Taxonomic Note

What does Rule 18c of the International Code of Nomenclature of Bacteria really say?

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A number of recent Requests for an Opinion have cited Rule 18c of the International Code of Nomenclature of Bacteria as the Rule governing setting a time limit on the search for a neotype strain. This Rule only governs what happens when a neotype is proposed and not what happens when the original type appears to have been lost and a neotype is not found. It is appropriate to emphasize this issue and to examine what other alternatives are available.

In a number of recent Requests for an Opinion (Pukall et al., 2008; Vereecke & Arahal, 2008; Podkopaeva et al., 2009; Oggerin et al., 2011; Branquinho et al., 2015; Dunlap, 2015; Lai et al., 2015; Samadpour et al., 2015; Kämpfer et al., 2016; Kimura et al., 2016) where problems are documented concerning the availability of an authentic type strain, the authors have suggested that a 2-year limit be put on the search for a neotype, citing Rule 18c of the International Code of Nomenclature of Bacteria (Lapage et al., 1992) as the basis for this action. While Rule 18c deals with the issue of what happens ‘if a strain on which the original description was based cannot be found’, it only indicates how one is to proceed in designating a neotype. In particular, with alterations to take into account that the International Journal of Systematic Bacteriology (IJSB) has changed its name to the International Journal of Systematic and Evolutionary Microbiology (IJSEM) (De Vos & Trüper, 2000) the wording now reads:

‘The neotype becomes established (established neotype) two years after the date of its publication in the IJSB/IJSEM, provided that there are no objections, which must be referred within the first year of the publication of the neotype to the Judicial Commission for consideration.’

There is no mention of what happens should a neotype not be found and suggests that the citation of Rule 18c is not correct. In considering such cases the Judicial Commission can act accordingly.

The Requests for an Opinion that cite Rule 18c incorrectly are a mixture of cases where either the properties of the strains in question do not appear to coincide with the properties of the strain deposited as the type strain or cases where the type strain does not appear to be available from the culture collections designated at the time of valid publication (Pukall et al., 2008; Vereecke & Arahal, 2008; Podkopaeva et al., 2009; Oggerin et al., 2011; Branquinho et al., 2015; Dunlap, 2015; Lai et al., 2015; Samadpour et al., 2015; Velázquez et al., 2015; Kämpfer et al., 2016; Kimura et al., 2016).

In the case of problems with discrepancies between information contained in the effective publication at the time of valid publication, Rule 18g may provide an alternative way of handling such matters:

‘If a type or neotype strain has become unsuitable owing to changes in its characters or for other reasons, then the matter should be referred to the Judicial Commission, which may decide to take action leading to replacement of the strain.’

However, if a suitable replacement is not available then an alternative course of action would need to be examined.

A number of the current Requests for an Opinion deal with the lack of availability of the designated type strain from the collections where it was deposited. In the case of the availability of strains deposited after the requirement that evidence be presented that the type strain has been deposited in the designated culture collection, together with confirmation from the culture collection concerned, the wording of Rule 18a, Rule 27 and Rule 30 (3b) is relevant and where alterations to the wording have been made to the latter two Rules (De Vos & Trüper, 2000) as cited below.

18a:

‘A type strain is made up of living cultures of an organism which are descended from a strain designated as the nomenclatural type. The strain should have been maintained in pure culture and should agree closely in its characters with those in the original description.’

Rule 27 (3):

‘A name of a new taxon, or a new combination for an existing taxon, is not validly published unless the following criteria are met.’
‘(3) The type is designated for a new taxon, or cited for a new combination, in the IJSEM/IJSB. The type of the taxon must be designated (see Rule 16). In the case of species or subspecies (including new combinations) the type strains must be deposited according to Rule 30.’

Rule 30:

‘For the name of species to be validly published it must conform with the following conditions.’

‘(3b) As of 1st January 2001 the description (of a new species, or new combinations previously represented by viable cultures) must include the designation of a type strain, and a viable culture of that strain must be deposited in at least two publicly accessible service collections in different countries from which subcultures must be available. The designations allotted to the strain by the culture collections should be quoted in the published description. Evidence must be presented that the cultures are present, viable, and available at the time of publication.’

