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## Obese Study, Keeping up Momentum

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### Abstract

Obesity is a prevalence metabolic phenotype caused by host-environmental interactions. Many types of preventive and therapeutic options have been widely sought against this special type of energy disturbance, glucose homeostasis and adipose dysfunction. In order to fully control of human body in a good-shape, genetic, molecular, physiological, behavior, environmental and clinical approaches must undergo.

**Keywords:** Obesity, Endocrinology, Human genome, Inflammatory factors, Neural disorder, Mental disorder, Obese treatment, Life-Style adjustment, Metabolic disease.

### Backgrounds

#### Current scenario

Obesity is a prevalence metabolic and physiological disorder caused by host-environmental interactions. Obese people commonly face a lot of personal trouble in the society and a number of patho-physiologic damages. As a result, a series of preventive and therapeutic options have been widely utilized against this special item of metabolic phenotype-energy imbalance and glucose homeostasis disorder [1-4]. However weight losses after different patterns of therapeutic interventions are often temporary and commonly bounce back due to pharmaceutical shortage among large human populations. The great cost of obese control requires 20% of all medical expenditure in US [5]. More seriously, it has been increasingly prevalent in both industrial and agricultural-based countries. People with obesity commonly face a number of personal image troubles, social status downwards and a number of pathogenesis consequences.

#### General therapeutics

It has been difficult and costly to fully manage human obesity by existing knowledge and advancing therapeutic interventions. After discontinuation of medical intervention (life-style and drug intakes), obese people regain their body-weight. To face with this grim therapeutic limitation, creative ideas as well as new perspectives must be promoted globally.

### Social and Political Impacts

#### Clinical symptoms and social problems

Obese persons have a higher risk or rate of metabolic, cardiovascular or mental illnesses, such as depression, type 2 diabetes, cardiovascular symptoms and many others [2-10]. These clinical symptoms are difficult to cure, which need to take medicine very long and overseen by specialists and doctors. It is overall costly. Obese youngsters often meet

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with some social embarrassment-difficult to be accepted by new acquaintance.

### **Economic burdens**

Obese managements encompass wide-spectra of medical/ pharmacologic issues that exhibit a seriously economic burden-including diet control, life-style adjustments, surgery, drug utility and clinical therapeutics [2-12]. All these management systems require 190 billion USD (2010-2012) that attribute 20% all healthcare expenditure in the US [5]. Formal pharmaceutical therapeutics and putative drug target candidates need growing sum of money worldwide. Only by wide-ranges of scientific efforts and clinical validity, better therapeutic options and healthy social environments can be helpful [13-22].

### **Disease impacts**

Generally speaking, purposed weight loss is very difficult to achieve no matter through personal practice versus seeking formal medications in general hospitals. Only a small proportion of obese people can get satisfactory therapeutic outcomes in the clinic worldwide. Many obese people, especially without receiving doctor's advice regain their body weight after intervention discontinuations [1-4]. As a result, most obese people struggle with this problem in a long period of times. These negative feelings further impact obese people for life quality.

### **Etiopathology**

#### **Obstacles in obese study**

There are three major limitations for obese counteractive up to now;

Different types of counteractive measures are suitable for different individual of obese conditions and therapeutics;

Large proportion of obese people may bounce back after the therapeutic discontinuation;

It is necessary to seek doctor's/expert's advice because general people do not have essential medical and pharmacological knowledge [10-11].

To overcome these obstacles, cellular and molecular etiologic/pathological mechanism and therapeutic study may improve therapeutics against human obesity.

#### **Genetic predisposition**

Similarly to many other chronic diseases, genetic predispositions play key roles for human obesity, metabolic disturbance and glucose homeostasis [18-30]. This element in obese people is generally less effective by food notification or cathartic therapeutics.

In the early stage of obese study, human genomic exploration and hypothesis-driven approaches are common avenues for finding curable medications in the clinic. In search for excellent therapeutic options, obese people are more suitable for combinations of life-style adjustments and drug treatments due to diverse obese originality and therapeutic resistance by current licensed drugs. More

counteractive actions are required for meet with high-quality of drug discovery, licensing and marketing.

In the future, curable therapeutics must be look for. In order to attain this goal, patho-therapeutic relation must be built.

