

Insulin Resistance and Yoga

Ashley Freidel
Carliana Carpenter
Courtney Rokowski
Kristin Costanzo



For our presentation we looked into the effects of the practice of yoga on individuals with Insulin Resistance and Type 2 Diabetes, focusing in on to whether or not the practice would benefit them with both short and long term effects.

Type 2 Diabetes

- In 2012 a study was done on 61 premenopausal obese Korean women with more than 50% body fat to measure the effects of yoga on insulin sensitivity and lipid profile and syndrome factors.
- Body weight, percent of body fat, waist/hip ratio, triglycerides, total cholesterol, and visceral fat area had significantly decreased.
- HDL cholesterol and adiponectin had significantly increased.
- In conclusion, yoga intervention in obese, type 2 diabetes, blood pressure, insulin, glucose, and hemoglobin A1c measurement-insulin resistance significantly decreased. (5)

Increase Adiponectin Release

- Yoga often increase the release of an adipocyte-derived hormone called adiponectin.
- Adiponectin decreases insulin resistance by decreasing triglyceride content in muscle and the liver, increasing insulin sensitivity, and expression of molecules involved in both fatty-acid oxidation and glucose disposal in muscle. (6)

What is insulin resistance?

Type 2 Diabetes

- Type 2 Diabetes makes up 90% of all diabetes cases. It is a chronic disease that occurs when the body does not produce enough insulin or does not use insulin effectively.
- Diabetes specifically describes a group of metabolic diseases. It results in the body not being able to use insulin effectively. (6)

Another study found that individuals with Type 2 Diabetes have a reduced ability to respond to insulin.

- Another study reported that after 12 weeks of yoga, insulin sensitivity improved and insulin resistance reduced. This was associated with a significant reduction in waist/hip ratio, systolic blood pressure, heart rate, and triglycerides upon completion of the yoga intervention compared to a group of patients on drug therapy.

Yoga

- Yoga has been practiced in India for over 4000 years and there are many ancient books that depict the healing properties behind the practice of yoga.
- Early yoga has been put under scientific evaluation as to whether or not the practice will actually rid the body of communicable diseases such as Diabetes.

How can we manage insulin resistance before it develops into type 2 Diabetes?

Enhancement of Cardiac Vagal Activity

- In 1958 in India a study was done to assess the insulin sensitivity and cardiac autonomic function in long-term practitioners of yoga.
- 15 healthy young male practitioners of yoga were compared to 15 young healthy males who did not practice yoga.
- There were no significant differences between the groups in their body measurement or body composition. However the fasting plasma insulin was significantly lower in the yoga group and the yoga group was also more insulin sensitive. (6)

Overview of Yoga's Benefits

- Reduces insulin resistance
- Decreases fasting blood glucose levels
- Lower blood pressure
- Improve cholesterol and triglycerides
- Reduce need for diabetic medication
- Lower stress hormone levels
- Increases flexibility and strength
- Improves balance and immune function
- Helps weight loss
- Alleviates chronic pain (?)

Quiz Time

1. The substance where the body produces insulin, but doesn't use it effectively or cannot use it at all correctly.
- A. Myocetica
- B. Myo-kinetics
- C. Diabetes Insipitus
- D. Insulin Shock

Help in Prevention of Type 2 Diabetes

- In 2007 a study was done to assess the risk of cognitive impairment in healthy adults with body composition, exercise tolerance, and various risk variables like hypertension and dyslipidemia. 100 healthy adults were recruited and studied for one month. They practiced 4 types of yoga for 1 hour per week and 4 types of stretching for 15 minutes. Patients developed a sense of well being within 7 to 10 days and showed significant improvements and pre-period blood glucose values.
- Another study reported that 10 sessions of yoga decreased hyperglycemia. There was normalization of the insulin glucose ratio in 5 of these 20 type 2 diabetic patients. (6)

