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The Role of Clinical Pharmacology in Personalized Therapy

Antonio Sansuan*

Department of Clinical Pharmacology, Hospital Universitario La Paz, Madrid, Spain

***Corresponding Author:** Antonio Sansuan, Department of Clinical Pharmacology, Hospital Universitario La Paz, Madrid, Spain; E-mail: sansuanantonio@gmail.com

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Description

Clinical pharmacology plays a pivotal role in the advancement of personalized therapy, a medical approach that tailors treatment to the individual characteristics of each patient. By integrating insights from pharmacology, genetics, and individual patient data, personalized therapy aims to optimize drug efficacy, minimize adverse effects, and improve overall therapeutic outcomes. This article explores the significant contributions of clinical pharmacology to personalized therapy, detailing how it enhances drug development, patient management, and therapeutic precision.

The role of clinical pharmacology in personalized therapy

Clinical pharmacology is central to the development and implementation of personalized therapy. This field focuses on understanding how drugs interact with the body and how individual variations affect drug responses. Several key areas highlight the role of clinical pharmacology in personalizing therapy:

Pharmacogenomics: Pharmacogenomics is the study of how genetic variations influence individual responses to drugs. Genetic differences can impact drug metabolism, efficacy, and toxicity, making pharmacogenomics important for personalized therapy [1].

Predict drug response: Genetic markers can predict how a patient will respond to specific medications. For instance, variations in the cytochrome P450 enzyme system, which is responsible for metabolizing many drugs, can affect how quickly or slowly a drug is processed. By identifying these genetic variations, clinicians can adjust drug dosages to achieve optimal therapeutic outcomes [2].

Drug development and optimization

Clinical pharmacology informs the development and optimization of drugs by providing insights into how individual differences affect drug efficacy and safety. Key contributions include:

Tailoring drug formulations: Clinical pharmacologists use data from pharmacokinetics (the study of drug absorption, distribution, metabolism, and excretion) and pharmacodynamics (the study of drug effects on the body) to develop formulations that are tailored to specific patient populations. This includes adjusting drug dosages and selecting appropriate routes of administration [3].

Designing targeted therapies: Advances in molecular biology and pharmacology have led to the development of targeted therapies that specifically address the underlying mechanisms of diseases. For instance, targeted cancer therapies aim at specific genetic mutations in cancer cells, improving treatment efficacy and minimizing harm to healthy tissues [4].

Personalized dosing strategies

One of the primary goals of personalized therapy is to determine the optimal dose of a medication for each individual. Clinical pharmacologists contribute to personalized dosing strategies by:

Implementing Therapeutic Drug Monitoring (TDM): TDM involves measuring drug concentrations in the blood to ensure that they remain within the therapeutic range. Personalized dosing strategies use TDM to adjust drug dosages based on individual responses and minimize the risk of toxicity or therapeutic failure [5].

Utilizing population pharmacokinetics: Population pharmacokinetics studies how drugs behave in different populations. Clinical pharmacologists use this data to develop dosing guidelines that account for variations due to age, weight, gender, and genetic factors. Personalized dosing considers these variations to optimize drug therapy for individual patients [6].

Integrating clinical and genetic data

The integration of clinical and genetic data is essential for personalized therapy. Clinical pharmacologists analyze comprehensive patient information, including genetic profiles, medical history, and lifestyle factors, to develop individualized treatment plans. This approach involves:

Developing decision support systems: Clinical Decision Support Systems (CDSS) use patient data and evidence-based guidelines to assist healthcare providers in making personalized treatment decisions. These systems integrate pharmacogenomics data with clinical information to recommend the most appropriate therapies and dosages [7].

Collaborating with multidisciplinary teams: Personalized therapy often involves collaboration among various healthcare professionals, including clinical pharmacologists, geneticists, and primary care physicians. This interdisciplinary approach ensures that all aspects of a patient's health are considered when developing personalized treatment plans [8-10].

Conclusion

Clinical pharmacology plays a difficult role in the advancement of personalized therapy by integrating pharmacogenomics, optimizing drug development, and developing personalized dosing strategies. By tailoring treatments to individual characteristics, clinical pharmacologists contribute to more effective and safer drug therapies. As personalized therapy continues to evolve, addressing challenges and leveraging advancements in genetic research and data analytics will be key to improving patient outcomes and advancing the field of medicine.

References

1. Ungaro R, Mehandru S, Allen PB, Peyrin-Biroulet L, Colombel JF (2017) Ulcerative colitis. Lancet 389:1756–1770.
2. Dorien JB, Jan De Monchy GR, Reinout Schellekens CA, Laurens W, Jan HK, et al. (2015) Ulcerative colitis patients with an inflammatory response upon mesalazine cannot be desensitized: A randomized study. Scand J Gastroenterol 50:399–405.
3. Langhorst J, Wulfert H, Lauche R, Klose P, Crameret H, et al. (2015) Systematic review of complementary and alternative medicine treatments in inflammatory bowel diseases. J Crohns Colitis 9: 86–106.
4. Li T, Wu M, Wang L, Song X, Feng P (2020) Huang Lian for ulcerative colitis: A protocol of systematic review and meta-analysis of randomized clinical trials. Medicine (Baltimore) 99:e22457.
5. Shuai S, Xin W, Xiaonan X, Lanping Z, Qiuyu C, et al. (2021) Phellodendrine promotes autophagy by regulating the AMPK/mTOR pathway and treats ulcerative colitis. J Cell Mol Med 25:5707–5720 (2021).
6. Shuai T, Wei L, Qianqian Z, Kaidong L, Jingyi Z, et al. (2021) Combination of polysaccharides from Astragalus membranaceus and Codonopsis pilosula ameliorated mice colitis and underlying mechanisms. J Ethnopharmacol 264:113280.
7. Quan Z, Fan Z, Ze H, Man-Zhen Z. (2019) E2F2/5/8 serve as potential prognostic biomarkers and targets for human ovarian cancer. Front Oncol 9:161.
8. Lili L, Lv J, He Y, Wang Z. (2020) Gene network in pulmonary tuberculosis based on bioinformatic analysis. BMC Infect Dis 20:612.
9. Yongfu W, Jingjing L, Ziwei H, Yucui L, Yuanyuan L, et al. (2021) Coptisine ameliorates DSS-induced ulcerative colitis *via* improving intestinal barrier dysfunction and suppressing inflammatory response. Eur J Pharmacol 896:173912.
10. Qianqian M, Yong O, Fansu M, Malleshappa NN, Stephen PA, et al. (2019) A review of pharmacological and clinical studies on the application of Shenling Baizhu San in treatment of ulcerative colitis. J Ethnopharmacol 244:112105.