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Cytoplasmic isocitrate dehydrogenase variation within the C3H inbred strain

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Two allelic forms of the supernatant NADP isocitrate dehydrogenase (IDH) are found in inbred strains of mice (Henderson, 1965). The five C3H substrains tested, namely C3H/HeJ, C3H/Re-sl, C3H/N-w^{J}+, C3H/J-W^{x}+ and C3HeB/FeJ, all proved to be of the Id-1^{a}/Id-1^{a} genetic constitution. (For the nomenclature of inbred strains and substrains of mice see Staats, Committee on Standardized Nomenclature for Inbred Strains of Mice, *Cancer Res.* **24** (1964), 147–168.) All these substrains were obtained from E. S. Russell at the Jackson Memorial Laboratory, Bar Harbor, Maine, and were presumably all derived from C3H/He mice.

In contrast, we have found that mice of the C3H/BiMcL substrain are Id-1^{b}/Id-1^{b} in genetic constitution. Extracts were obtained by tissue homogenization, inserted into starch gels and run at 4 °C for 3–4 h with a voltage of 20 V/cm. The gels were then stained using the technique of Fine & Costello (1963). C3H/He Lac mice, also obtained originally from Dr Russell at the Jackson Laboratory and kindly given to us by Dr Dickinson of the Animal Breeding Research Organization, proved to be Id-1^{a}/Id-1^{a}, as expected. C57BL and CBA strains maintained in our Institute are respectively Id-1^{a}/Id-1^{a} and Id-1^{b}/Id-1^{b}, as found by Henderson (1965). The JU inbred strain developed by Falconer (see *Mouse News Letter* **18** (1952), 5) is Id-1^{b}/Id-1^{b}.

According to Festing (1969), in 1965–6 the C3H strain was the most widely used of all inbred mouse strains, both for immunological and for cancer research. A genealogical study of this strain was made by McLaren & Michie (1954). The strain was started by Strong in 1920; the C3H/He substrain was derived from it by Andervont in 1930 and the C3H/Bi substrain by Bittner in 1931. Green (1953) had shown that two C3H/Bi stocks resembled two stocks derived later from Strong's original line (C3H/St) in having predominantly five lumbar vertebrae. On the other hand, all three C3H/He stocks tested had predominantly six lumbar vertebrae. McLaren & Michie (1954) confirmed this finding on a further seven C3H/Bi, three C3H/St and six C3H/He stocks. Green commented: 'On the assumption that the difference is genetic, the following are possibilities. (1) The original C3H mice may have been heterozygous for one or more pairs of genes affecting skeletal type. By inbreeding, different genetic combinations may have become fixed in different sublines. The heterozygosity would have had to continue in the line at least until the Andervont line was established in 1930. (2) One or more mutations of skeletal genes may have occurred following the separation of the Andervont subline, leading thereby to the establishment of different types in the existing sublines. (3) One of the sublines may have been genetically contaminated by an accidental and unrecorded mating outside the line. (4) Some other strain may erroneously have been labelled as C3H.'

The finding of an additional difference, namely in IDH type, between mice of the two major substrains renders the second explanation unlikely and the first less likely. If either the third or fourth explanation is true, the affected substrain is likely to have been C3H/He. We suggest that C3H/He should be considered as a different strain from

C3H/Bi or C3H/St, and that the International Committee should consider renaming it. Suitable alternative names might be C3HE or Z, the original synonym for the C3H strain. The present situation often leads to confusion, when workers refer to 'C3H' mice without specifying the substrain (see Festing, 1969).

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