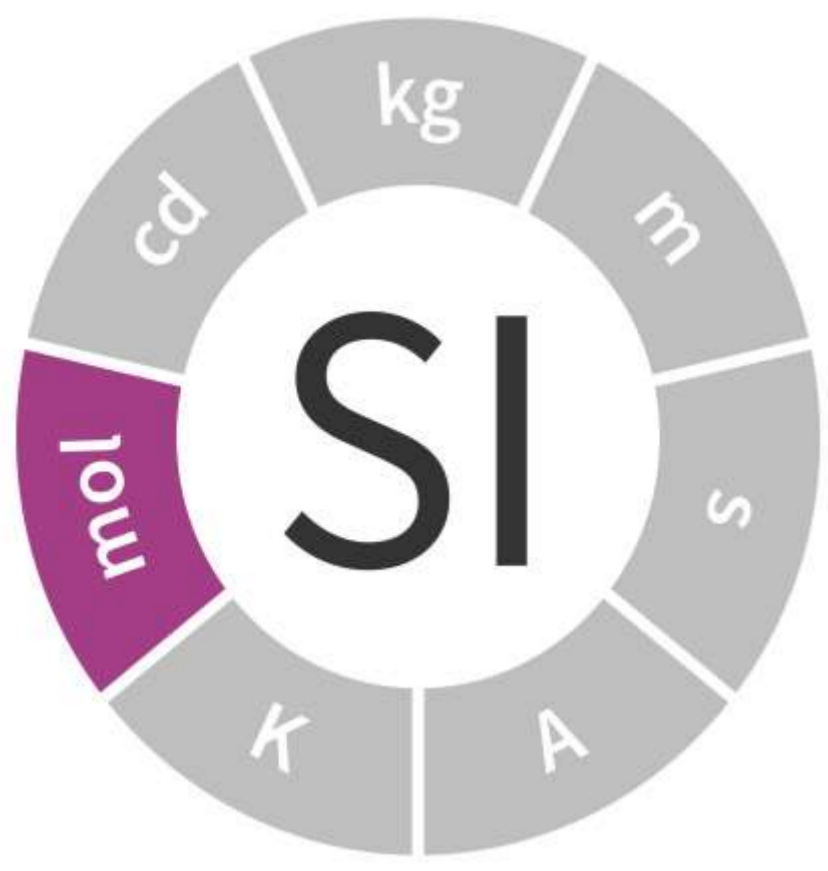


Redefinition of the mole: consulting the chemical community



DE GRUYTER Pure Appl. Chem. 2018; 90(3): 175-180

IUPAC Recommendations

Roberto Marquardt, Juris Meija, Zoltán Mester, Marcy Towns, Ron Weir, Richard Davis and Jürgen Stohner*

Definition of the mole (IUPAC Recommendation 2017)

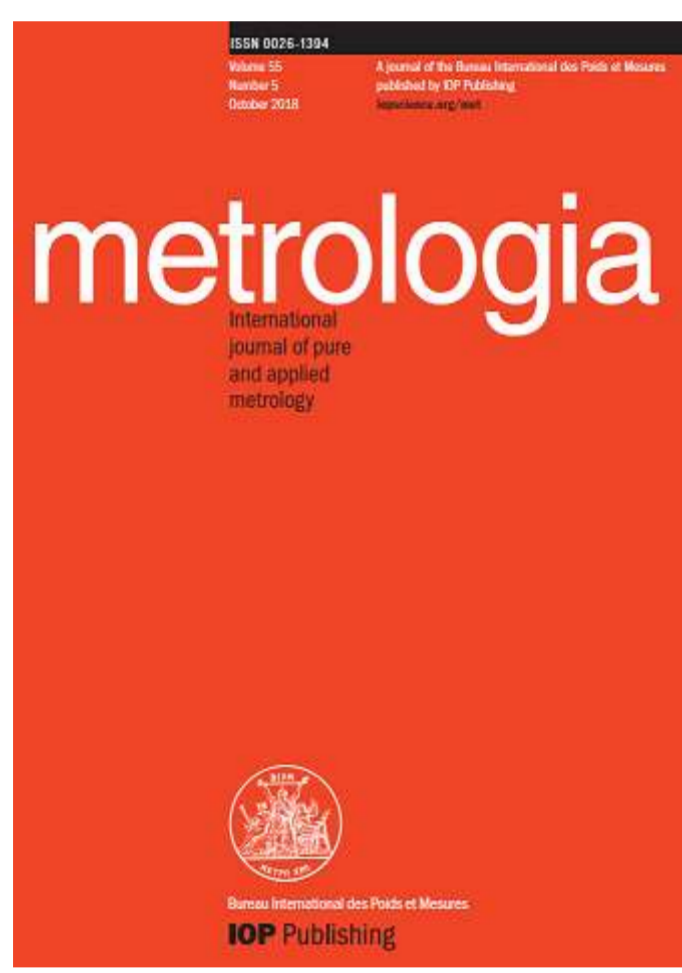
https://doi.org/10.1515/pac-2017-0106
Received January 11, 2017; accepted September 12, 2017