- Yoga can help in all three styles. Yoga is used to decrease insulin in the beta cells that make insulin in body to prevent diabetes. Yoga leads to an increase in insulin sensitivity and reduction in insulin resistance. Insulin resistance is a condition where the body does not respond to insulin properly and prevents the development of diabetes and provides the development of cardiovascular disease. Yoga increases insulin sensitivity to free fatty acid levels reducing the risk of cardiovascular disease.
- Yoga is a great way to reduce stress. Therefore it is reasonable to conclude that yoga can help in reducing insulin levels and lipid metabolism processes and cell function and thus reduce the risk of cardiovascular disease, preventing development of type 2 diabetes. (6)

Beneficial Yoga Poses

- Yoga poses may be particularly beneficial for type 2 diabetes patients:
- **Seated spinal twist** massages the kidneys, pancreas, muscles, gallbladder, liver, and small intestines, stimulating digestion and regulating insulin, bile and adrenaline secretion.
- **Seated forward bend** promotes the functioning of internal organs, including the kidneys, pancreas, and liver.

- **Child's pose** regulates circulation, promotes relaxation, and relieves fatigue and stress.
- **Lizard pose** helps digestion and supports the pancreas and liver.
- **Standing balance poses**, such as **Warrior**, **Lord of the Dance**, and **Tree** position, stimulate endocrine glands and regulate metabolism. They require a higher level of fitness, however, and without certain modifications and proper instruction aren't appropriate for beginners or those who have physical limitations. (7)

Research has suggested that yoga's contribution to stress reduction actually may moderate the impact of diabetes. High levels of stress hormones have been shown to raise blood glucose levels, promote overeating, lead to the accumulation of abdominal fat, contribute to insulin resistance, and boost heart attack risk. By reducing stress hormone levels, yoga can minimize these side effects.

Type 2 Diabetes

- In the last few years, some clinical studies and reviews have been published on yoga and diabetes, providing new evidence to benefits. The most recent studies found that those who practice yoga regularly have significantly reduced different measured risk factors, control compared with standard care alone.

- Another study reported that after 12 weeks of yoga, insulin sensitivity improved and insulin resistance reduced. This was associated with a significant reduction in waist/hip ratio, systolic blood pressure, heart rate, and triglycerides upon completion of the yoga intervention compared to a group of patients on drug therapy.

Yoga

- Yoga has been practiced in India for over 4000 years and there are many ancient books that depict the healing properties behind the practice of yoga.
- Early yoga has been put under scientific evaluation as to whether or not the practice will actually rid the body of communicable diseases such as Diabetes.

Enhancement of Cardiac Vagal Activity

- In 1958 in India a study was done to assess the insulin sensitivity and cardiac autonomic function in long-term practitioners of yoga.
- 15 healthy young male practitioners of yoga were compared to 15 young healthy males who did not practice yoga.
- There were no significant differences between the groups in their body measurement or body composition. However the fasting plasma insulin was significantly lower in the yoga group and the yoga group was also more insulin sensitive. (6)

High Blood Pressure
Overweight
Smoking
Sedentary Lifestyle
High Fat/Fried Foods

- In 2012 a study was done on 61 premenopausal obese Korean women with more than 50% body fat to measure the effects of yoga on insulin sensitivity and lipid profile and syndrome factors.
- Body weight, percent of body fat, waist/hip ratio, triglycerides, total cholesterol, and visceral fat area had significantly decreased.
- HDL cholesterol and adiponectin had significantly increased.
- In conclusion, yoga intervention in obese, type 2 diabetes, blood pressure, insulin, glucose, and hemoglobin A1c measurement-insulin resistance significantly decreased. (5)

Yoga's Benefits
- Reduces stress
- Reduces blood glucose levels
- Reduces triglycerides
- Reduces diabetes medication
- Reduces blood pressure
- Reduces body weight
- Reduces strength
- Reduces immune function
- Reduces depression
in (7)

Help in Prevention of Type 2 Diabetes

- In 2007 a study was done to assess the role of yoga practices on glycemic control, insulin kinetics, body composition, exercise tolerance, and various cardiovascular risk type 2 diabetes patients were studied.
 - 28 type 2 diabetics and 14 type 1 diabetics were studied for one month. They practiced 4 types of Pranayama for 30 minutes followed by Shashavasana for 15 minutes. Patients developed a sense of well being within 7 to 10 days and showed a significant fall in fasting and post-prandial blood glucose values.
 - In 4 of 17 patients the requirement of drugs came down significantly. There was normalization of the insulin glucose ratios in 5 of these 28 type 2 diabetic patients. (6)

