PHARMACOGENETICS AS A TOOL FOR TEACHING PRECISION MEDICINE TO PHARMACY STUDENTS

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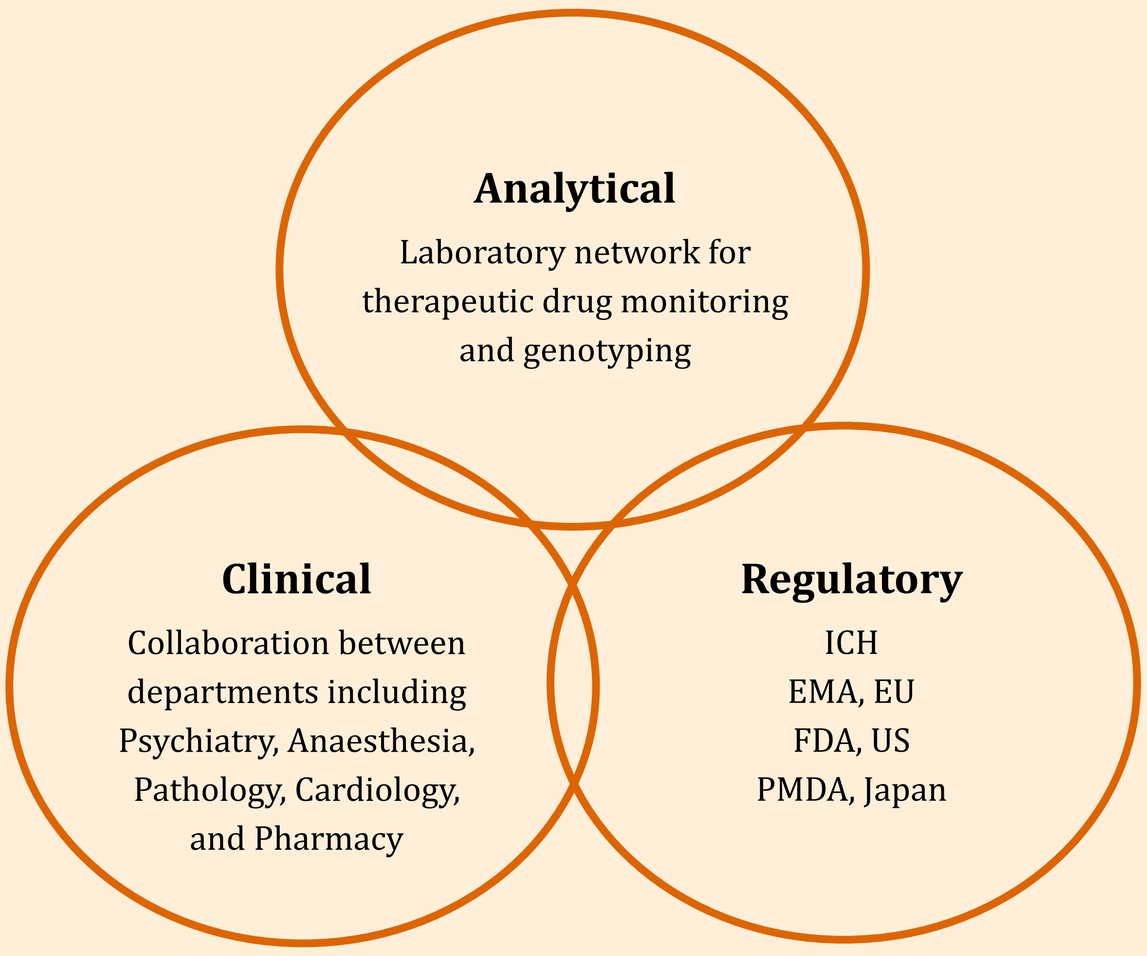
INTRODUCTION

Pharmacy education has the potential to bridge the current gap between exponential growth in pharmacogenetic research and limited incorporation into clinical practice. Teaching precision medicine demands the integration of knowledge in the basic sciences, such as chemical analysis and genetics, with applied pharmacology, pharmacotherapeutics, toxicology, and regulatory sciences.

METHODS

A multiplicity of methods with clinically relevant examples are necessary to stimulate interest in the forthcoming generation of pharmacists for providing patients with the expected benefits of precision medicine. The case of amitriptyline is considered as prospective teaching material. An example of integrated pharmacy teaching is developed, considering three important apects.



Analytical

Determination of the metabolite to parent drug concentration ratio to understand potential correlations between polymorphic gene alleles of the drug metabolizing enzymes CYP2D6 and CYP2C19 and metabolic phenotype.

Clinical

Treatment plan revision based on recommendations of gene/drug clinical practice guidelines published by CPIC, the Clinical Pharmacogenetics Implementation Consortium, a pharmacist-led initiative[1].

Regulatory

Implications of the level of harmonisation in pharmacogenomics guidelines and labelling. Assessment of pharmacovigilance activities related to adverse reactions, including interactions, that may have a pharmacogenetic causality.

RESULTS

Pharmacy teaching, embracing science and practice, shall expound how the interpretation of pharmacogenetic data, as it correlates to blood levels, can support in exploiting the benefit of drugs. Specific sessions, targeting each of the implicated contexts, complemented by an overarching session, are proposed to outline implementable scenarios for using genotyping to translate biomarkers into personalised therapy.

- Background in the pharmaceutical sciences
- Experimental genotyping and blood levels analysis practicals
- Experiential clinical practice rotations
- Insight of the dynamic regulatory environment through placements
- Consolidation on integrating all aspects for the implementation of precision medicine

CONCLUSION

The amalgamation of analytical, clinical and regulatory aspects to explore pharmacogenetics illustrates how effective curricular coverage of precision medicine may be advanced. This sets a pragmatic approach for transposing knowledge of the basic sciences to clinical practice relevance in modern-day pharmacy education.

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Reference

[1]Roederer MW, Kuo GM, Kisor D, Frye R, Hoffman JM, Jenkins J, et al. Pharmacogenomics competencies in pharmacy practice: a blueprint for change. *J Am Pharm Assoc* 2017; 57(1): 120–5.