Abstract: In 2011 the General Conference on Weights and Measures (CGPM) noted the intention of the International Committee for Weights and Measures (CIPM) to revise the entire International System of Units (SI) by linking all seven base units to seven fundamental physical constants. Of particular interest to chemists, new definitions for the kilogram and the mole have been proposed. A recent IUPAC Technical Report discussed these new definitions in relation to immediate consequences for the chemical community. This IUPAC Recommendation on the preferred definition of the mole follows from this Technical Report. It supports a definition of the mole based on a specified number of elementary entities, in contrast to the present 1971 definition.

CCQM has led an extensive consultation process with the international chemical community to ensure their requirements are met with the redefinitions, including:

- CCQM Workshop "The Redefinition of the Mole - A new era for chemical metrology?" (2012)
- CCQM Workshop on the redefinition and realization of the mole (2014)
- Support and Consultation on the IUPAC Project: 'A critical review of the proposed definitions of fundamental chemical quantities and their impact on chemical communities'
- CCQM Workshop at ACS Meeting, Boston USA, 'Redefinition of the SI' (2015)
- CCQM recommendation to CIPM in 2017, taking into account views expressed by IUPAC

Global forum for progressing the state of the art



April 2019 sees the 25th meeting of the CCQM. This milestone is being celebrated with a *Metrologia* Focus Issue on **Advances in Metrology in Chemistry and Biology** with an accompanying workshop on the same theme at the CCQM meeting. The papers in the Focus Issue highlight the state of the art of measurement science in chemistry and biology.

Focus issue papers

SI traceability and scales for underpinning atmospheric monitoring of greenhouse gases

Paul J Brewer et al 2018 *Metrologia* 55 S174

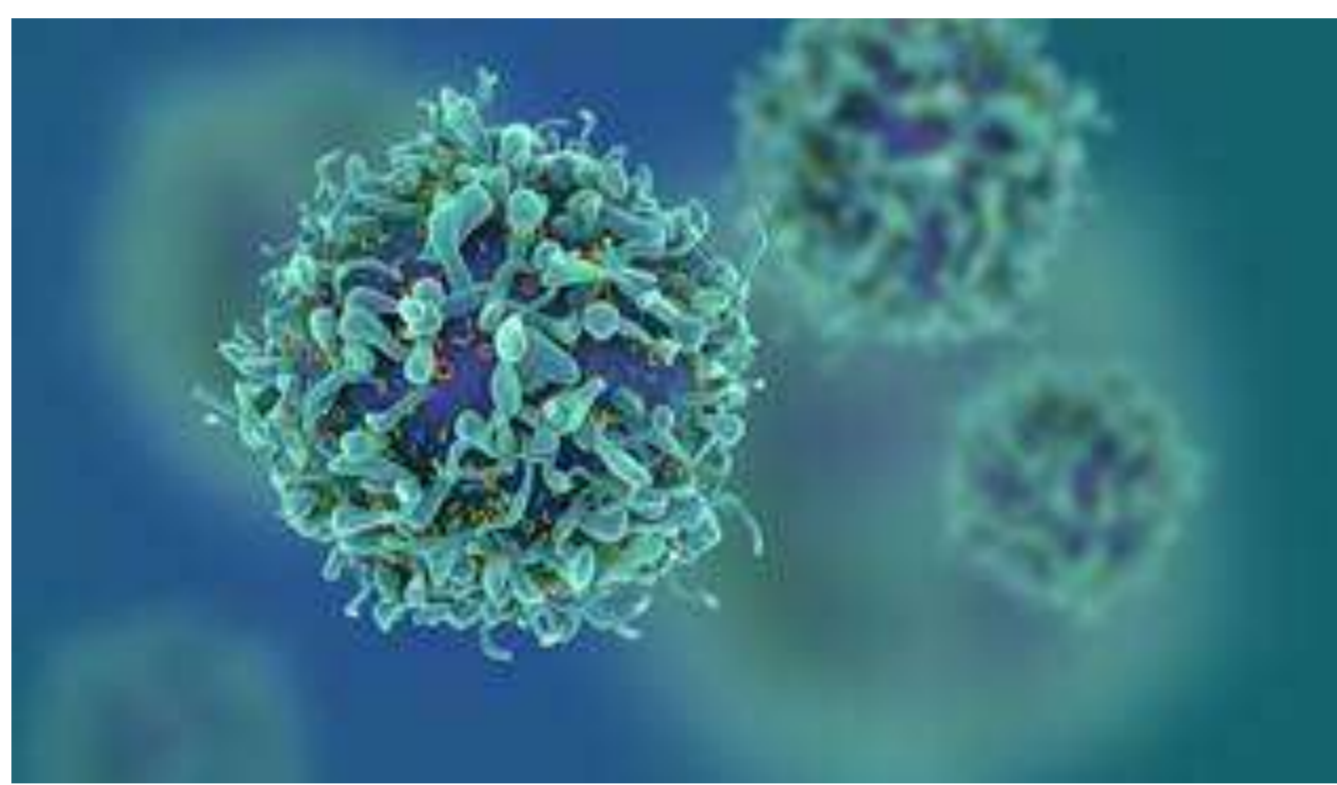
[View abstract](#) [View article](#) [PDF](#)