- Yoga practices in all these studies have produced an increase in the lean body mass and decrease in body fat percentage. This leads to an improvement in insulin sensitivity and reduces the risk of developing Type 2 Diabetes due to major abnormalities in type 2 diabetes and prevents the development of overt diabetes by several years.
- Reducing stress and anxiety levels reduces inflammation, which has a significant effect on beta cell function. Therefore it is reasonable to presume that the beneficial effects of yoga are mainly through its anti-inflammatory properties, beta cell exhaustion and development of a beta-cell secretory defect, preventing development of type 2 diabetes. (6)

Beneficial Yoga Poses

Yoga poses that may be particularly beneficial for type 2 diabetes patients:

- **Seated spinal twist** massages the kidneys, pancreas, stomach, gallbladder, liver, and small intestines, stimulating digestion and regulating insulin, bile, and adrenaline secretion.
- **Seated forward bend** promotes the functioning of internal organs, including the kidneys, pancreas, and liver.

Improves circulation,
relieves tension,
and relieves
digestion and
liver.
poses, shoulder
the sun salutation
glands and
They require a
however, and
activities and
o appropriate for
o physical

Enhancement of Cardiac Vagal Activity

- In 2008 in India a study was done to assess the insulin sensitivity and cardiac autonomic function in long-term practitioners of yoga.
 - 15 healthy young male practitioners of yoga were compared to 15 young healthy males who did not practice yoga matched for body mass index.
 - There were no significant differences between the groups in their body measurement or body composition. However the fasting plasma insulin was significantly lower in the yoga group and the yoga group was also more insulin sensitive.(4)

Research has suggested that yoga's contribution to stress reduction actually may moderate the impact of diabetes. High levels of stress hormones have been shown to raise blood glucose levels, promote overeating, lead to the accumulation of intra-abdominal fat, contribute to insulin resistance, and boost heart attack risk. By reducing stress hormone levels, yoga can minimize these side effects.

What is insulin resistance?

Type 2 Diabetes

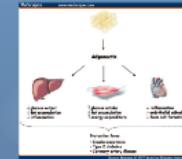
- Type 2 Diabetes makes up 90% percent of individuals who have diabetes typically due to obesity and physical inactivity.
- Type 2 Diabetes is a result from the pancreas being unable to use insulin effectively. (World Health Organization)
- According to Singh et al. India has one of the highest percentages of Type 2 Diabetes in the world, estimated 75m plus by 2030 (1).
- Persons with Type 2 Diabetes have difficulty producing insulin, along with being hyperinsulinemic. (6)

How can we manage insulin resistance before it develops into type 2 Diabetes?

- In 2012 a study was done on sixteen postmenopausal obese Korean women with more than 36% body fat to determine the effects of yoga exercise on serum adiponectin and metabolic syndrome factors.
- Body weight, percentage of body fat, lean body mass, body mass index, waist circumference, and visceral fat area had significantly decreased.
- HDL cholesterol and adiponectin had significantly increased, but total cholesterol, triglyceride, LDL cholesterol, blood pressure, insulin, glucose, and homeostasis model assessment-insulin resistance had significantly decreased. (5)

Increase Adiponectin Release

- Yoga's effects increase the release of an adipocyte-derived hormone called adiponectin.
- Adiponectin decreases insulin resistance by decreasing triglyceride content in muscle and the liver. This effect results from increased expression of molecules involved in both fatty-acid combustion and energy dissipation in muscle. (5)



Insulin Resistance and Yoga

Ashley Freidel
Carliana Carpenter
Courtney Rokowski
Kristin Costanzo

For our presentation we looked into the effects of the practice of yoga on individuals with Insulin Resistance and Type 2 Diabetes, focusing in on as to whether or not the practice would benefit them with both short and long term effects.