### **Patho-Therapeutic-Relations**

Human obesity is caused by multitude and diverse factors:

Overfeed (high proportion of obese population)

Pathologic factorials (endocrinological factors)-leptin, thyroxine, insulin and many other hormonal dysfunction

Sedentary (less physical activity and working)

Gastro-intestinal abnormal (functional increase and overdone)

Brain-visual-appetite axis (hypothalamic)

Adipose dysfunctions (hypoxia or other stressing factors)

Energy disturbance and glucose homeostasis

Psychiatric burden and disorder

Behavior (alcoholic and laziness)

Drug-induced (hormonal drugs, antibiotics or other drugs associated with human liver dysfunction)

Inflammatory factors (TNF secretion)

Tumor-induced (pituitary tumors and others)

Physiological change (adipose cells or tissues)

Genetic alleles (loss-of-function or copy number changes of key genes and molecules)

Inheritance and epigenetic switch

Hormonal or blood glucose level escalations

### **Cellular and Genetic Pathways**

To make any dramatic breakthroughs, genetic/molecular approaches are fundamental. Until now, several mechanisms of obese etiology and pathologic pathways are discovered:

1. Until now, human brain can trigger appetite feeling through different neural axis or circuits. These processes include many neural-related pathways; Hypothalamic-Pituitary-Somatotropic System (HPS); Hypothalamic-Pituitary-Adrenal System (HPA) and Hypothalamic-Automic-Gastrointestinal System (HAG) have been proposed [14].
2. Damaged metabolic tissues and organs require greater part of foods and glucose in human bloodstream for compensating. These compensatory processes may trigger weight-gain and metabolic syndromes [24].
3. Epigenetic ON/OFF switch is recently observed and clinically targeted in animal and human bodies. One of those genetic pathways is *via* TRIM28/TRIM28 [19-20].

4. Adipose-hypoxia can increase inflammatory-related pathways and further result in human obesity, metabolic imbalance and an increase of lipid ratio in adipose tissues [15].
5. Inflammatory pathways; Human inflammation commonly triggers a number of cellular/tissue damage machinery that may change normal/abnormal functionality in cells and tissues. Furthermore, damaged metabolic tissues or cells will lead to dysfunction of metabolic system [25].
6. Energy imbalance and glucose homeostasis disturbance; Energy imbalance may determine body weight-gains.

## Life Style Adjustments

### General principles

Life style adjustment is a useful option for a great number of obese people. Many types of life-style/behavior adjustments are usually as effective as drug therapy. There are multiple selections, such as food restrain, regular exercises, bad habit avoidance, spiritual focusing and other types of life-style adjustments for weight control [3]. Equal effective as drug therapy, many details and style of non-drug therapeutics need to be classified for moderate obese human beings in the clinic.

### Human exercises

One of the most effective lifestyle adjustments is for different patterns of body exercises. However, their therapeutic outcomes vary in intensity, duration and regularity of exercises [5-6].

### Healthy food consumptions

Food types and components are very relevant to human body-mass. Vegetable, fruits, cereal, seed and nut consumption can help to build desirable body shapes [30]. Based on past knowledge, many traditional beverages, such as tea, coffee [14-15] and so on are effective in body-mass reductions. This type of beverage is introduced to more people. Nonetheless, most of beverage, such as beer, sweet beverage may increase human body-mass.

## Co-Morbidity and Complications

### Metabolic phenotypes

Currently, little is known for sure about co-morbidity between obesity and other pathogenesis. Several factors of pathogenesis have been correlated in the clinic [15-18, 21-26]. We list them into the following categorizing:

Cardiovascular risks (heart-attack, brain stroke and so on)

Type 2 diabetes, atherosclerosis, hypercholesteremia and so on

Immune impairment and system abnormality

Higher incidence of viral-induced human mortality

Human inflammation, infection (foots) and related processes

Mental illness (depression, suicide, intimidate and so on)

## Counteractive Measures

The counteractive measures against human obesity are important and therapeutic variable in categories [14-22]. (Table 1) Main types of obesity managements include surgery, drugs and life-style. However, most of these counteractive measures are not perfect until now. Molecular mechanisms and genetic/epigenetic approaches are indispensable (Table 2).

## Drug Mechanisms and Types

Multiple drug mechanisms and types target against variant pathologic elements and phenotypes. Like green tea, it can decrease body weight by energy expenditure and fat-oxidation reductions [22-24].