A higher order method for the determination of total phosphorus in human serum

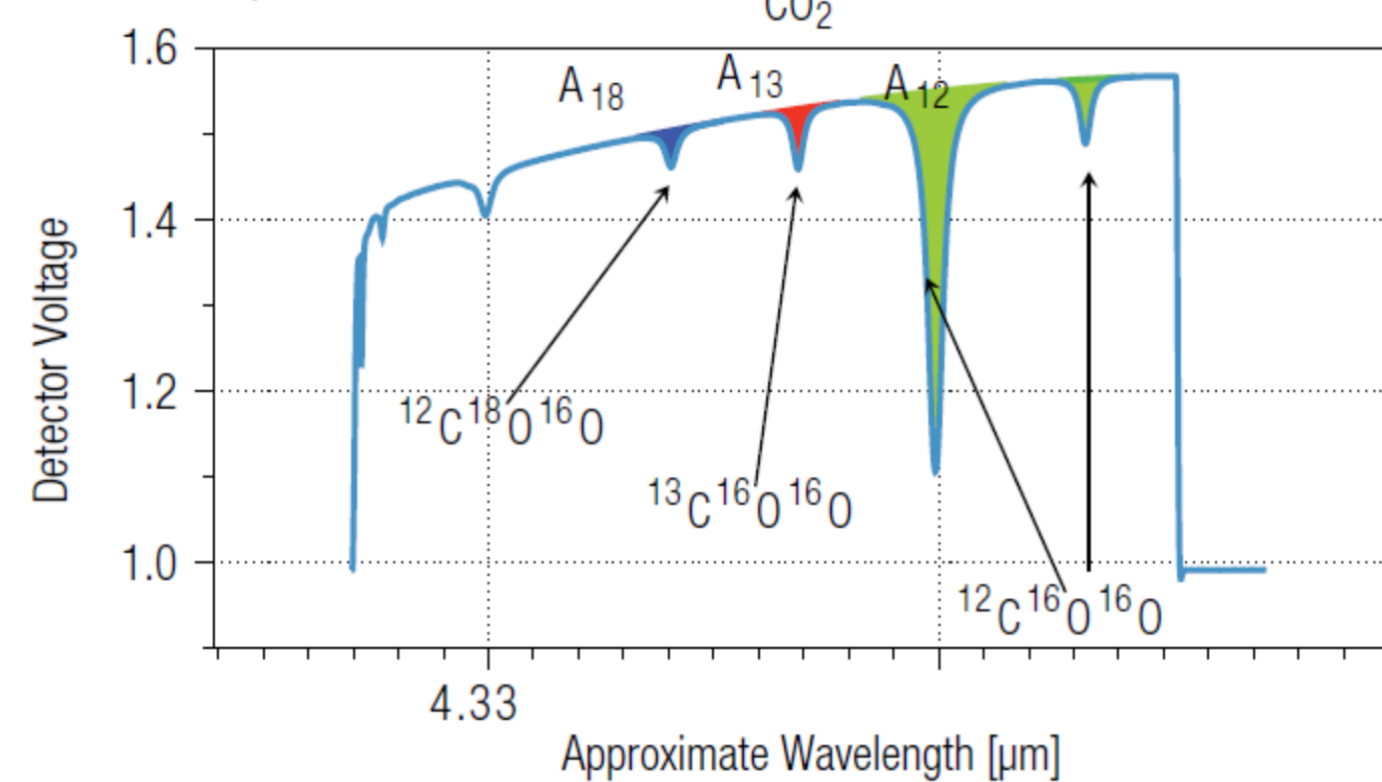
Fransiska Dewi et al 2018 *Metrologia* 55 S195