Type 2 Diabetes



dia has one
of Type 2
an
0 (1).
es have
along with

Insulin Resistance and Yoga

Ashley Freidel
Carliana Carpenter
Courtney Rokowski
Kristin Costanzo



For our presentation we looked into the effects of the practice of yoga on individuals with Insulin Resistance and Type 2 Diabetes, focusing in on as to whether or not the practice would benefit them with both short and long term effects.

What is insulin resistance?

- Insulin resistance is a condition where the body produces insulin but does not use it effectively or cannot use it at all. Therefore, glucose builds up in the blood instead of being absorbed by the cells leading to type 2 diabetes or pre-diabetes.
- Most people with insulin resistance do not know they have it until they develop type 2 diabetes. By catching people with insulin resistance early on, they can prevent or delay diabetes. (1)

Type 2 Diabetes

Overweight

High Blood Pressure

Smoking

Sedentary
Lifestyle

High Fat and
Cholesterol Levels

Type 2 Diabetes

- Type 2 Diabetes makes up 90% percent of individuals who have Diabetes typically due to obesity and physical inactivity.
- Type 2 Diabetes is a result from the pancreas being unable to use insulin effectively (World Health Organization).
- According to Singh et al. India has one of the highest percentages of Type 2 Diabetics in the world with an estimated 79million by 2030 (1).
- Persons with Type 2 Diabetes have difficulty producing insulin, along with being hyperglycemic (2).

**How can we manage
insulin resistance
before it develops
into type 2 Diabetes?**

Yoga

- Yoga has been practiced in India for over 4000 years and there are many ancient books that depict the healing properties behind the practice (5).
- Lately yoga has been put under scientific evaluation as to whether or not the practice will actually rid the body of communicable diseases such as Diabetes.



Research has suggested that yoga's contribution to stress reduction actually may moderate the impact of diabetes. High levels of stress hormones have been shown to raise blood glucose levels, promote overeating, lead to the accumulation of intra-abdominal fat, contribute to insulin resistance, and boost heart attack risk. By reducing stress hormone levels, yoga can minimize these side effects.

Enhancement of Cardiac Vagal Activity

- In 2008 in India a study was done to assess the insulin sensitivity and cardiac autonomic function in long-term practitioners of yoga.
- 15 healthy young male practitioners of yoga were compared to 15 young healthy males who did not practice yoga matched for body mass index.
- There were no significant differences between the groups in their body measurement or body composition. However the fasting plasma insulin was significantly lower in the yoga group and the yoga group was also more insulin sensitive.(4)

