5, 219 (1969).

⁹ R. J. REITER, *Anat. Rec.* 160, 13 (1968).



Influence of pinealectomy on compensatory testicular enlargement in blinded adult hamsters. Height of hollow bars represents mean weight of the original testis (taken at the beginning of the experiment). Height of solid bar represents mean weight of remaining testis (taken at the conclusion of the experiment). Each point represents the weight of a single testis. Mean per cent increase in testis weight is in parentheses at top. UNIL GONADX, unilateral gonadectomy; PINX, pinealectomy.

substances also curtails compensatory growth of the gonads⁴⁻⁶. The fact that pinealectomy alone did not stimulate a significant regrowth of the testes within 3 weeks confirms earlier findings; usually about 4 weeks is required before the testes of blinded hamsters will show evidence of regeneration after pinealectomy⁹. Presumably, the pineal gland of blinded hamsters secretes a substance or substances which act on the neuroendocrine axis to restrict gonadotropin synthesis or secretion¹⁰.

Zusammenfassung. Halbseitige Kastration führt bei geblendeten Goldhamster Männchen mit Atrophie der Geschlechtsorgane nur nach Pinealektomie zu kompensatorischer Hodenhypertrophie.

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¹⁰ J. A. KAPPERS, J. Neuro-Visc. Rel., Suppl. 9, 140 (1969).
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A Nutritional Method for the Isolation of Morphological Mutants of *Neurospora crassa*

In spite of the acknowledged importance of morphological mutants in understanding developmental processes, no method exists for their systematic isolation. They have been observed from time to time in *Neurospora*, an organism in which they should prove particularly useful due to its extensive use for genetic and biochemical studies. We have found a method, based largely upon the filtration enrichment technique of CATCHESIDE¹ (as later modified²) for the isolation of large numbers of morphological mutants. This came from the earlier observa-

tion that many known morphological mutants of *Neurospora* fail to grow, or exhibit a lag when sodium acetate in combination with glutamate or aspartate replace the usual sucrose and potassium nitrate of minimal medium. Wild type strains, on the other hand, grow on this combination, thus allowing a method for selection of morphological mutants.

The enrichment technique is based on the elimination of germinated conidia by means of successive filtrations through gauze filters which will pass conidia. Thus conidia

Growth response of several known morphological mutants to the selective media used for concentrating unknown mutants as described in the text

Locus	Allele isolate No.	Linkage group	FGSC ^a No.	Growth response Acetate + glutamate	Acetate + aspartate
Amycelial	K422	I	305	—	+
Biscuit	B6	V	277	—	—
Plug	B118	V	96	—	+
Colonial-4	70007	IV	67	—	—
Fluffy	L	II	45	—	+
Spray	B132	V	68	—	—
Frost	B110	I	103	—	—
Dapple	R2375	II	1077	+	—
Doily	LD-55-51	VII	177	+	—
Carpet	P564	II	292	—	—
Medusa	R2401	IV	1403	—	—
Crisp	B122	I	804	+	+
Colonial-2	Y5331	VII	172	+	+
STA ₄	(wild type)	—	262	+	+
LIND +	(wild type)	—	853	+	+

^a FGSC-Fungal Genetics Stock Center, Dartmouth College, Hanover (New Hampshire, USA).