[View abstract](#) [View article](#) [PDF](#)

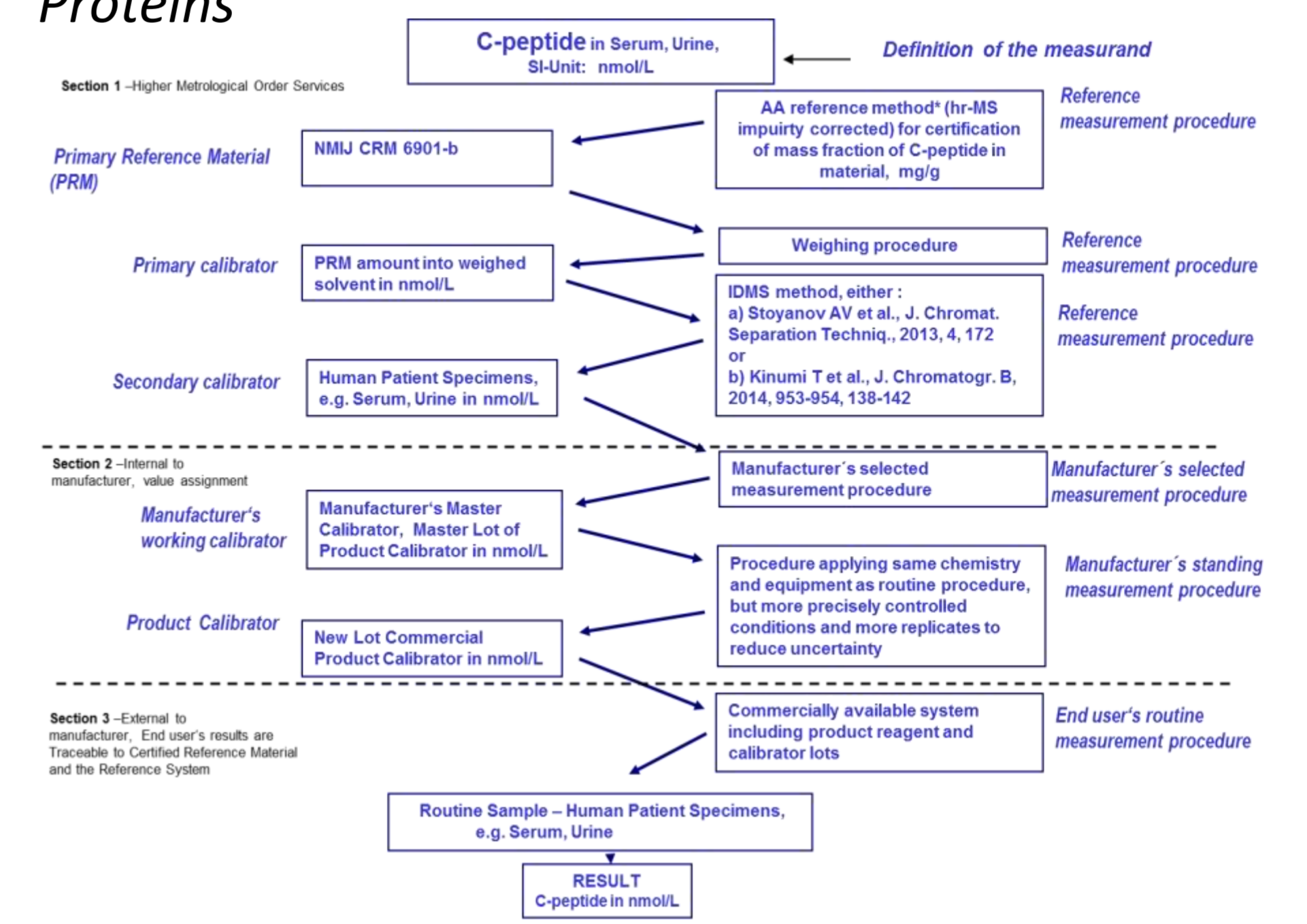
Cells



Isotopes



Proteins



CCQM and its Working Groups have organized 17 workshops over the last 4 years to progress the state of the art of chemical and biological measurement science

