port for the view that, at least for the case of alloxan, zinc metabolism is disturbed, and the present findings may be compared with those of the Japanese group (*4*). Differences of opinion have been recorded as to the actual location of zinc in pancreatic tissue. Fairly heavy ingestion of zinc is said to lead to deposition in the acinar portion (*10*), while other work implicates the islet tissue (*5*). In the present study the possibility presents itself that diabetic rat kidney takes up more radiozinc than normal kidney. Comment upon this phenomenon must be withheld at the present time.

J. R. LOWRY
R. R. BALDWIN
R. V. HARRINGTON
Central Laboratories, General Foods Corporation
Hoboken, New Jersey

References

1. SCOTT, D. A., and FISHER, A. M. *J. Clin. Invest.* **17**, 727 (1938).
2. EISENBRAND, J., and SEINZ, M. *Z. Physiol. Chem.* **268**, 1 (1941).
3. EISENBRAND, J., SEINZ, M., and WEGEL, F. *Med. u. Chem. Abhandl.* **4**, 250 (1942).
4. OKAMOTO, K. *Acta Schol. Med. Univ.* Kyoto **27**, 43 (1949).
5. ———. *Hyogo J. Med. Sci.* **1**, 77 (1951).
6. ROOT, M. A., and CHEN, K. K. *J. Pharmacol. Exptl. Therap.* **104**, 404 (1952).
7. MONTGOMERY, M. L., SHELINE, G. E., and CHAIKOFF, I. L. *J. Exptl. Med.* **78**, 151 (1943).
8. SHELINE, G. E., *et al. J. Biol. Chem.* **149**, 139 (1943).
9. HEATH, J. C., and LIQUIER-MILWARD, J. *Biochim. Biophys. Acta* **5**, 404 (1950).
10. SCOTT, D. A., and FISHER, A. M. *Am. J. Physiol.* **121**, 253 (1938).

Received November 16, 1953.

Callus and Shoot Formation from Tomato Roots *in Vitro*

IT is known that shoots will arise from some plant callus tissues under certain cultural conditions; the development of plantlets from *Nicotiana* callus (*1–4*) and carrot callus (*4, 5*) has been described. White (*6*) reported that shoots arise from callus formed on isolated dandelion roots in culture. Since 1934, when White (*7*) first was able to subculture tomato roots for indefinite lengths of time, various workers have investigated root cultures of numerous strains of tomato. Through repeated subculturing, some of these lines have been maintained for a number of years. However, there has been no case reported of plants developing from such tomato roots. This paper reports the formation of callus and, subsequently, shoots from roots of a clone of *Lycopersicon peruvianum* (L.) Mill.[1] Root cultures in White's medium (*6*) were kept in the dark. Calluses and shoots were first noted on roots 15 days after subculturing. Most of the roots had a callus on the proximal end, and there were shoots visible on two of these calluses. In cultures originating from a segment of a root, rather than a root tip, there was a callus at one or both cut ends. Callus and shoot formation did not occur in another clone derived at the same time from the same seed sample and kept under the same conditions as the callus-forming clone. In later subcultures of the callus-producing clone, callus formation occurred on most of the roots, and shoot formation was frequent.

[1] The seed, harvested in 1950 from Line 2245, from which this root clone was obtained was furnished by the Ohio Agricultural Experiment Station, Wooster.

FIG. 1. ×5.

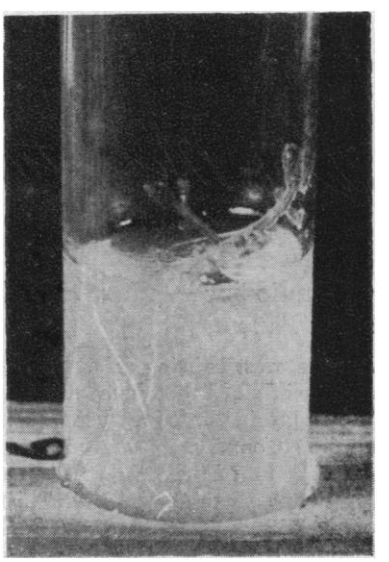

FIG. 2.

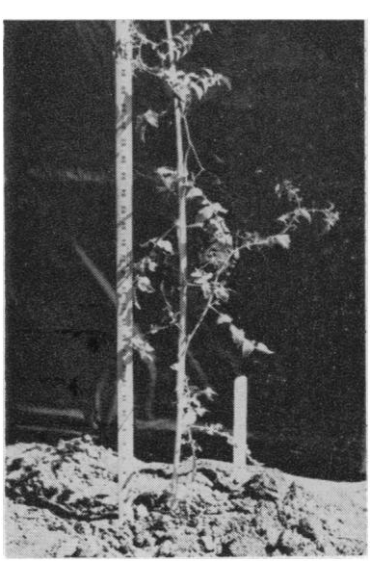

FIG. 3.

