

## The Pathogenesis and Treatments of Diabetes, A New Insight

Da-Yong Lu<sup>1\*</sup>, Jin-Yu Che<sup>2</sup>, Hong-Ying Wu<sup>3</sup> and Ting-Ren Lu<sup>3</sup>

<sup>1</sup>School of Life Sciences, Shanghai University, 99 Shangda Road, Shanghai200444, PR China

<sup>2</sup>Shanghai University, 99 Shangda Road, Shanghai200444, PR China

<sup>3</sup>College of Science, Shanghai University, 99 Shangda Road, Shanghai200444, PR China

### Abstract

Diabetes Mellitus is an old disease but modern epidemics. Despite many improvements and benefits of diabetes mellitus treatments recently, many new and unresolved problems relevant to diabetes mellitus pathogenesis and therapy have been found; in this editorial, new ideas for building update diabetes mellitus therapeutic systems, new drug development pipelines and experimental and clinical models are addressed.

### Keywords

Diabetes mellitus; Diabetes therapy; Insulin; Insulin-derivatives; Diabetes complications; Small molecular chemical; Bee extract; Cardiovascular complication; Hyperglycemia; Drug toxicity; Propolis; Genetics; Genomics; Pharmacogenomics; Nephropathy; Traditional chinese medicine

### Introduction

Diabetes Mellitus is an old disease but modern epidemics. The epidemics of diabetes in China, developing and developed countries have been growing now. For this reason, medical expenses on diabetes diagnosis and treatments have been increased greatly worldwide now [1,2]. Many people of experienced medical personnel and many new comers all enthuse for diabetes studies. Owing to the diversity of talents and educational backgrounds of researchers, scientific merits and usefulness of experimental or clinical study have been differed greatly. This editorial will address some of them.

### Building Good Educational Systems Worldwide

Developing to type 2 diabetes mellitus might undergo a long course of pathogenesis processes in susceptible human (many of them are family inheritance). Many preventive measures or control food intake can slow the disease progression and reduce morbidity rates. Some good and long-term educations, propaganda and wide-spread the basic knowledge and themes of diabetes pathogenesis and therapeutics will be beneficial to people' healthy quality.

### Therapeutic Studies

Development of more effective and less toxic drugs is always the ultimate goals of drug developments and manufactures. Likelihood, it is one of the major avenues of diabetes mellitus treatment study and clinical applications [3-8]. Despite insulin and insulin-derivatives are the safest and first-line anti-hyperglycemia therapeutic options and can be used in both type I and type II diabetes mellitus patients, it also has some obvious deficiency. The most conspicuous one is that needle injection is needed every day, which leads to treatment inconvenience and physical burden for diabetes mellitus patients. Currently, oral intake of drugs is the most welcoming and environmental-friendly drug administration options for all patients. Thus, some small-molecular chemicals having the insulin-configurations or insulin receptors binding activity might be potential oral anti-hyperglycemia drugs for surrogating insulin or insulin-derivatives. In future, we can compare, simulate and calculate insulin-configurations or insulin receptors

binding activity from large-pool of small-molecular chemicals pipelines by computing or experimental work.

Seeking solutions outside of normal therapeutic arsenals, such as propolis is also good options [9]. Propolis is bee extracts of waxy-like and other components. It has been discovered for anti-bacterial, anti-fungal or anti-tumors [9]. In China, it has been licensed as healthy-promoting agents. Now it has been largely sold for treatment of diabetes mellitus and received widely acclaiming for its efficacy in China. Many renowned-brands of long history Chinese Pharmaceutical Companies are almost all manufactured and sold propolis widely. Nonetheless, large-scale, double-blind systematic clinical investigations are needed in future. Some similar alterations should also be initiated, cooperatively studied, testified and verified by more experimental, preclinical or clinical investigations worldwide (Table 1).

### Future Directions

Since a lot of people are agonized and suffered with hyperglycemia and related complications worldwide, current diabetes mellitus therapy needs to be improved. Many persistent efforts and novel ideas are all welcomed. Table 2 illustrates roadmap and many avenues for diabetes mellitus treatment study and clinical usefulness in future.

### Conclusions

In future, new challenges relating to improve therapeutic outcomes for late-staged diabetes mellitus patients are urgently needed. In addition, personal diabetes treatment might be also useful and perfected by persistent experimental and clinical investigations and systematic studies.

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\*Corresponding author: Da-Yong Lu, School of Life Sciences, Shanghai University, 99 Shangda Road, Shanghai200444, PR China, Tel: 769768586; E-mail: ludayong@shu.edu.cn

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Targets	Mechanisms	Personal opinions
Glucose	Decrease glucose concentrations in animal and human by many metabolism interference Substitute food glucose intake with other mono carbohydrates	Controversy Controversy
Insulin	Human insulin and its derivatives Modulators of pancreatic island $\beta$ -cell	First line therapy Potential
Disease complications	Cardiovascular complications Nephropathy Vision impairment Mental retardations Chronic leg infection	Potential and need to be improved
Hepatic functions	Ameliorate of damaged cells and metabolism	Future trend

**Table 1:** Current targets and mechanisms of different drugs for *diabetes mellitus* treatments

Development and production of more effective and low toxicity anti-hyperglycemia chemical drugs
Educate more normal people to understand the basic knowledge of diabetes. So <i>diabetes mellitus</i> can be properly noticed and treated once the disease just begins. To deepen fundamental and comprehensive mechanism study to make licensed anti-hyperglycemia drugs more reliable and versatility
Genetic or molecular study of pathogenesis of disease progression, drug pharmacological mechanisms of action and drug toxicities in living bodies along with different individuals, ethnic groups and largest populations.
Lesson from history—traditional Chinese medicine, Indian medicine or Middle-east medicine etc
Perfecting the personalized diabetes therapy (PDT) study and applications
To test and study some new initiatives and natural products such as propolis
To set a more rigorous toxicity baseline for anti-hyperglycemia drugs development, approval and license in developing countries, or even in developed countries.
To find some small-molecular chemicals for simulating insulin functions and receptors-binding activities

Adapted and modified from ref 3.

**Table 2.** Possible roadmap and landscape for future anti-hyperglycemia study

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