Opinion

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The type strain of *Lactobacillus casei* is ATCC 393, ATCC 334 cannot serve as the type because it represents a different taxon, the name *Lactobacillus paracasei* and its subspecies names are not rejected and the revival of the name '*Lactobacillus zeae*' contravenes Rules 51b (1) and (2) of the International Code of Nomenclature of Bacteria.
Opinion 82

Judicial Commission of the International Committee on Systematics of Bacteria

The Judicial Commission affirms that typification of *Lactobacillus casei* is based on ATCC 393, that ATCC 334 is a member of a different taxon and that the publication rejecting the name *Lactobacillus paracasei* (and its included subspecies) together with the revival of the name '*Lactobacillus zeae*' contravenes Rules 51b (1) and (2) of the International Code of Nomenclature of Bacteria.

At the meeting of the Judicial Commission in 2005 at the IUMS Bacteriology and Applied Microbiology Congress in San Francisco, the Judicial Commission of the International Committee for Systematics of Prokaryotes ruled that typification of *Lactobacillus casei* (Orla-Jensen 1916) Hansen and Lessel 1971 is based on ATCC 393, that ATCC 334 is a member of the taxon *Lactobacillus paracasei* Collins *et al.* 1989, that the proposal to revive the name '*Lactobacillus zeae*' contravenes Rules 51b (1) and (2) of the International Code of Nomenclature of Bacteria (the Code) and that the rejection of the name *Lactobacillus paracasei* together with the proposal of a neotype for *Lactobacillus casei* are not in accordance with the Rules of the Code. This confirms the deliberations (Wayne, 1994) that followed a previous Request for an Opinion (Dellaglio *et al.*, 1991).

In the present Request for an Opinion (Dellaglio *et al.*, 2002), the authors have presented extensive evidence in support of the fact that ATCC 393 is distinct from other strains previously classified as *Lactobacillus casei* [Note: in the paper by Collins *et al.* (1989), NCDO 161, now held as NCIMB 11970 = ATCC 393, is used to represent the type of *Lactobacillus casei*, while NCDO 151, now held as NCIMB 700151 = ATCC 25302, is designated the type strain of *Lactobacillus paracasei*]. While the data presented, together with previous publications, are clearly sound, the Request presupposes that modern methodologies (Collins *et al.*,

1989; Dellaglio *et al.*, 1975; Felis *et al.*, 2001) should have a bearing on the way taxa were delineated at a time when these methods were not available and the taxa were described. The evidence presented reinforces the fact that ATCC 393 and ATCC 334 are members of distinct species. The suitability of choosing ATCC 393 as the neotype of *Lactobacillus casei* was presented by Hansen & Lessel (1971), largely on the basis of methods available to them at the time (morphology, physiology/biochemistry) and a comparison with the original description of '*Bacillus* α du fromage' by von Freudenreich (1889–1890, 1891), which Orla-Jensen (1916) used in conjunction with his work on lactic acid bacteria to propose a number of new names with reference to von Freudenreich's organism. Hansen & Lessel (1971) presented evidence in favour of designating ATCC 393 as a neotype of *Lactobacillus casei* (Orla-Jensen 1916) Hansen and Lessel 1971, including the fact that it was assumed to be derived from one of Orla-Jensen's original isolates. All data to date indicating that *Lactobacillus casei* ATCC 393 belongs to the same species as '*Lactobacterium zeae*' Kuznetsov 1959 ATCC 15820 are also scientifically sound. However, applying the Rules of the Code in use at the time that the Approved Lists were drawn up (Lapage *et al.*, 1975; Skerman *et al.*, 1980) would mean that placing the type of '*Lactobacterium zeae*' Kuznetsov 1959, represented by ATCC 15820, together with the type of *Lactobacillus casei* (Orla-Jensen 1916) Hansen and Lessel 1971, represented by the neotype ATCC 393, in a single

species would mean that the epithet *casei* in *Lactobacillus casei*, attributed to Orla-Jensen 1916, would have priority over the epithet *zeae* in '*Lactobacterium zeae*' Kuznetsov 1959. While Dellaglio *et al.* (1975) drew attention to the distinct differences between various strains previously identified as *Lactobacillus casei* subsp. *casei*, Collins *et al.* (1989) made formal proposals to recognize these differences, proposing the creation of new species.

In considering this Request, the following aspects are important. The first part of the request by Dellaglio *et al.* (2002) is to 'pronounce on the classification of strain ATCC 393'. It is, however, the role of the Judicial Commission to rule on matters of nomenclature, not of classification. This is a matter of classification and the Judicial Commission cannot rule on this matter. In the second part of the Request, the authors state 'we ask the Judicial Commission to unite them in a single species', again a matter of classification, on which the Judicial Commission cannot rule. Thirdly, 'on the basis that the species *Lactobacillus casei* has no type strain (see Request 1), we propose strain ATCC 334 as the neotype'. Since the Judicial Commission cannot rule on the classification of strain ATCC 393, it is not in a position to rule on whether *Lactobacillus casei* has no type strain. If this is the case, ATCC 393 is still the designated type of *Lactobacillus casei*. In an earlier publication, Dicks *et al.* (1996) rejected the name *Lactobacillus paracasei*, an action reserved for the Judicial Commission; this rejection thus has no standing. Incidentally, this would have consequences for the names of the subspecies included within this species.

The Judicial Commission previously rejected a Request to reject the name *Lactobacillus paracasei* (Wayne, 1994). The designation of ATCC 334, a strain of *Lactobacillus paracasei*, as the neotype of *Lactobacillus casei* contravenes Rules 51b (1) and (2). Equally, if *Lactobacillus casei* cannot be typified by ATCC 334, the designated type remains ATCC 393, which, although genetically similar to ATCC 15820, retains the name *Lactobacillus casei* because '*Lactobacterium zeae*' Kuznetsov 1959 was not included on the Approved Lists of Bacterial Names, and Mills & Lessel (1973) showed that this name was a later heterotypic synonym of *Lactobacillus casei* (Orla-Jensen 1916) Hansen and Lessel 1971, typified by ATCC 393. The proposal by Dicks *et al.* (1996) to use the name '*Lactobacterium zeae*' Kuznetsov 1959 as the basis for the name '*Lactobacillus zeae*' also contravenes Rules 51b (1) and (2), because this strain was shown to be in the same taxon as ATCC 393, the type of *Lactobacillus casei*, and which cannot be typified by ATCC 334, a strain of *Lactobacillus paracasei*. The name *Lactobacillus paracasei* has not been rejected by the Judicial Commission and is legitimate, validly published and may be used as a correct name for this taxon. Dicks *et al.* (1996) had no authority to reject the name *Lactobacillus paracasei* (or, as a consequence, the subspecies names within this species). The decisions in this Opinion largely follow as the consequences of the problems arising from the proposed rejection of this name by these authors. The Judicial

Commission also regrets that this has led to problems in the literature with regards to which strain has been used to represent the type of *Lactobacillus casei*, together with the use of a name that contravenes the Rules of the Code and should not be used, '*Lactobacillus zeae*' (*ex* Kuznetsov 1959) Dicks *et al.* 1996.

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