Certainly improvements could be made in the wording of Rule 30, such as exchanging the word ‘strain’ with ‘type strain’ and also cross referencing the definition of a type strain in Rule 18a. This would establish a link between these three Rules (18, 27 and 30).

During the course of the review of this manuscript the role of Rule 18a (1) was raised and is worthy of further discussion also in the light of Rule 18f and the role of type strains as the nomenclatural types of species and subspecies.

The current wording of Rule 18a is:

‘Whenever possible, the type of a species or subspecies is a designated strain.

The type strain is made up of living cultures of an organism, which are descended from a strain designated as the nomenclatural type. The strain should have been maintained in pure culture and should agree closely to its characters with those in the original description (see Chapter 4C). The type strain may be designated in various ways (see Rules 18b, 18c, and 18d).’

(1) Until 31 December 2000, for a species (or subspecies) which has not so far been maintained in laboratory cultures or for which a type does not exist, a description, preserved specimen, or illustration (see also Rule 18f) may serve as the type.

Example: Non-cultivated, Oscillospira guilliermondii Chatton and Perard 1913.

(2) As from 1 January 2001, a description, preserved (non-viable) specimen, or illustration may not serve as the type.’

In pointing to Rule 18f, Rule 18a (1) indicates what is to happen should a type strain be substituted for a nomenclatural type previously only based on a description or illustration, or a dead preserved specimen.

Rule 18f:

‘If a description or illustration constitutes, or a dead preserved specimen has been designated the type of a species [Rule 18a (1)] and later a strain of this species is cultivated, then the type strain may be designated by the person who isolated the strain or by a subsequent author. This type strain shall then replace the description, illustration or preserved specimen as the nomenclatural type. The designation of a type strain in this manner must be published in the IJSEM, the authorship and date of priority of publication being determined by the effective and valid publication of the name by the original authors (Rule 24b).’

The suggestion has been made that this would also allow a description or illustration or a dead preserved specimen to serve as the nomenclatural type when a type strain has been lost. Reference to Rule 18a (2) (see above) clearly indicates that post 1 January 2001 this is no longer possible. Secondly if a type strain stored in a culture collection has died this would essentially represent a dead preserved specimen and it is hoped that in the case of all recently validly published species names there is adequate information in the description to allow the taxon to be recognized again. In such cases the loss of a viable type strain does not have any effect on any existing information published in the literature on which the search for a suitable neotype may be based. There may no longer be a nomenclatural type based on a type strain, but the purpose of Rule 18c is to allow a neotype to be located and designated. Limiting that search to 2 years is certainly not part of the wording of Rule 18c of the Code and has no place in the majority of the Requests for an Opinion cited in the list of references. The Code also does not state that there are any negative effects for a species or subspecies where the type strain has been lost (i.e. it is no longer validly published or it becomes illegitimate) because at the time of valid publication an authentic type strain was available and deposited. The situation is different where evidence is presented that an authentic type strain was never deposited as now required by Rule 30 (3b) and came into effect from 1 January 2001. There are documented instances where authentic type strains were also not deposited before that date and action has had to be taken (Trüper, 2005).

The interpretation of the Code in the context of the current Requests for an Opinion is a matter for the Judicial Commission and this article should not pre-empt any actions or Opinions issued by the Judicial Commission. However, it is important to highlight the function of Rule 18c and that the way it has been cited in support of a particular proposal made in the relevant Requests for an Opinion does not reflect the currently published wording (Pukall et al., 2008; Vereecke & Arahal, 2008; Podkopaeva et al., 2009; Oggerin et al., 2011; Branquinho et al., 2015; Dunlap, 2015; Lai et al., 2015; Velázquez et al., 2015; Kämpfer et al., 2016; Kimura et al., 2016). If Rule 18c is not applicable then the examination of other Rules, such as Rules 18a, 27 and 30, among others is a suitable course of action.
While Requests for an Opinion deal with the matters relating to the Code it is worthwhile remembering that in instances where authors have clearly failed to provide biological material in the form of authentic type strains in support of the scientific claims that are made in the relevant publications (i.e. the original taxonomic publications) other publishing sanctions exist such as the retraction of papers.

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