Chemical, biological and herbal drugs are the commonest therapeutic options in the obese treatments. In therapeutic pathways and drug components, human hormonal factors such as adipocytokine, leptin and adiponectin are possibly involved.

The suggestion for overall therapeutics against different categories of obese and diabetic conditions is classified in table 2 [31-36]. These therapeutic selection principles may help clinical anti-obese trials (Table 3) [34].

## Mathematical Network Study

Mathematical modeling is an emerging possibility to find new relations-including risk origin, modern diagnostics, patho-therapeutic relation, drug mechanisms and treatment selections. These kinds of mathematical approaches are not mandatory, but indispensable for quality medications, cost reduction and new ideology from vast sources of experimental and clinical data and information on pharmaco-

**Table 1:** Major patterns of clinical therapeutics

Therapeutic categories	Specific options
Surgery	Gastric bariatric surgery Brain surgery (if available) And so on
Dietary	Higher-content of fibers in foods Fresh vegetable Reduce sweet and dessert consumptions Beverage selections Sea food consumptions And so on
Drug developments	Chemical drugs Bio-agents Herbal therapy And so on
Clinical therapy	Drug utility Gene therapy Drug combination Personalized medicine Precision medicines And so on
Others	Life-style/behavior adjustment Biotherapy (genomic editing, genetic circuits and others) Community supports Modern diagnostics Psychoanalysis and interventions And so on

**Table 2:** Suggestion for therapeutics against different categories of obese and diabetic conditions

Body mass index	Blood glucose level (mM/L)	Therapeutic options (proposed)
28 <BMI <30	Normal	Less sedentary work
>30	Normal	Food and life-style adjustment
35>BMI>30	6.2-8.0	First-line chemical drug+life-style
35>BMI>30	8.0-12.0	Drug (chemical or insulin)+life-style
>35	>8.0	Gastric surgery+Drugs

**Table 3:** Layout for computational network and AI system in the future

System buildup stages	Mathematical methodology
Descriptive statistics	Data collection
Inferential statistics and description	Iterative, matrix
Mode building	Methodological selections
New equation and computations	Theorem establish
Workable AI	Association with computers

therapeutics. Equation 1 and 2 represent our vision towards this topic [37-39];

$$T(P_1, \dots, P_n) = \theta(P_n) \quad (\text{Eq 1})$$

T: incidence of obesity in random human population

Associations between pathogenesis simulation and events of human obesity may be established and better utilized as equation 2 and others.

$$B = f(x; \alpha) + f(y; \beta) + f(z; \gamma) + E \quad (\text{Eq 2})$$

B=body mass index

x=food related variables

y=drug related variables

z=genetic related variables

E=a common constant

A lot of mathematical methodologies and computational network, such as algebra, iterative, matrix, Monte Carlo and others may be applied for this area of biomedical campaign. In addition, Artificial Intelligence (AI) for obese diagnosis and treatments may be gradually established (Table 2).

In the future, more similar mathematical equations and AI systems may assist clinical anti-obese therapeutics and teach medical students and junior doctors in the hospitals.

## Future Trends

Effective anti-obese therapeutics should be targeted against disease origins, unique pathogenesis pathways and novel drug targets. Without targeted therapeutics and other primary health-care progresses, clinical anti-obese therapy will remain unchanged and less responsive.

Therapeutic combinations (drugs plus life-style) are widely recommended for obese patients over the past two decades. These kinds of therapeutic paradigms are very useful for many other chronic diseases, such as HIV/AIDS and neoplasm metastasis. Further work is inevitable. Maybe any other therapeutic breakthroughs creating from other disease categories, like HIV [40-41] and cancer treatments [42-43] may be lend into anti-obese therapeutics in the

world. Nonetheless, it is usually based on doctor's experience rather than scientific-supportive formats [44-45].

Herbal medicine is an effective measure against a lot of diseases, including obese phenotype due to higher therapeutic index for many common diseases [46-48]. Different spectra of plant ingredients must be validated for drug developments in this medical area.

## Conclusion

Though there is no direct association between obesity and death, obesity is a strong risk for human morbidity and mortality. New insights into human obese causality and therapeutics may help human beings with overweight problem. We need to promote these researches in the near future.

## Conflict of Interests

None

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