Let's Excel Together

CANADIAN ACADEMY OF SPORTS NUTRITION

Lecture 26:

Plateau in Weight Loss

Part 2

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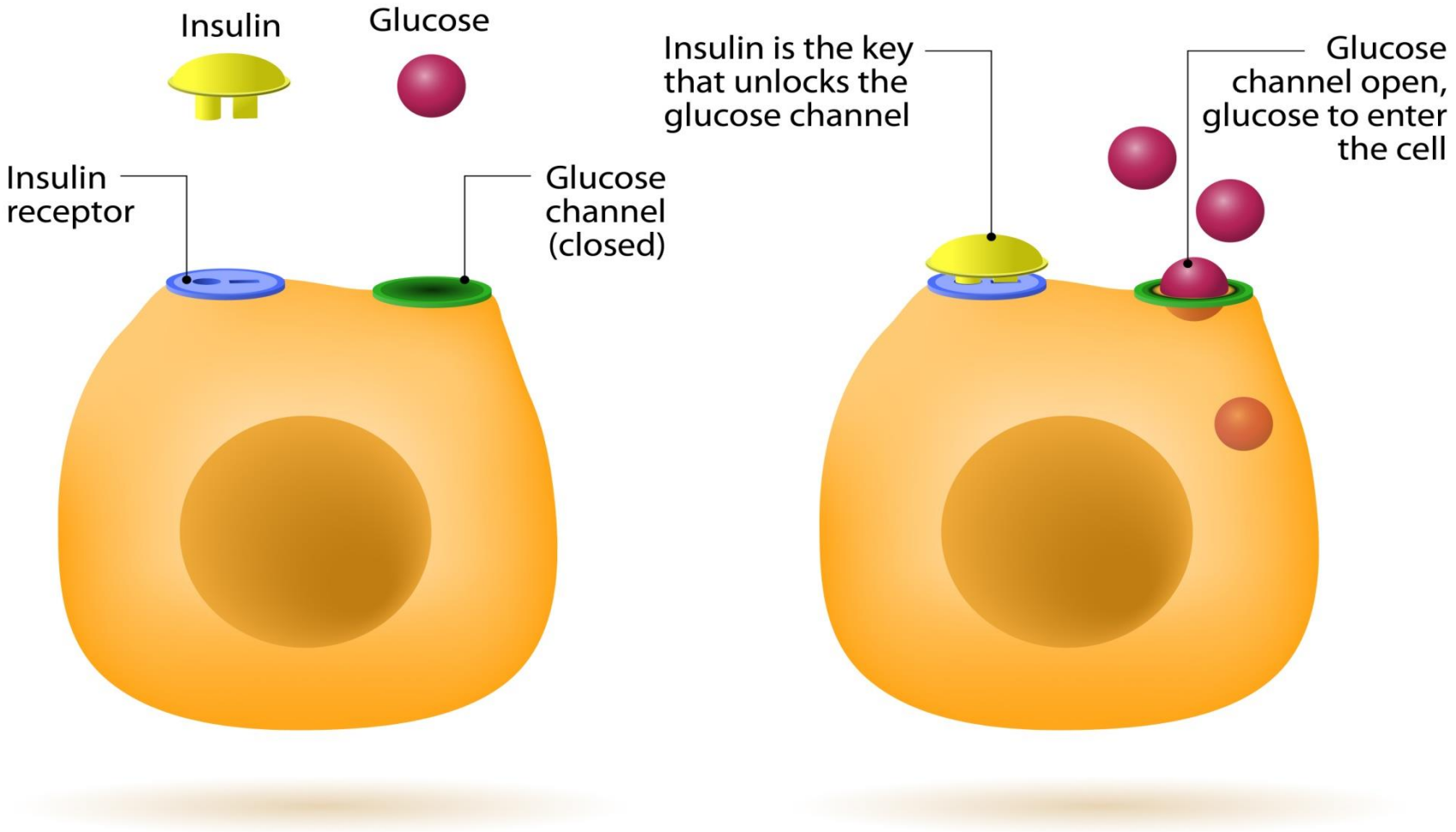
4) Insulin Resistance:

- **Insulin is a hormone released by the pancreas and has a key role in metabolism of carbohydrates, proteins, and fats.**