Facilitating dialogue between NMIs and stakeholders

Symposium on Standards and Metrology in support of Anti-Doping Analysis with WADA (2016)

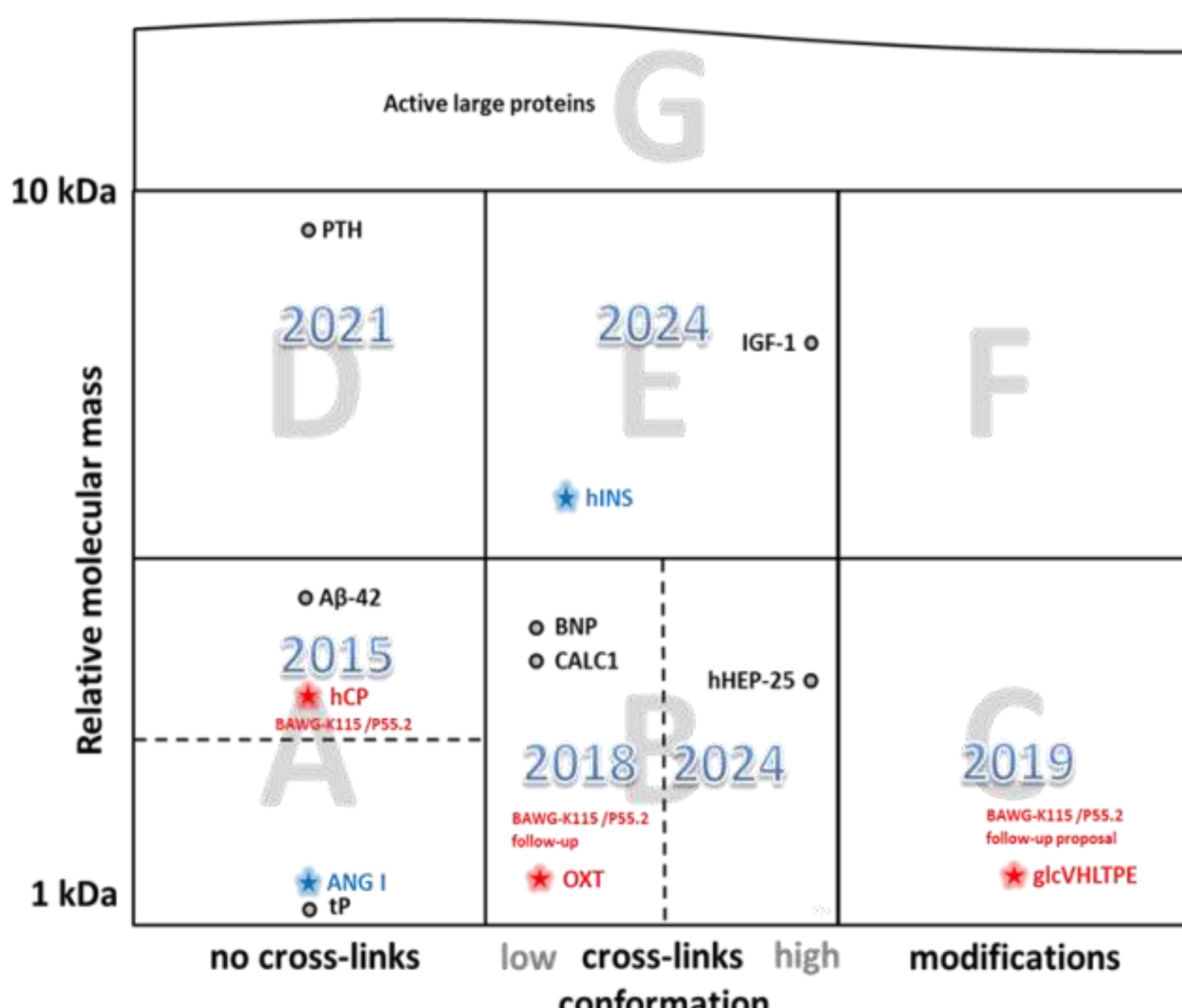
- assess needs and priorities for reference materials and measurement systems to support anti-doping analysis;
- discuss the implementation of inter-laboratory comparisons;
- share knowledge on the latest approaches for the detection and quantification of chemical and biological analytes in urine and blood matrices.