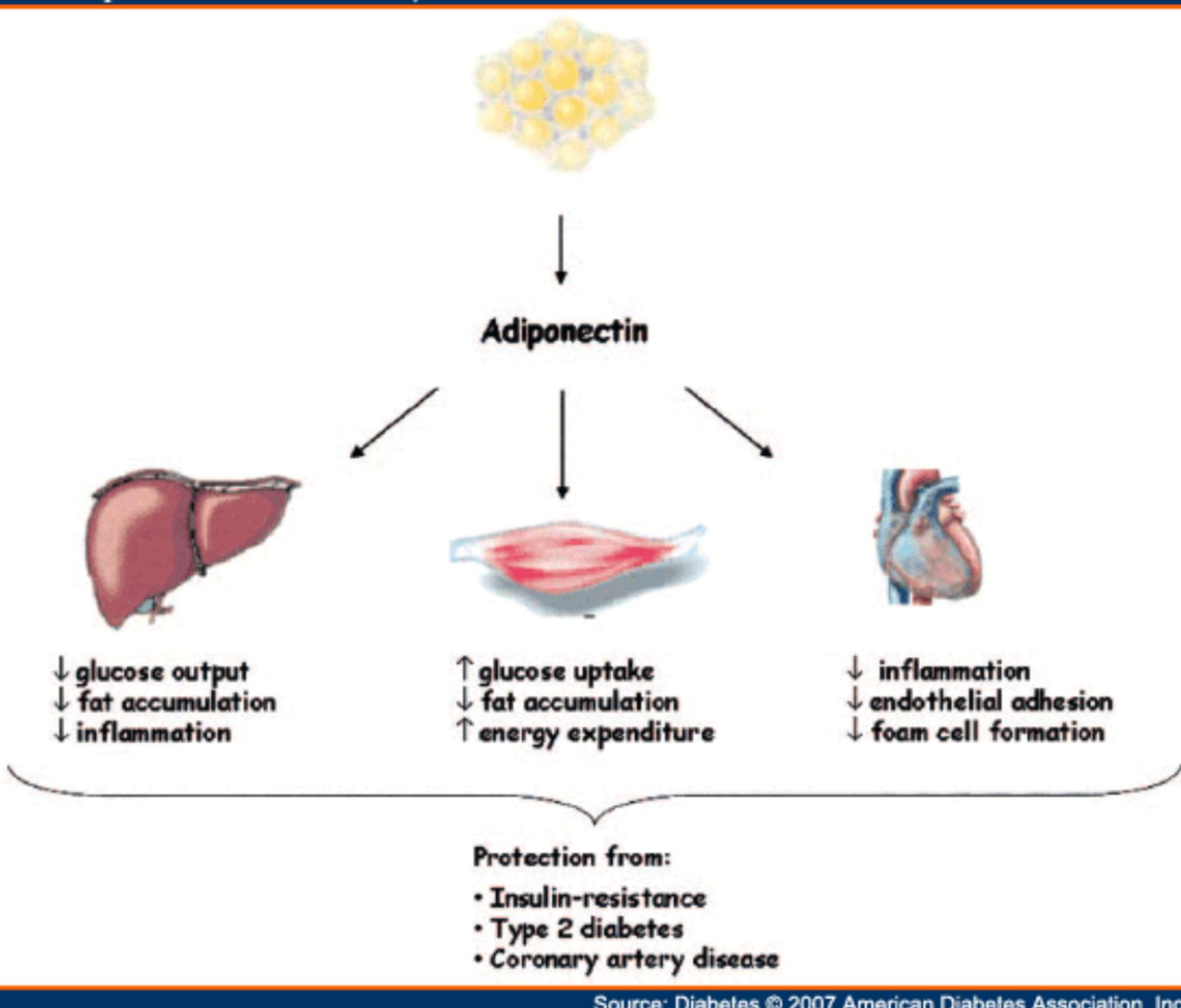
- **Yoga enhances cardiac vagal activity (the action of the vagus nerve; the 10th cranial nerve, which relays information between the brainstem and most of the internal organs) and reduces sympathetic activity (stimulates the fight or flight response) and increases parasympathetic activity (rest and digest response).**
- **In conclusion those who practice yoga over a long period of time have better glucose disposal and Insulin Sensitivity irrespective of their body weight and composition. (4)**

Increase Adiponectin Release

- Yoga's effects increase the release of an adipocyte-derived hormone called adiponectin.
- Adiponectin decreases Insulin Resistance by decreasing triglyceride content in muscle and the liver. This effect results from increased expression of molecules involved in both fatty-acid combustion and energy dissipation in muscle. (5)

- In 2012 a study was done on sixteen postmenopausal obese Korean women with more than 36% body fat to analyze the effects of yoga exercise on serum adiponectin and metabolic syndrome factors.
- Body weight, percentage of body fat, lean body mass, body mass index, waist circumference, and visceral fat area had significantly decreased.
- HDL cholesterol and adiponectin had significantly increased, but total cholesterol, triglyceride, LDL cholesterol, blood pressure, insulin, glucose, and homoeostasis model assessment-insulin resistance had significantly decreased. (5)

- Serum adiponectin concentrations were significantly correlated with waist circumference, HDL cholesterol, diastolic blood pressure, and homoeostasis model assessment-insulin resistance in the post-yoga exercise group.
- These findings indicated that yoga exercise improves adiponectin level, serum lipids, and metabolic syndrome risk factors in obese postmenopausal women (5).



