



Orientation of Drug Development: Focusing on Gene Expression Alterations and Giving up the Mechanisms of Action of Drugs

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Abstract

Many diseases are linked to abnormalities of gene expression patterns, and therefore, the study of drugs that alter gene expression patterns is important for improving these diseases. In pharmacology books, we cannot see the data of drug-altered gene expression patterns except the mechanisms of action of drugs. In this paper, we propose focusing on gene expression alterations and giving up the mechanisms of action of drugs.

Subject Areas

Pharmacology

Keywords

Therapy Improvement, Drug-Altered Gene Expression Patterns, Mechanisms of Action of Drugs

1. Introduction

Many diseases are linked to abnormalities of gene expression patterns that are caused by abnormal 3D genome structures [1], especially, aging-related diseases, such as diabetes, cardiovascular disease, neurodegenerative disorders and cancers [2]. Even drug resistance is associated with alteration of gene expression patterns [3]. We first proposed that alteration of gene expression patterns in human viral target cells can prevent viral infection [1] [4], which has been supported by experimental evidence [5]. Therefore, to treat these tough diseases, alteration of the abnormal gene expression patterns is very important, which indicates that the drugs we used should have ability for changing gene expression patterns.

We once proposed that non-carcinogenic genotoxic drugs (NCGDs) might pos-

sess the cure-all properties that can treat many diseases because they can change gene expression patterns in different cells by affecting 3-dimensional (3D) genome architecture [6]. A simple method to identify NCGDs is that any drugs with genotoxic side effects could be named as NCGDs. Occasionally, some drugs that have no genotoxic side effects might indirectly alter gene expression patterns as well. Therefore, all of drugs should be tested if they are altering gene expression patterns.

2. Drug-Altered Gene Expression Patterns Is Important for Disease Therapy Study

As an orientation of drug development, we propose that all drugs that no matter they are new or old should provide data of alteration of gene expression patterns. These could be done on few commonly used cell types that can be named as standard cells. These data should be deposited in the data bases for drug-altered gene expression patterns. With computer assistance, different drug-altered gene expression patterns could be marked and graded, which could be used in the treatment of different diseases. In this way, we know the reason of disease therapy changing. We can also try different drug-altered gene expression patterns to treat the same diseases, or we can judge which drug combinations are good or bad for the disease improvement.

Chinese herbal formulas are the validated prescriptions that have been used to treat a variety of diseases for thousand years. However, the mystery of the mechanism of action of the Chinese herbal formulas remains unsolved. Now, we think that Chinese herbal formulas mainly act on alteration of gene expression patterns in different cells. The key ingredients in the formulas might contain genotoxic molecules that can alter gene expression patterns in different cells by affecting 3D genome structures. The doses of all ingredients in the formulas might be adjusted based on patient conditions for a good level of gene expression alteration so that the diseases are improved. Hopefully, Western doctors should learn this strategy to improve diseases by using combinations of drugs that can change gene expression patterns to varying degrees.

All this disease therapy study is controlled by drugs and computer assistance. Massive accumulation of the data bases for drug-altered gene expression patterns might provide a good opportunity for using artificial intelligence (AI) in medical practice.

3. The Mechanisms of Action of Drugs Should Be Abandoned

The mechanisms of action of drugs did nothing for drug development and disease treatments, which usually come from simple and shallow studies and contain human thought. These mechanisms are not realistic and should be given up. Much research didn't use changing abnormal gene expression patterns for treating tough diseases, but use simple approaches to do so. For example, they want to block a passway to stop cancer growth based on simple theory and mechanism of drug

action. To treat cancers, NCGDs that change gene expression patterns are very important because some NCGDs can change gene expression patterns in cancers and thus stop cancer spreading, other NCGDs can change gene expression patterns in cancers and thus kill cancer cells through apoptosis or immune system. In a word, NCGDs might be used to prevent occurrence of cancers [1] [6]. Some scientists want to prevent viral infection through blocking so-called viral receptors [7] which have been criticised [8]. Hydroxychloroquine and chloroquine can treat many diseases, the reason is that hydroxychloroquine and chloroquine belong to NCGDs and can change abnormal gene expression patterns in different cell types. But a nature paper reports that the mechanism of hydroxychloroquine and chloroquine interfere with lysosomal activity and autophagy [9], which has nothing to do with the two drugs' treatments.

Some scientists using different theories want to stop viral replication that is called targeted therapy, but they don't want to report whether the drug they used can change gene expression patterns in human viral target cells. Therefore, all drugs, no matter they are targeting viruses or human cells, should be reported whether they can alter gene expression patterns, otherwise, we don't know that the drugs solely act on viruses not on altering gene expression patterns. In many experiments, drugs were used to block a passway, but if the drugs could alter gene expression patterns, the experimental results would be untrustworthy.

4. Conclusion

In conclusion, the mechanisms of action of drugs are not useful for drug development and disease therapy. Accumulation of data bases for drug-altered gene expression patterns is very important for drug studies and disease treatments. NCGDs might possess the cure-all properties because they can alter gene expression patterns in different human cells, including disease-associated cells. Screening a large number of NCGDs to cure tough diseases (such as cancers) and to extend your life is promising. We hope that in the future of pharmacology, only drug-altered gene expression patterns in standard cells are contained and there will be no mechanisms of action of drugs in it because they are useless and misleading.

Conflicts of Interest

The author declares no conflicts of interest.

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