Working with stakeholders to identify measurement standard needs

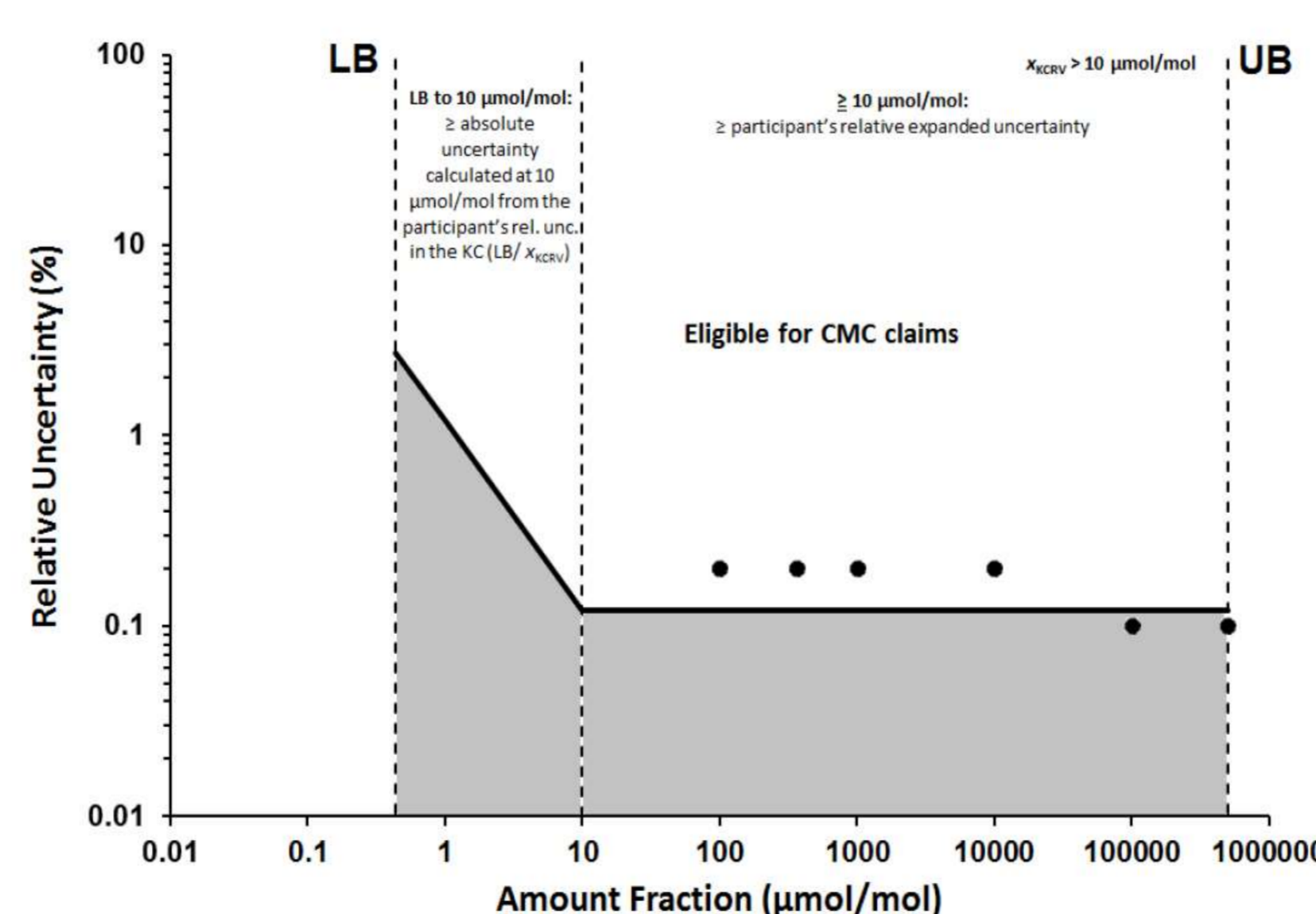
Global comparability of measurements

An effective and efficient process for demonstrating global compatibility of chemical and biological measurement standards