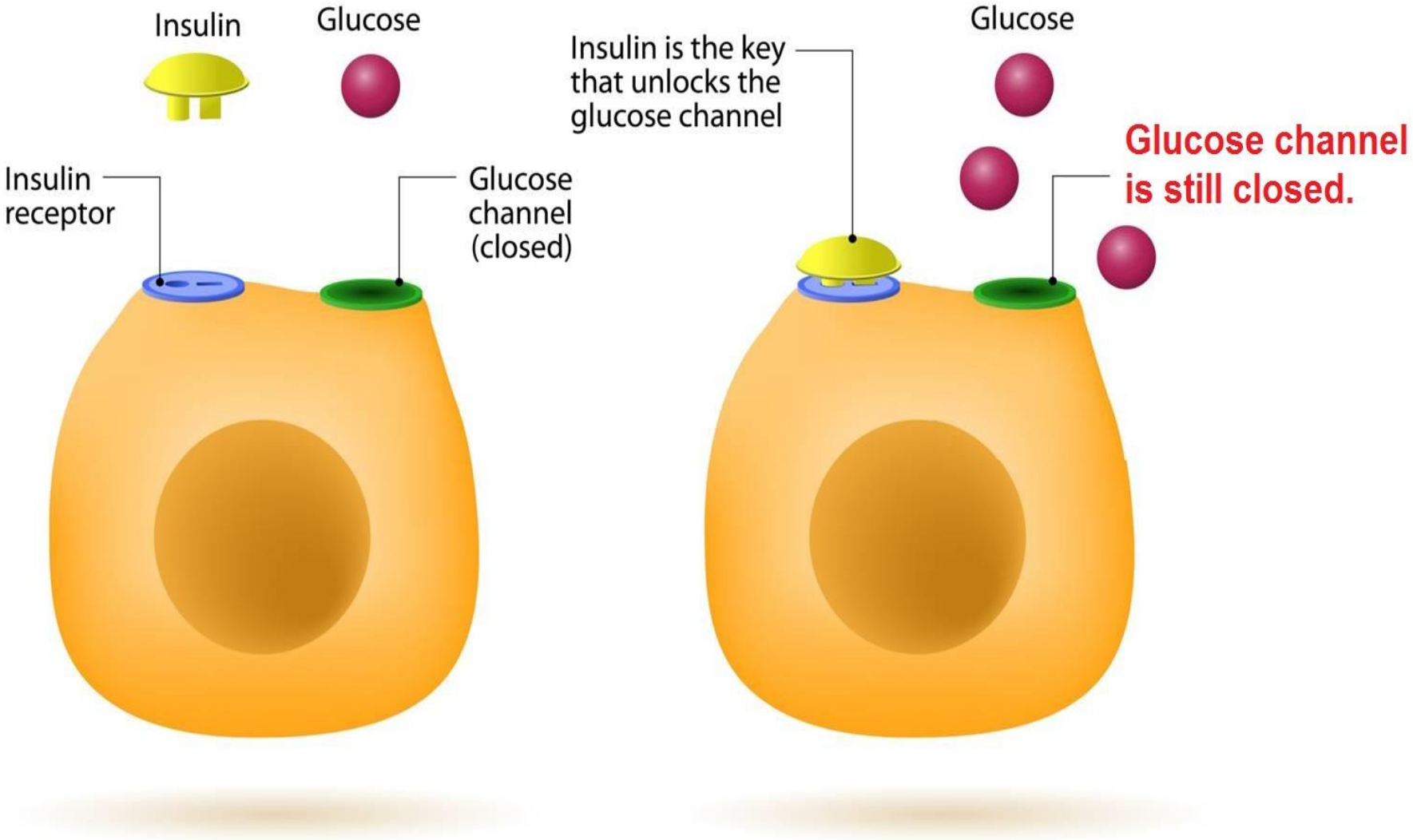
- **Insulin sits on its receptors on the cells, leading to activation of cascades of reactions that transfer carbohydrates (in the form of glucose) and amino acids into the cells.**

- **All tissues and cells in the body require insulin for effective uptake of glucose, except nervous system, kidneys and red blood cells.**

HOW DOES INSULIN WORK?

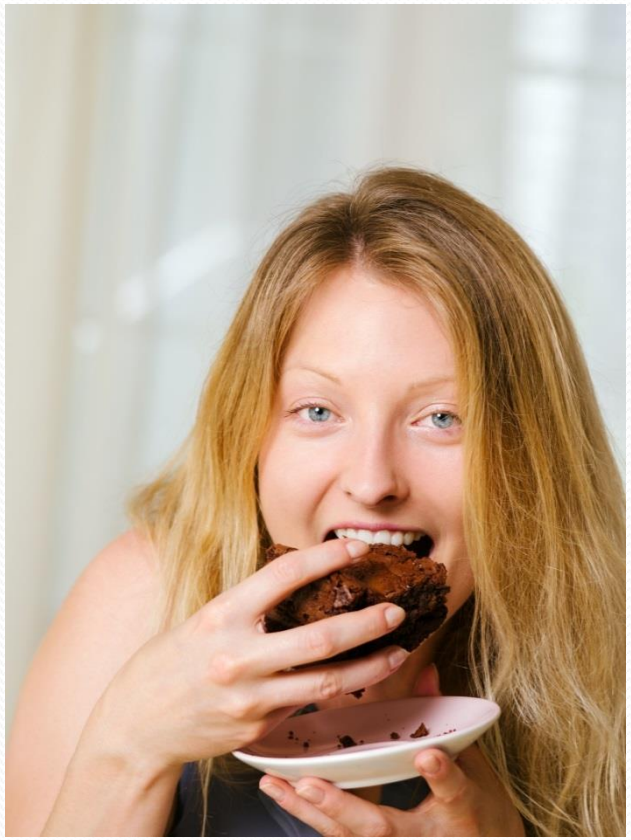


Insulin Resistance



Symptoms of Insulin Resistance:

- High blood sugar.
- Fatigue and tiredness.
- High blood pressure and triglyceride.
- Weight gain.
- Plateau during weight loss program.
- Increased hunger and thirst.
- Increased tendency to infections.
- Susceptibility to inflammation.
- Diabetes type II.



Risk Factors for Insulin Resistance:

- - Acidic diet
- - Diets poor in fiber
- - Diabetes type II
- - High blood pressure
- - High triglyceride level
- - Low level of good cholesterol
- - Sedentary life style
- - Pregnancy induced diabetes

- **- Liver diseases, especially “Hepatitis C”**
- **- Hemochromatosis (Iron overload)**
- **- Acanthosis nigricans (a skin disorder)**
- **- Donohue syndrome (a rare genetic disorder)**
- **- Rabson–Mendenhall syndrome (a rare medical condition that affects insulin receptors).**
- **- Increased cortisol level (Cushing disease or syndrome)**
- **- Polycystic ovarian syndrome (PCOS)**
- **- Food supplements: Glucosamine, CLA (conjugated linoleic acid), and Omega-3.**

- **- Medications (corticosteroids, rifampicin, isoniazid, olanzapine, risperidone, progestogens, glucocorticoids, methadone, anti-HIV drugs, niacin, and birth control pills).**
- **- Vitamin D deficiency.**
- **- Zinc deficiency.**

Solutions:

- Stop taking causative agents.
- Avoid taking foods with glycemic index over 55.
- Take foods with glycemic index less than 55.
- Avoid food colorings, additives, and preservatives.
- Keep your fiber intake 30 grams/day.
- Increase taking green tea, cinnamon, ginger, turmeric, spirulina and bitter melon.
- Increase taking foods high in flavonoids.

Solutions:

- **Take 3 of the following products:**

- **Chromium Picolinate.**
- **Vanadium Sulfate.**
- **ALA.**
- **French Maritime Pine Bark Extract.**
- **Resveratrol.**
- **Glucomannon.**
- **L- Carnitine.**
- **Grape Seed Extract.**

5) Leptin Insensitivity:

- **Leptin is a hormone produced mainly by the fat cells and a very small amount by the ovaries, skeletal muscles, liver, stomach and pituitary gland.**

- **It is an appetite controlling hormone, because it suppresses appetite by acting on the hypothalamus – a part of the brain that controls appetite and satiety.**

- **Causes unusual greater appetite and excessive hunger pangs.**

- **This hormone has a key role in metabolism.**

Leptin insensitivity causes unusual greater appetite and excessive hunger pangs! *Image: Copyright©Depositphotos.com/Piotr Marcinski*

Risk Factors for Developing Leptin Insensitivity:

- Acidic body
- Caloric restriction
- Foods high in GI (glycemic index)
- Diets poor in fiber
- High percentage of body fat
- Emotional stress
- Sleep deprivation

- Increased testosterone level
- Decreased estrogen level
- Diabetes
- Fatty liver
- Polycystic ovarian syndrome (PCOS)
- Low function thyroid
- Abnormal serotonin level

Solutions:

- **Stop taking causative agents.**
- **Avoid taking foods with glycemic index over 55.**
- **Take foods with glycemic index less than 55.**
- **Avoid food colorings, additives, and preservatives.**
- **Keep your fiber intake 30 grams/day.**
- **Increase taking green tea, cinnamon, ginger, turmeric, spirulina and bitter melon.**
- **Increase taking foods high in flavonoids.**
- **Add Irvingia gabonensis (African mango) supplement, or garcinia cambogia.**

6) Imbalance among Leptin, Ghrelin, Adiponectin and Orexin:

- **Ghrelin is a hormone released primarily by the stomach and a very small amount by the small intestine and pancreas.**

- **It is famous as "*hunger hormone*", as it stimulates hunger feeling and increases appetite. Imbalance between leptin and ghrelin could affect the weight loss process.**

- **This imbalance is one of the theories behind "anorexia nervosa" as well. In fact, it is believed that overproduction of leptin and underproduction of ghrelin would lead to anorectic status.**

