

COMMENTARY

Principles for inclusive implementation of the undergraduate pharmacology core curriculum

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Through our vision for inclusive pharmacology, the British Pharmacological Society commits to placing equity, diversity, and inclusion at the heart of pharmacology, whether in terms of the opportunity for a successful career or in benefitting from pharmacology research. How pharmacology is taught, and to whom is at the heart of achieving this. Therefore, we have developed the following principles for inclusive implementation of the undergraduate pharmacology curriculum as part of a holistic review to help ensure that the curriculum continues to meet the needs of students, responds to an evolving discipline—and ultimately reflects the real-world settings that require pharmacology education and training.

These principles were developed by an expert steering group and captured the cross-cutting themes that emerged from a wider review of the British Pharmacological Society's undergraduate core curriculum. We hope that using them will support the development and delivery of pharmacology programs that:

- Positively impact research and health across global communities.
- Acknowledge cultural and historical influences on the discipline.
- Value the individuality of all who benefit from and contribute to pharmacology.
- Operate within inclusive educational environments, including collaboration and setting expectations with students.
- Inspire knowledge sharing and discussion within and between educator and student communities.

The British Pharmacological Society acknowledges that progress in inclusive pharmacology education will emerge as part of a reflective, collaborative, and community-driven approach. These principles are intended to spark discussion and to help continue to

build such a community. We know that there will be gaps in knowledge or confidence and welcome discussion about the use of language. We believe that being honest and curious about where we are now as a collective will help focus progressive discussions and support shared learning. To this end, the British Pharmacological Society has named inclusive pharmacology as a priority education area, committing funding and staff time to support the development and dissemination of resources, good practice, and continued learning. This will be an evolving process, and our intention is to progress it in partnership with the global pharmacology community.

The British Pharmacological Society thanks IUPHAR for endorsing these principles.

To enable inclusive delivery:

Pharmacokinetics and pharmacodynamics

- Explore genetic and epigenetic influences on drug action and how these lead to interindividual differences in response to drugs.
- Consider how drug effects can be significantly impacted by dietary and environmental variation.
- Consider how drug effects can be significantly impacted by physiological variables, such as age, sex, and pregnancy.

Pharmacological research

- Examine the need for research to include a diverse and representative pool of subjects.
- Consider drugs in a variety of contexts e.g. as the focal point of clinical trials, as active ingredients in medicines/remedies, as positive controls, and as tools in mechanistic studies.

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The global pharmacology community

- Provide examples of drugs to treat a broader range of diseases from across the world.
- Recognize global inequities (e.g., health inequalities, data gaps) and the impact of dominant power structures (e.g., patriarchy, colonialism, capitalism) and biases in generating and perpetuating them.
- Explore the historical and geographical origin of drugs and therapeutic interventions, and recognize contributions to our understanding from all individuals, environments, and cultures.
- Acknowledge regional variations in local rules, regulations, resources, technology, and approaches to discovery, development, and administration of drugs.

Accessible pharmacology

- Ensure learning environments and materials are fully accessible by accounting for differences in educational skills, background, and learning needs, taking care to not assume expertise or cultural norms.
- Provide support and additional opportunities for learning in critical areas, particularly mathematics, where considerable variation in the educational background is recognized.
- Minimize the use of extraneous technology or software, or provide alternative means to access them.

Use of language: We have chosen to include some explanatory notes alongside these principles regarding our use of language. Language is meaningful and can be subject to interpretation. Our intention is to be explicit about our choice of language, and how we hope it will support inclusive implementation—and to invite comment and update as we learn.

Inclusive pharmacology: The British Pharmacological Society acknowledges that the term 'inclusive' has been used in some education settings to solely mean 'accessible'. Our intention is that these principles capture accessibility—but we use the word 'inclusive' here as an umbrella term in its broadest sense. Our aim is to enhance connectivity and intersectionality in the component parts of this work, whilst still committing to the focused difficult discussions that must happen—particularly in the context of decolonisation, democratisation and diversification. We recognise that as written, the curriculum hides biases and assumptions that reflect the impact of dominant power structures (e.g. patriarchy, colonialism, capitalism) that must be named if they are not to be perpetuated through implementation. For example, the curriculum is Euro-centric—it is currently framed through a Western lens, speaking to Western approaches to drug discovery and development, to terminology, and to Western educational norms. This lens is valuable, but limiting if used in isolation. For example, if left unexamined, the curriculum will continue to hide divides (e.g. between Global North and Global South) and other biases and assumptions prevalent in research, development and health care, such as data gaps that perpetuate health inequalities. Naming

inclusivity as a priority for implementation is intended to help acknowledge and redress such biases, and to widen 'ways of knowing'—whilst still valuing Western scientific method and critical thinking as an important part of pharmacology as a discipline.

Drug: We recognise that across different cultures and geographical regions, the term 'drug' has a variety of meanings and connotations often referring to Western therapeutic approaches or even abuse of illicit substances. In our documentation, the term 'drug' refers to a chemical or biological entity that induces physiological changes as a result of interactions with a target within the organism. The term is intended as a catch all for entities that might be active ingredients e.g. within experimental tools, prescribed medicines, plant or herbal preparations, natural products or traditional remedies. In clarifying this, it is hoped that we open up the pharmacology curriculum to recognise diverse cultural contributions to therapeutic approaches and practice.

Genetic and epigenetic influences: We talk about inter-individual genetic variation in the context of contribution to scientific and clinically meaningful difference in drug responses. We have chosen not to use the term 'ethnicity' in the context of genetics because there are more similarities than differences between ethnic groups. Relying on ethnicity as a proxy for genetics is problematic and risks perpetuating genetic determinism, the tendency for people to ascribe differences in behaviours or traits to genetics alone. To understand differences in individual drug responses, researchers should directly measure the presence of implicated alleles alongside other factors such as diet, age and sex.

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CONFLICT OF INTEREST

No conflicts.

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