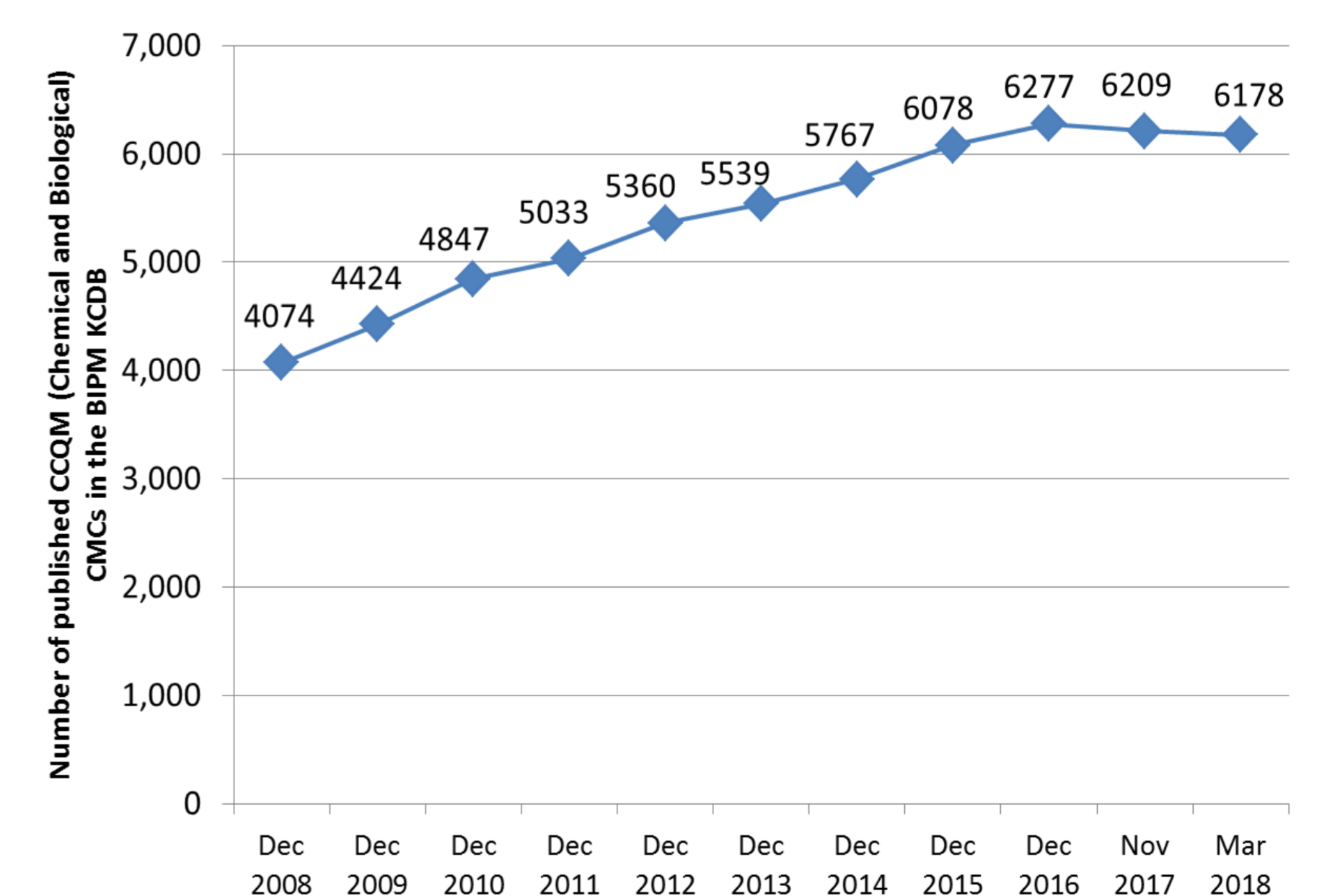


Core Key Comparisons in CCQM Protein Analysis Working Group

Example track A (K52 - NPL)



Core Key Comparisons in CCQM Gas Analysis Working Group



Evolution of Chemistry/Biology CMCs 2008-2018

Core comparisons and broad-claim CMCs have led to a 20% reduction in number of comparisons and stabilized the number of CMCs