Help in Prevention of Type 2 Diabetes

- In 2007 a study was done to assess the role of yogic practices on glycemic control, insulin kinetics, body composition, exercise tolerance, and various co-morbidities like hypertension and dyslipidemia.
- 28 type 2 diabetics and 4 type 1 diabetics were studied for one month. They practiced 4 types of Pranayama for 30 minutes followed by Shavasana for 15 minutes. Patients developed a sense of well being within 7 to 10 days and showed a significant fall in fasting and post-prandial blood glucose values.
- In 4 of 17 patients the requirement of drugs came down significantly. There was normalization of the insulin glucose ratios in 5 of these 28 type 2 diabetic patients. (6)

- **Yogic practices in all these studies have produced an increase in the lean body mass and decrease in body fat percentage. This leads to an improvement in insulin sensitivity and reduction in Insulin Resistance. Insulin Resistance is the major abnormality in type 2 diabetes and precedes the development of overt diabetes by several years.**
 - **Reduction in free fatty acid levels reduces lipotoxicity, which has a significant effect on beta cell function. Therefore it is reasonable to postulate that the beneficial effects of yoga on insulin kinetics and lipid metabolism prevents beta cell exhaustion and development of a beta-cell secretory defect, preventing development of type 2 diabetes.**
- (6)

- In the last few years, new clinical studies and reviews have been published on yoga and diabetes, providing more evidence of its benefits. The most recent study found that three months of yoga along with standard care significantly reduced BMI and improved glycemic control compared with standard care alone.
- Another study reported that after 40 days of yoga, adults with type 2 diabetes experienced significant reductions in their BMI and anxiety as well as improved general well-being. Three of these adults, at high risk for type 2 diabetes, experienced improvements in weight, blood pressure, insulin control, and triglycerides upon completion of the yoga regimen, compared to a group of patients receiving only diabetes education materials. (7)

Beneficial Yoga Poses

Yoga poses that may be particularly beneficial for type 2 diabetes patients:

- ***Seated spinal twist*** massages the kidneys, pancreas, stomach, gallbladder, liver, and small intestines, stimulating digestion and regulating insulin, bile, and adrenaline secretion.
- ***Seated forward bend*** promotes the functioning of internal organs, including the kidneys, pancreas, and liver.

- *Child's pose* regulates circulation, promotes relaxation, and relieves fatigue and stress.
- *Locust pose* helps digestion and supports the pancreas and liver.
- *Standing balance poses, shoulder stand, plough, and the sun salutation* series stimulate endocrine glands and regulate metabolism. They require a higher level of fitness, however, and without certain modifications and proper instruction aren't appropriate for beginners or those who have physical limitations (7).

Overview of Yoga's Benefits

- Reduces Insulin Resistance
- Decreases fasting blood glucose levels
- Lower blood pressure
- Improve cholesterol and triglycerides
- Reduce the need for diabetes medication
- Lower stress hormone levels
- Increases flexibility and strength
- Improves balance and immune function
- Precipitates weight loss
- Relieves stress
- Alleviates chronic pain (7)

Quiz Time

1. The condition where the body produces insulin, but does not use it effectively or cannot use it at all is called:
 - A. Myxedema
 - B. Insulin Resistance
 - C. Diabetes Insipidus
 - D. Insulin Shock

B. Insulin Resistance

2. What percentage of Diabetics have Type 2 Diabetes?:
- A. 90%
 - B. 52%
 - C. 77%
 - D. 25%

A. 90%

3. What decreases Insulin Resistance by decreasing triglycerides content in muscle and the liver?
- A. Calcitonin
 - B. Dopamine
 - C. Adiponectin
 - D. Melatonin

C. Adiponectin

4. Which yoga pose is the most beneficial for regulating Insulin?
- A. Seated Spinal Twist
 - B. Child's Pose
 - C. Locust Pose
 - D. Sun Salutation