- **During weight loss period, underproduction of leptin and overproduction ghrelin would collectively stimulate hunger pangs, forcing the person to eat more and cheat on diet!**

- **Ghrelin has a paradox effect on the body. On one hand, it stimulates the release of growth hormone which speeds up consumption of fat. On the other hand, ghrelin suppresses fat utilization which is opposite to the effect of growth hormone.**

- **Overall, any increase in ghrelin level would increase hunger, challenging the weight loss process.**

The following factors may increase ghrelin level:

- Poor fiber diet
- Low protein diet
- Foods high in fat
- Decreased blood sugar level
- Stress
- Lack of sleep

- **Adopinectin is a hormone released exclusively by the fat cells.**

- **It is sometimes referred as AdipoQ or Acrp30. This newly discovered hormone has an important role in metabolism of fat and glucose.**

- **It seems that adiponectin functions through insulin, which explains its importance in fighting insulin resistance.**

- **Adiponectin along with the three key minerals, zinc, chromium picolinate and vanadium sulfate, may improve insulin function.**

- **There is an inverse relationship between blood levels of adiponectin and percentage of body fat.**

- **This hormone fails to function appropriately in an acidic environment.**

- **Orexin, also called hypocretin, is a hormone released by the brain and regulates appetite and wakefulness.**

- **Leptin and glucose inhibit the production of orexin, reducing appetite. Ghrelin, lack of sleep, and low blood sugar level stimulate the production of orexin, increasing the craving for foods.**

- **The correlation among leptin, ghrelin, adiponectin and orexin and their links with obesity and weight loss are of hot topics among research scientists.**

Imbalance among the hormones leptin, ghrelin, adiponectin and orexin stimulates hunger feelings, leading to an increased appetite and plateau in weight loss.

Image: Copyright©Depositphotos.com/Gennadiy Poznyakov

Solution:

Combine the solutions for:

- **Insulin resistance.**
- **Leptin insensitivity.**

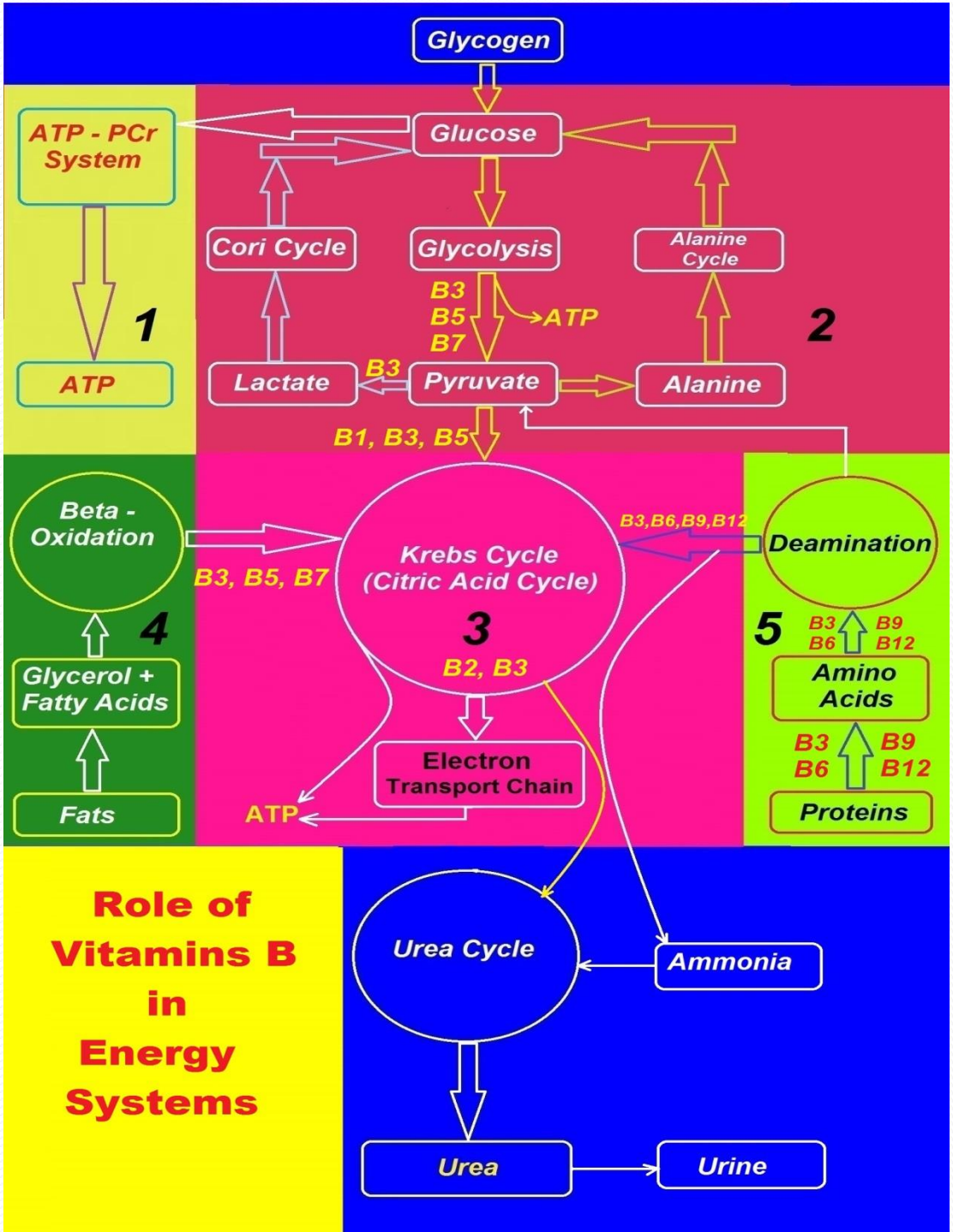
7) Micronutrients Deficiencies:

- **Micronutrients include vitamins, minerals, antioxidants, phytonutrients, and fatty acids.**

- **They are involved in many reactions and metabolism of macronutrients (carbohydrates, fats, and proteins).**

- **In fact, macronutrients require micronutrients to get metabolized and continue burning.**

- **Micronutrients – deficient diets are a common reason to plateau in a weight loss program.**


Glycogen
ATP - PCr System
Glucose
Cori Cycle
Glycolysis
Alanine Cycle
B3
B5
B7
ATP
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Lactate
B3
Pyruvate
Alanine
B1, B3, B5
Beta - Oxidation
B3, B5, B7
Krebs Cycle (Citric Acid Cycle)
3
B2, B3
B3,B6,B9,B12
Deamination
5
B3
B6
B9
B12
4
Glycerol + Fatty Acids
Amino Acids
Electron Transport Chain
ATP
Fats
Proteins
Role of Vitamins B in Energy Systems
Urea Cycle
Ammonia
Urea
Urine

Solutions:

- **Add the following nutrients:**
- **B – Complex, a high quality product.**
- **Multivitamin – Multiminerals.**
- **Low dose of Omega-3: 1 gram a day.**
- **Flavonoids.**

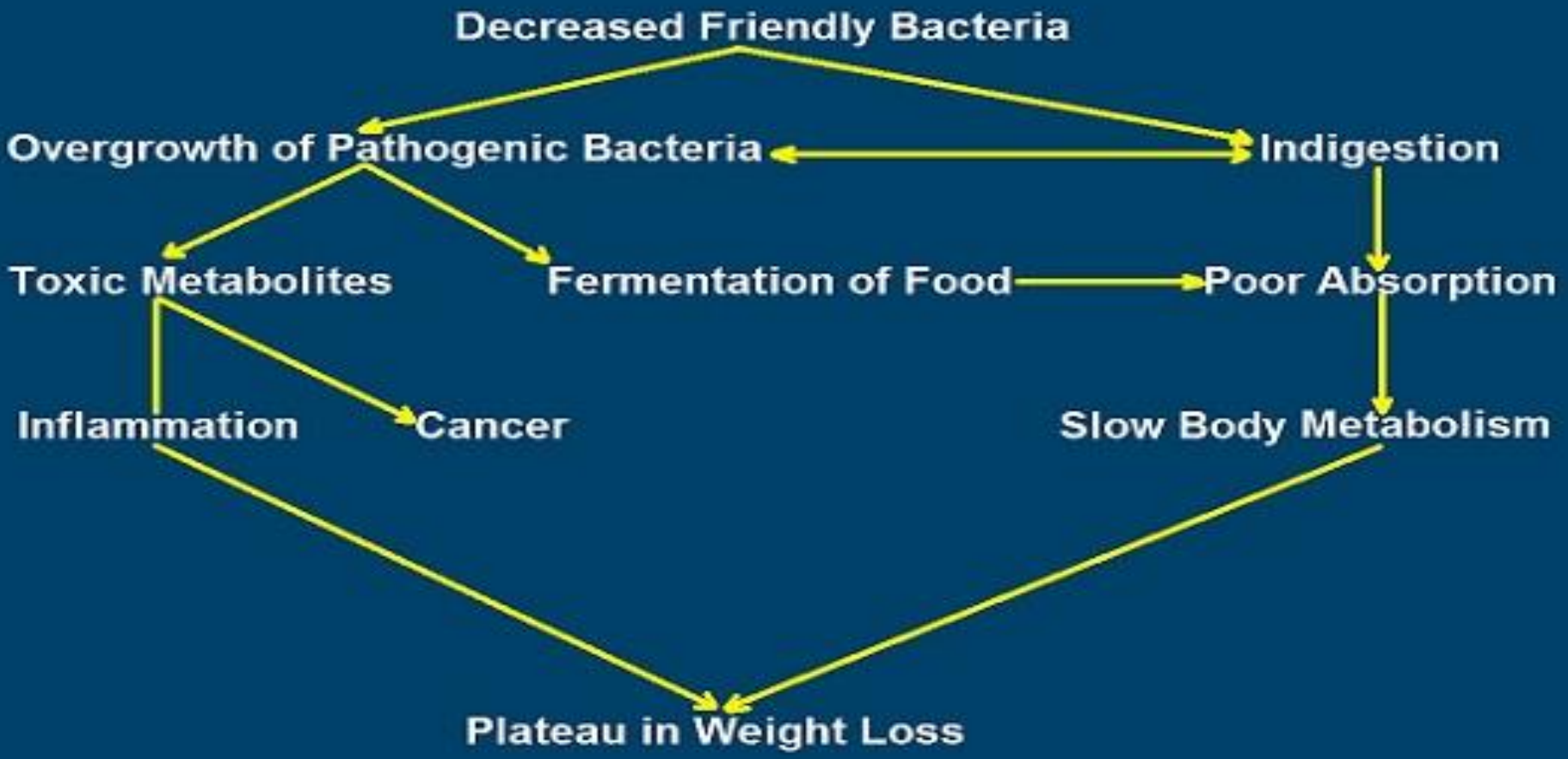
8) Dysbiosis:

- **Dysbiosis is disruption of normal flora of the intestines.**
- **It is the imbalance between good and bad bacteria of the intestine.**
- **Dysbiosis has been linked with obesity, chronic fatigue syndrome, inflammatory bowel disease, weak immune system, and cancers.**

The common causes of dysbiosis are:

- **Long term consumption of antibiotics.**
- **Alcoholism.**
- **Unhealthy diets (high in fats and animal proteins and low in fiber).**

Dysbiosis



Solution:

- Check to see if your client is on any antibiotics.
- Add Probiotics: start with 20 billion per day.
- Stop alcohol.
- Adjust fiber to 30 grams a day.
- Make sure that protein is not beyond 1.5 gram per kg of body day.

9) Disordered Metabolism of Serotonin:

- **Serotonin is a hormone predominantly found in the gastrointestinal and nervous systems.**

- **Being considered as "*happiness hormone*", serotonin plays an important role in the regulation of appetite, mood, sleep, and cognitive functions (memory and learning).**

- **Low levels of serotonin have been linked with depression, anxiety, obesity, migraine, chronic fatigue, poor concentration, and sleep disorders.**

- **An increase in serotonin level improves mood and sleep, enhances cognition, and helps control appetite.**

- **Serotonin level increases in the brain in the following conditions:**

- Foods with higher ratio of tryptophan to phenylalanine and leucine (banana, dates, and papaya)

- Exposure to bright light (sun)

- Exercise

Solution:

Add one of the followings:

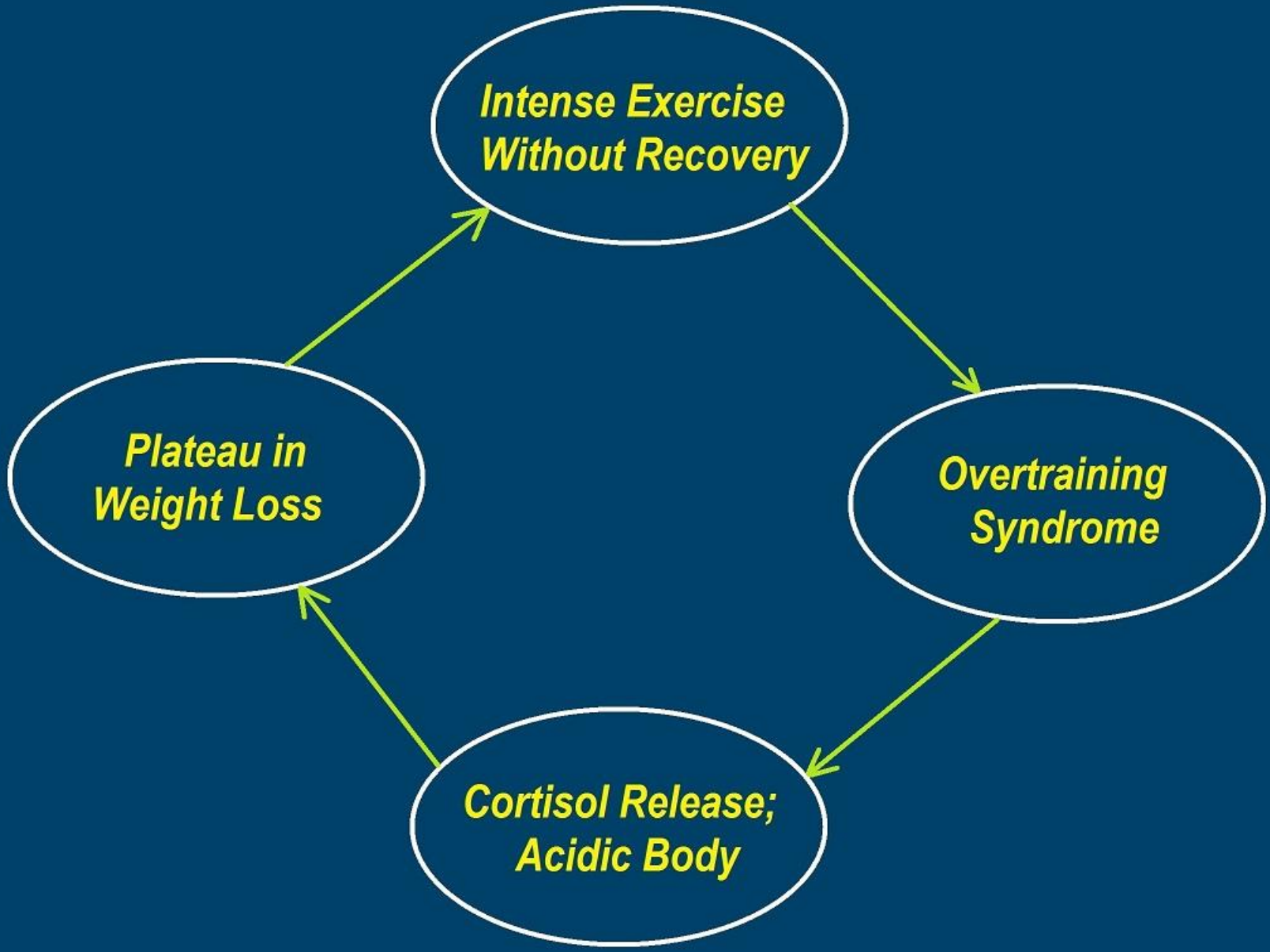
- **5 – HTP: 50 – 100 mg bedtime.**
- **L – Tryptophan: 1000 – 2000 mg per day.**

10) Overtraining Syndrome:

- **Affects up to 30% of team athletes and 50% of individual sport athletes and gym-goers.**

- **It is a complex syndrome with physical, psychological, emotional, immunological, and biochemical changes.**

- **Known also as burnout, overworked, overstressed, and staleness, it results from excessive training overload and inadequate recovery.**



Solutions:

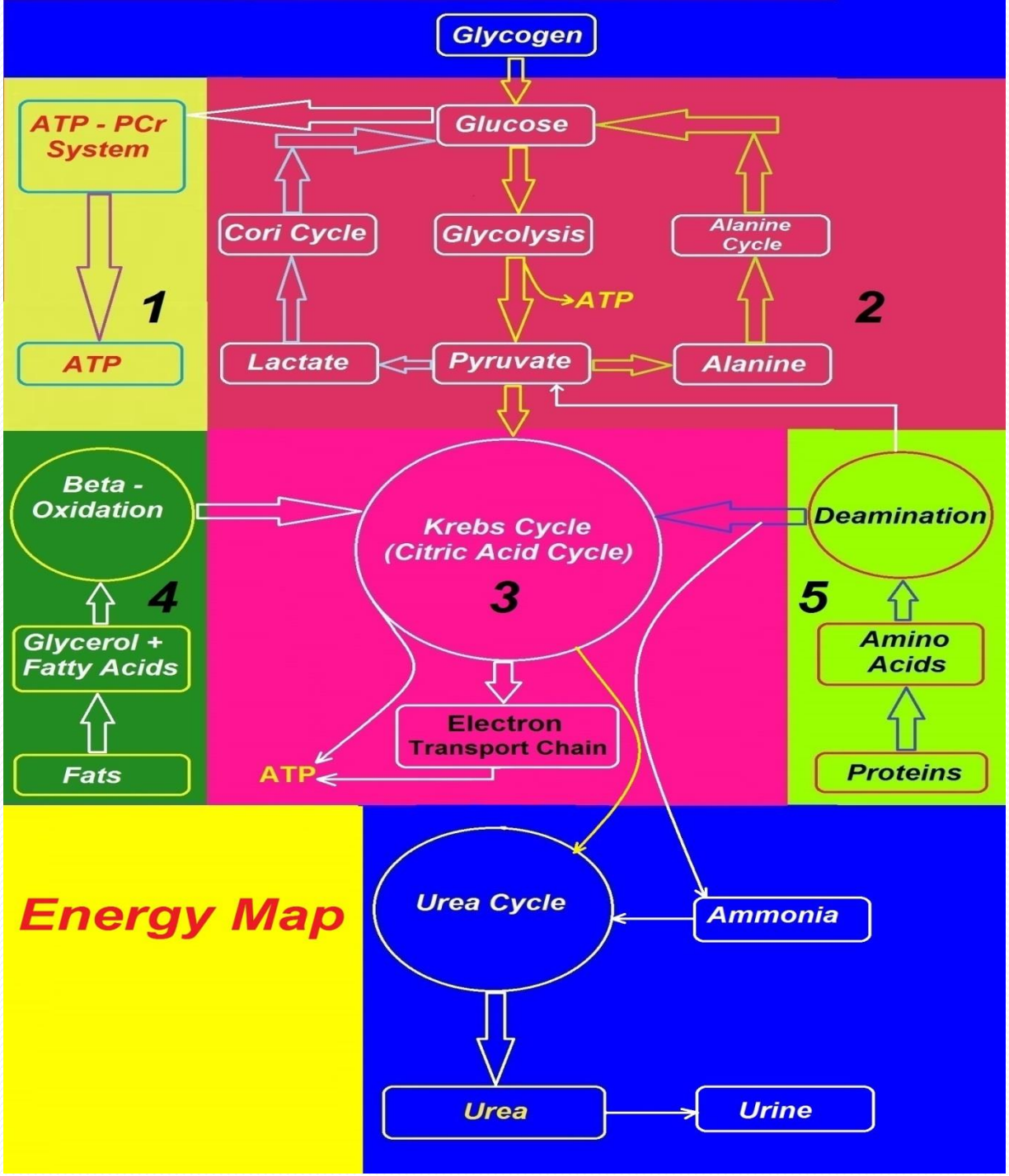
- **Rest.**
- **Stop training for at least 2 weeks.**
- **Avoid prolonged training sessions (over 100 minutes per session).**
- **Avoid training 7 days a week.**
- **Reduce intensity and volume of training.**
- **Use periodization.**
- **Follow anti – OTS supplementation.**

11) No Carbs At All.

- **Consequences of no carbs diet:**
  - **Accumulation of ketons in the body.**
  - **Slow metabolism of fats.**
  - **Agitation and nervousness.**

"Fats require intermediates to continue burning. The intermediates come from metabolism of carbs".

"Fats burn in a carbohydrate flame".


Glycogen
ATP - PCr System
Glucose
Cori Cycle
Glycolysis
Alanine Cycle
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ATP
ATP
2
Lactate
Pyruvate
Alanine
Beta - Oxidation
Krebs Cycle (Citric Acid Cycle)
3
Deamination
4
5
Glycerol + Fatty Acids
Amino Acids
Electron Transport Chain
Fats
ATP
Proteins
Energy Map
Urea Cycle
Ammonia
Urea
Urine

Solutions:

- **Follow the right pre – workout diet.**
- **Add low glycemic index carbs to your diet:**

- **0.5 gr/kg.**
- **60 – 90 minutes before Exercise.**

12) Lack of Exercise or Failure to Build Muscle:

Exercise helps lose weight through the following mechanisms:

- **a) Exercise stimulates the release of growth hormone (GH), which is a powerful fat burner.**

- **b) Exercise stimulates the release of irisin, the exercise hormone. It is a newly discovered hormone that supports normal function of insulin.**

- **c) The muscles constitute nearly 50% of the body mass, but they consume 18% of BMR (basal metabolic rate).**

For one pound gain in muscle mass, BMR would increase by 8 – 10 kCal per day. Therefore, the more muscles you build, the more fats you burn!

- **d) Exercise stimulates the aerobic metabolism that improves catabolism of fats.**

- **e) Exercise improves microcirculation of the adipose tissues, which enhances their breakdown.**

- **f) Exercise enhances functions of the liver, an organ that plays a key role in body metabolism.**

Image: Copyright©Depositphotos.com/Alen Ciric

Solution:

- **Add an exercise program to your clients regiment.**
- **Combine weight training and cardio.**

13) Undiagnosed Medical Conditions:

- Low function thyroid.
- Diabetes.
- Depression.
- Insulinoma.
- Cushing`s disease.
- Polycystic ovarian syndrome (PCOS).

Solution:

- **Ask your client to see his/her doctor for a complete medical check up.**
- **Communicate with the doctors if possible.**

14) Toxic Overload.
15) Lazy Liver.

- Refer to the lecture of Detoxification.

Homework:

- **1) Describe how insulin resistance could cause weight gain and plateau in weight loss.**

- **2) Describe how exercise could help a weight loss seeker go through plateau.**