monomers recombined into active enzyme. This result suggests that the ADH_1^S monomers are less stable than ADH_1^F monomers under the conditions of treatment.

The addition of Zn^{++} during dialysis, when the subunits are re-associating, has a striking effect in shifting the ratio back to 1 FF: 2 FS: 1 SS, and increasing the amount of activity which is restored. Without Zn^{++}, the average activity recovered for $\underline{Adh_1}^S/\underline{Adh_1}^S$ extracts was 12% of the undissociated control and 75% for the $\underline{Adh_1}^F/\underline{Adh_1}^F$ extracts. With the addition of Zn^{++}, the activities recovered for $\underline{Adh_1}^S$ extracts increased to 60% while the $\underline{Adh_1}^F$ recovery was unchanged. Our results indicate that Zn^{++} is necessary for the reassociation of ADH_1^S monomers to form active enzyme.

Preliminary results obtained with a modification of this procedure, which yields almost 100% active enzyme upon reassociation, suggest that dissociated F monomers bind Zn^{++} more strongly than do the S monomers.

Experiments are currently underway to determine whether or not zinc plays a role in the dimerization process itself.

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4. The products specified by two, unlinked alcohol dehydrogenase genes in maize are immunologically similar.

One way to identify similarities in the primary structures of two different enzyme subunits is to ascertain whether any antibody specified against one subunit will cross-react with the other subunit. The antigen-antibody reaction is extremely specific (see Reichlin, 1972, J. Mol. Biol. 64, 485). There are two unlinked alcohol dehydrogenase (Adh genes; ADH enzyme, EC 1.1.1.1.) genes in maize: $\underline{Adh_1}$ and $\underline{Adh_2}$. Their products dimerize into three electrophoretically separate enzymes of the same molecular size: Set I (ADH1•ADH1), Set II (ADH1•ADH2) and Set III (ADH2•ADH2)

(Schwartz, 1966, Proc. Nat. Acad. Sci. 56, 1431; Freeling and Schwartz, 1973, Biochem. Genet. 8, 27). All three sets of ADH can be induced by anaerobic treatment of primary roots (Freeling and Schwartz, 1973).

It was shown--from data to be reported elsewhere--that some anti-ADH1 antibodies specified against highly purified ADH1 subunits (Set I) also cross-react with ADH2 subunits (Set III). Competitive titrations and a two-dimensional immunoelectrophoretic technique (Schwartz, 1972, J. Chromatogr. 67, 385) were used. ADH1 and ADH2 subunits share some, but not all, antigenic sites. Homogenous ancestry is directly supported.

This result was not expected. The two subunits composing the major lactate dehydrogenases (LDH's) in animals are not immunologically similar although they do have considerable amino-acid sequence homology (see Kaplan, 1964, Brookhaven Symp. Biol. 17, 131). Compared to the animal LDH's, the original Adh duplication event reflected in contemporary maize may be recent. In any case, the Adh gene-system may prove phylogenetically useful. Quantitative immunological comparisons between the ADH's of maize and its relatives would be expected to yield evolutionary relationships. The antigenic similarity of ADH1 and ADH2 in maize, and presumably in maize relatives, may permit the quantitation of rate and extent of divergence of two, unlinked, duplicate genes.

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5. The functioning of the dissimilar sperm of high-loss plants in double fertilization.

Roman (1947, 1948) in his studies with TB-A translocations, where dissimilar sperm are formed by nondisjunction at the second microspore division, reported that the hyperploid sperm with two B^A chromosomes preferentially fertilized the egg while the hypoploid sperm with no B^A chromosome united with the polar nuclei. The fate of the two sperms is dependent on their genetic make-up and not on the segregation of the two B^A chromosomes into a specific nucleus with a preordained function in fertilization (Carlson, 1969). Carlson showed that preferential fertilization of the egg by sperm with two B^9 chromosomes did not occur when several intact B chromosomes were present (the so-called "swamping" effect). Any tendency toward