EFFECT OF ORAL ZINC SULPHATE SUPPLEMENTATION ON THE GROWTH OF REGENERATING TAIL OF *HEMIDACTYLUS VIRIDIS*

ZINC is known to be an essential trace element for more than a century[1] but its essentiality was not established until 1934 when Todd *et al.*[2] produced zinc deficiency syndrome in rats. The usual manifestations of zinc deficiency summarised by Underwood[3] include marked retardation or cessation of growth, abnormal bone maturation, unsteady gait, impaired reproductive performances, skin defects, hair loss and impaired would healing. A critical analysis of the symptoms of zinc deficiency syndrome clearly suggests that zinc promotes the rapid proliferation of tissue. In this context it was considered interesting to examine whether or not, the oral supplementation of zinc can enhance the rate of proliferation and growth of regenerating tail in lizards. This communication reports the effect of oral zinc sulphate supplementation on the regenerating tail of common wall lizard, *Hemidactylus viridis*.

Twenty common wall lizards, *Hemidactylas viridis*, (10–12 gm) with snout-vent length 6·5–7·5 cm. were kept in aluminium cages (12″ × 12″ × 12″) at 30° C (± 2°). They were given house crickets (*Acheta domestica*) as food. The tails of all the lizards were amputated, about 0·5–1 cm from their base. Preliminary studies demonstrated that the rate of tail regeneration after such amputation was the same as after induced autotomy by pulling. The animals were divided into two equal groups, A, and B, group A served as control animals. They were fed *ad libitum* on house crickets. The animals of group B served as experimental animals. They were also fed *ad libitum* on house crickets but each of these lizards received an oral dose of 0·1 ml of 1% $ZnSo_4$ solution in distilled water daily throughout the duration of the experiment. The measurement of the tail was continued for 30 days. The data have been summarised in Table I.

TABLE I

Measurements of the regenerating tail in cm.

Time in days	Mean growth of tail in control animals	SD	Mean growth of tail in experimental animals	SD
1	Zero (Blood clot)		Zero (Blood clot)	
2–4	Zero (Wound healing)		Zero (Wound healing)	
5	Zero (Wound healing)		Zero (Blastema formation begins)	
6	Zero (Wound healing)		0·14 cm (Blastema formation)	± ·054
7	Zero (Wound healing completes)		0·38 cm (Blastema formation)	± ·070
8	Zero (Blastema formation begins)		0·64 cm	± ·094
9	0·15 cm (Blastema formation)	± ·037	0·88 cm	± ·088
10	0·29 cm (Blastema formation completes)	± ·031	1·09 cm	± ·074
12	0·53 cm	± ·037	1·34 cm	± ·157
14	0·79 cm	± ·045	1·61 cm	± ·170
16	0·96 cm	± ·050	1·91 cm	± ·202
18	1·15 cm	± ·093	2·18 cm	± ·204
20	1·39 cm	± ·064	2·43 cm	± ·200
22	1·59 cm	± ·057	2·71 cm	± ·253
24	1·73 cm	± ·065	2·94 cm	± ·272
26	1·87 cm	± ·053	3·20 cm	± ·295
28	1·95 cm	± ·046	3·56 cm	± ·253
30	2·04 cm	± ·179	3·88 cm	± ·197

The above data clearly reveal that $ZnSO_4$ has a profound effect on the process of wound healing, blastema formation, and the growth of the tail after amputation. The wound healing prodess is greatly enhanced by the administration of $ZnSO_4$. In 30 days the tail regenerates by about 2·0 cm in control animals and 3·9 cm in experimental animals. Thus the

regeneration of tail is 1·9 times greater in animals that have been provided with an oral administration of $ZnSo_4$.

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Department of Zoology, S. K. TANEJA.
Panjab University, HARPREET KAUR.
Chandigarh, India, *April* 22, 1978.

1. Raulin, J., *Ann. Sci. Nat. Bot. Biol. Veg.*, 1869, 11, 93.
2. Todd, W. R., Elvehgem, C. A. and Hart, E. B., *Amer. J. Physiol.*, 1934, 107, 146.
3. Underwood, E. J., *Trace Elements in Human and Animal Nutrition*. Academic Press, New York, 1971, p. 222.

REVIEWS

Horizons in Biochemistry and Biophysics, Volume 4. Editors: E. Quagliariello, F. Palmieri and Thomas P. Singer. (Addison-Wesley Publishing Company, Inc., Advanced Book Program, Reading, Massachusetts 01867, U.S.A.), December 1977. Pp. xvi + 302. Price: U.S. $ 19.50 in hard binding.

The fourth volume in this series contains 9 articles of quality that satisfy the aims of the editors "to choose articulate authors who are more concerned with the dissemination of knowledge than with emphasis on their own contribution or priorities". The subject-matter covers a wide range of biochemistry and biophysics: calcium and mineralization, fluidity of biomembranes and spin labels, hormone receptors and hormone action in lipolysis, biological effects of purines and transport-dependent adenylate cylase, biochemistry of fertilization and structure function of transfer RNA. The editorial policy has claimed to make these articles "a new means of communication.....unencumbered by specialized jargon, extensive documentation or bibliography". Thus the reader will easily be able to assimilate the information in the field and gain an appreciation of the trends of current research. In fact the authors seem to assume that the reader had no background and give explanation of all terms used (*e.g.*, synapse on p. 65). Calling the book 'Horizons', is probably unfair to the expected readership. On the contrary, the reviewer gained the impression, in some articles at least, that these are written as essays with basic conceptual treatment fit as answers in an examination paper.

Lehninger's article on mitochondrial function in mineralization is stimulating and shows the whole canvas of calcium biochemistry. Friedberg's article on hormone receptors gives a glimpse of this fascinating field. The article of Meisner and Carter Jr. on lipolysis seems to be a summary of old work with hardly any references beyond 1975. Henderson's coverage on purine compounds and their participation in metabolic regulation and cell growth is a fine presentation. One would have expected coverage on the effects of adenosine in vasoconstriction and in glycogen and cholesterol synthesis. The article of Kim and Sussman on transfer RNA is an exceedingly informative piece on this subject.

The book is printed by photo-offset method, contains 305 pages and is easy to read. The reviewer wonders whether it is essential to print ISBN 0-201-02714-3 number on each page tending to irritate the reader. There are many number of good reviewing books; yet the "Horizons', will have a place of its own and the reviewer has enjoyed reading this volume.

T. RAMASARMA.

Principles of Reaction Mechanism in Organic Chemistry, Second Edition, (Sultan Chand and Sons, 23, Daryaganj, New Delhi, 110 002), February 1978. Pp. xiii + 447. Price: Rs. 14.00.

The present second edition is a much improved book incorporating most of the corrections needed in the first edition. In addition, the authors have added a chapter on Woodward-Hofmann rules of orbital symmetry and their role in determining the stereochemical course of the electrocyclic reactions.

Chapter 14 has been rewritten. However, there is still some confusion regarding the statement made in the preface and the discussion on page 348.

Some aspects of the chemistry of carbonium ions have been included in Chapter 13. Several new aspects of isomerism like E Z system of naming geometrical isomers, R & S nomenclature, Huckel's rule for aromaticity have been included.

The author has incorporated a large number of problems at the end of each chapter. This is quite useful in understanding the chapter more clearly. Further some selected references for further reading are also given.

The book is recommended for use by M.Sc. students.

T. R. KASTURI.

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