Some of the calluses with shoots were transferred to a modified Gautheret's medium containing 1% agar and 10 mg cysteine/liter, and the cultures were then kept under artificial light. On this medium, callus growth continued slowly but the shoots did not develop. When transferred to an identical medium, with addition of 40 mg adenine/liter, the shoots grew vigorously. One week after being transferred to this medium, the shoots had enlarged and become green (Fig. 1). During the next 2 wk, the plantlets increased in size and root systems developed (Fig. 2). The shoots were allowed to develop in the culture tubes until 5 or 6 leaves had expanded. One such plantlet, after being transferred first to vermiculite in a pot and later to soil, subsequently developed into a flowering plant (Fig. 3), which has been propagated vegetatively. No fruits have set.

JOANNE PARKER NORTON
WILLIAM G. BOLL

The Plant Research Institute
The University of Texas and *Clayton Foundation for Research*
Austin, Texas

References

1. WHITE, P. R. *Bull. Torrey Botan. Club* **66**, 507 (1939).
2. SKOOG, F. *Am. J. Botany* **31**, 19 (1944).
3. SKOOG, F., and TSUI, C. *Ibid.* **35**, 782 (1948).
4. LEVINE, M. *Bull. Torrey Botan. Club* **77**, 110 (1950).
5. ———. *Am. J. Botany* **37**, 445 (1950).
6. WHITE, P. R. *A Handbook of Plant Tissue Culture.* Lancaster, Pa.: The Jaques Cattell Press, 1943.
7. ———. *Plant Physiol.* **9**, 585 (1934).

Received November 16, 1953.

Interaction of Chromate with Nucleic Acids in Tissues[1]

IN the course of work on a simple separation of basic proteins, in particular of histones in nucleoproteins, the effect of a number of anions on nucleoproteins was investigated. After treatment with solutions containing the chromate-bichromate system of ions, determinations of nucleic acids in hot trichloracetic acid extracts of tissues according to Schneider's method (*1*) were found to give much lower values than in extracts of tissues which were not treated with chromate. Analyses of the tissues after contact with either chromic acid or Zenker's solution and after extraction of lipids shows that the total P retained in the residue is much larger than in the residue after contact with trichloracetic acid. The increase in total P in the tissue was found to be the same order of magnitude as the decrease of nucleic acid phosphorus in the extracts. This seems to indicate that the low nucleic acid values in the extracts of chromate treated homogenates were actually due to the decreased extractibility of nucleic acids or of reaction products of nucleic acids with chromate. It seems unlikely, that the retention of nucleic acids is due to the formation of a simple, salt-like compound, e.g., between the weakly positively charged groups of the nucleic acids and the chromate anion, since the yellow color imparted by the chromate ion is completely removed before the extraction with hot trichloracetic acid. Also, the effect of chromate seems to be specific in so far as treatment of the tissues with other acids such as trichloracetic acid, metaphosphoric acid, sulfosalicylic acid, picric acid, or Bouin's solution does not decrease the extractibility of the nucleic acids. It seems more probable that a small portion of chromate is reduced as is evidenced by the greenish color of the residue and in this state it forms complexes with nucleic acids or nucleoproteins which are more resistant to the decomposition of trichloracetic acid.

HEINZ HERRMANN
LOUISE B. SPECK

Division of Chemical Embryology,
Department of Pediatrics
University of Colorado Medical School
Denver, Colorado

Reference

1. SCHNEIDER, W. C. *J. Biol. Chem.* **161**, 293 (1945).

Received December 1, 1953.

[1] Work carried out with the aid of the American Cancer Society.

Listings of Unpublished Articles

BIBLIOGRAPHICAL lists submitted by applicants for research grants, fellowships, positions, or in other situations often contain references to articles not yet published. Sometimes the studies covered by these unpublished papers are among the most relevant ones for an evaluation of the application by a reviewing panel. Obviously only a reading of the papers themselves can give full knowledge of their content, but some minimum information could be obtained if a clear distinction were made in the listing of papers according to whether they are: (1) actually in press, that is, accepted by a journal; (2) submitted to a journal but not yet acted upon; or (3) not yet submitted to a journal and available only as manuscripts or still in preparation.

In (1) and (2) it would also help if the name of the journal and the approximate number of words were to be given. In any case, an abstract or summary of each unpublished paper should be provided. I suggest that in submitting bibliographies in connection with applications, some such procedure as the one proposed here should become general practice.

I also believe that editors should accept a bibliographical item listed as "in press" only when it falls into class (1) as defined above and only if it includes the name of the journal which will publish it.

CURT STERN

Department of Zoology
University of California
Berkeley, California

Received December 2, 1953.