in the knowledge of the solution chemistry as well as in the formation of hydrates, and their stability, was presented. A series of questions to select and screen data from different sources was given and developed, as well as the difficulty of thermodynamic models to produce accurate solubility values of salts in water, under conditions not experimentally studied. In a well contemporary approach, perhaps with more significant impact on younger researchers, it was underlined how AI will not participate in obtaining better data.

Six seminars have been completed, and the videos uploaded to the IUPAC webpage dedicated to the project (https://iupac.org/project/2022-002-2-500). Besides the knowledge produced and shared, all these activities underlined the project's impact. On average, fifty participants from Australia to the USA attended the online presentations, always keen to join the discussions and share their expertise vividly. Still, during 2024, new activities will take place in the framework of the project. In September, a workshop will be organized within the scope of the 21st International Symposium on Solubility Phenomena (Novi Sad, Serbia), and a special issue in the *Journal of Solution Chemistry* is to be co-edited by Magdalena Bendová (University of Chemistry and Technology, Czechia) and Earle Waghorne.

For more information and comment, contact Task Group Chair Simão P. Pinho <spinho@ipb.pt> | https://iupac.org/project/2022-002-2-500

Human Drug Metabolism Database (hDMdb)

The IUPAC's Drug Discovery and Development Subcommittee (D3SC) has long been considering the assembly of a human drug metabolism database (hDMdb) that, in particular, might be a useful tool for interdisciplinary scientists engaged in small molecule drug discovery or toxicology. Ideally, it would be mounted on the Internet and available at no (or minimal) cost similar to the Protein Data Bank. Prominent applications would be to have an established compilation of human data from which each user could confidentially:

(i) Predict the biological disposition of new (e.g. proprietary) compounds relative to metabolic possibilities and, more importantly, relative to statistically-derived and ranked metabolic probabilities;

(ii) Assess the value of preclinical in vitro and in vivo models for predicting human drug metabolism, drug-drug interactions, and off-target toxicity when preceded by one or more competing bioactivation versus detoxification events;

(iii) Develop general and/or proprietary methods to account for 3D chemical structures and derive structure-metabolism/transporter relationships for specific metabophores or structurally-related families of compounds; and,

(iv) Explore machine learning (AI and 'facial recognition' at the molecular level) relative to drug metabolism in both humans and in preclinical in vitro and in vivo models of human drug metabolism.

The accompanying paper describes what we were initially thinking in more technical detail (*J. Current Drug Metabolism*, **2003**, *4*, 411-422). Current interest in exploiting AI within the context of drug discovery suggests that the concept outlined in this article may be even more relevant today than when it was first being contemplated several years ago (*e.g.* see *Drug Metabolism – Databases and High-Throughput Testing During Drug Design and Development* published for IUPAC by Blackwell Sciences Ltd. **1999**; ISBN 0-632-05342-9).

For various reasons we made limited progress past the early testing points noted in this initial paper. Alternatively, we feel that databases and the field of predicting/assessing drug metabolism have, in general, moved forward considerably in several directions over the last twenty years. Thus, we now envision writing a white paper update (pros and cons) about today's status of this topic and where it may be heading in the future. For that we are seeking your assistance in whatever way you may want to help, and specifically toward answering three questions. Depending upon which you prefer, your input can be cited in: (a) A non-identifying, confidential manner for you and your organization; (b) An acknowledgement of you and/or your organization; or (c) As a specifically cited reference including as much detail as you may want. Either way, we are not requesting any proprietary information or details for unpublished methods. The three questions are:

1. Is there still a need for a hDMdb like the one described above or for some other version; and can you please elaborate what resources are available for you to currently use in this regard and indicate any missing features that would add value if they could be incorporated?
2. What other types of resources are available or are you trying to develop internally, for you to address items (i) to (iv) above, especially with regard to the cutting-edge machine learning (AI) arena as it might be applied to the field of small molecule drug metabolism?
3. Given today's interest in small molecule

bio-conjugates such as ADCs, and the deployment of immune-related biomolecules as therapeutics, would it be useful to have: (a) A glossary and/or tutorial pertaining to the biological disposition/metabolism of medium and/or large molecule therapeutics, perhaps something like our recently published document pertaining to small molecule therapeutics (Pure Appl. Chem., 2021, 93, 273-403 and then republished in the ACS series Medicinal Chemistry Reviews, 2021, 56, 463-659); and/or (b) A hDMdb something like the one described above but instead dedicated to (focused upon) metabolism data collected only from medium/large molecule (biomolecule) therapeutics?

Any other comments you may want to contribute toward this topic, beyond the questions noted above, are most certainly, additionally welcome. They may also become important for adding to the intended white paper. Please note the level of recognition that you would like to have for whatever additional information you choose to share.

We respectfully request any assistance you can provide for this non-profit undertaking which we hope will be of specific value to the drug metabolism, drug discovery-development, and toxicology fields, as well as to the global pharmaceutical corporate-academic-public enterprise in general. **Please send your response *via* email attachment to paul.erhardt@utoledo.edu by no later than September 30**, so that a summary white paper can be issued in early 2025.

For more information and comment, contact Task Group Chair Paul Erhardt <paul.erhardt@utoledo.edu > | https://iupac.org/project/2000-010-1-700/

JCGM Guides in Metrology—IUPAC working in the field of metrology with others broadly-based international organizations

by Stephen L R Ellison

The Joint Committee for Guides in Metrology (JCGM) is a partnership between eight member organisations, all concerned with measurement and the standardisation of measurement.* The Committee maintains guidance on measurement uncertainty, based around the "Guide to the Expression of Uncertainty in Measurement" (known as the GUM) [1] and guidance on terminology for metrology applications, via the "International Vocabulary of Metrology" (known as the VIM) [2]. The JCGM operates through two working groups: JCGM-WG1, with responsibility for the GUM and related documents, and JCGM-WG2, with responsibility for the VIM. IUPAC takes a close interest in both of the working groups. Guidance on measurement uncertainty is important for working analytical chemistry laboratories; not only because an understanding of the measurement uncertainty associated with results is good practice, but also because laboratories accredited to ISO/IEC17025 are required to evaluate measurement uncertainty and to report it where relevant [3]. Vocabulary for metrology is important because it provides a consistent set of concepts, terms and definitions for use across all fields of measurement. For IUPAC, this is important because chemists, and particularly analytical chemists, need to understand standardised terms as they apply to chemical measurement. In addition, close involvement in the development of generic terminology helps to make sure generic terms can be applied in chemistry and in IUPAC's own terminology guides. For example, the most recent edition of the IUPAC Orange Book [4] adopts many terms from the current version of the VIM.

IUPAC currently has three representatives on JCGM-WG1: Stephen Ellison (LGC, UK) has recently been joined by two very welcome new representatives, Ivo Leito (University of Tartu, Estonia), and Francesca Pennecchi (INRIM, Italy) Ellison has also recently joined JCGM-WG2, supporting established WG2 members Zoltan Mester (NRC, Canada) and Jeremy Frey (University of Southampton, UK).

Work in WG1 has for some time focused on reshaping the series of JCGM guidance documents on measurement uncertainty. Although still a key

*The eight members organizations of JCGM are

- the Bureau international des poids et mesures (BIPM),
- the International Electrotechnical Commission (IEC),
- the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC),
- the International Laboratory Accreditation Cooperation (ILAC),
- the International Organization for Standardization (ISO),
- the International Organization of Legal Metrology (OIML),
- the International Union of Pure and Applied Chemistry (IUPAC), and
- the International Union of Pure and Applied Physics (IUPAP).