A. Seated Spinal Twist

References

1. Stoppler, Melissa Conrad, MD. "Insulin Resistance Syndrome: Facts about Symptoms." MedicineNet.
2. Singh, Savita, Tenzin Kyizom, K. P. Singh, O. P. Tandon, and S. V. Madhu. "Influence of Paranayamas and Yoga-Asanas on Serum Insulin, Blood Glucose and Lipid Profile in Type 2 Diabetes." *Indian Journal of Clinical Biochemistry* 23.4 (2008): 365-68
- 3.. Chaya, M. S., G. Ramakrishnan, R. P. Kishore, H. Nagendra, T. Raj, T. Thomas, and A. V. Kurpad. "Insulin Sensitivity and Cardiac Autonomic Function in Young Male Practitioners of Yoga." *The National MEdical Journal of India* 21.5 (2008): 217-21.
- 4.. Lee JA, Kim JW, Kim DY. Menopause. 2012 Mar;19(3):296-301. doi: 10.1097/gme.0b013e31822d59a2. Erratum in: Menopause. 2012 Apr;19(4):486.
5. Sahay, B. K. "Role of Yoga in Diabetes." *Japi* 55 (2007): 121-26. Web.
6. Precautions, Take. "Strike the Perfect Pose—Research Shows Yoga Can Stabilize Blood Sugar in Diabetes Patients By Jennifer Van Pelt, MA Today's Dietitian Vol. 14 No. 1 P. 12."

Yoga's Benefits
- Stress
- Blood glucose levels
- Cholesterol
- Triglycerides
- Diabetes medication
- Blood pressure
- Strength
- Immune function
- Mood (7)

Help in Prevention of Type 2 Diabetes

- In 2007 a study was done to assess the role of yoga practices on glycemic control, insulin kinetics, body composition, exercise tolerance, and various cardiovascular risk type 2 diabetes patients.
 - 28 type 2 diabetics and 14 type 1 diabetics were studied for one month. They practiced 4 types of Pranayama for 30 minutes followed by Shavasana for 15 minutes. Patients developed a sense of well being within 7 to 10 days and showed a significant fall in fasting and post-prandial blood glucose values.
 - In 4 of 17 patients the requirement of drugs came down significantly. There was normalization of the insulin glucose ratios in 5 of these 28 type 2 diabetic patients. (6)

- Yoga practices in all these studies have produced an increase in the lean body mass and decrease in body fat percentage. This leads to an improvement in insulin sensitivity and reduces the risk of developing Type 2 Diabetes due to major abnormalities in type 2 diabetes and prevents the development of overt diabetes by several years.
- Reducing stress and anxiety levels reduces inflammation, which has a significant effect on beta cell function. Therefore it is reasonable to presume that the beneficial effects of yoga are mainly due to its ability to reduce metabolism, prevent beta cell exhaustion and development of a beta-cell secretory defect, preventing development of type 2 diabetes. (6)

Beneficial Yoga Poses

Yoga poses that may be particularly beneficial for type 2 diabetes patients:

- **Seated spinal twist** massages the kidneys, pancreas, stomach, gallbladder, liver, and small intestines, stimulating digestion and regulating insulin, bile, and adrenaline secretion.
- **Seated forward bend** promotes the functioning of internal organs, including the kidneys, pancreas, and liver.

Improves circulation,
relieves tension
and relieves
stress on the heart
and liver.
- **Child's pose, shoulder
stand, and the sun salutation**
stimulate glands and
organs. They require a
lot of strength, however,
and are not appropriate for
those who are not physically
able to perform them.

Enhancement of Cardiac Vagal Activity

- In 2008 in India a study was done to assess the insulin sensitivity and cardiac autonomic function in long-term practitioners of yoga.
 - 15 healthy young male practitioners of yoga were compared to 15 young healthy males who did not practice yoga matched for body mass index.
 - There were no significant differences between the groups in their body measurement or body composition. However the fasting plasma insulin was significantly lower in the yoga group and the yoga group was also more insulin sensitive.(4)

Research has suggested that yoga's contribution to stress reduction actually may moderate the impact of diabetes. High levels of stress hormones have been shown to raise blood glucose levels, promote overeating, lead to the accumulation of intra-abdominal fat, contribute to insulin resistance, and boost heart attack risk. By reducing stress hormone levels, yoga can minimize these side effects.

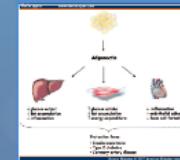
What is insulin resistance?

Type 2 Diabetes

- Type 2 Diabetes makes up 90% percent of individuals who have diabetes typically due to obesity and physical inactivity.
- Type 2 Diabetes is a result from the pancreas being unable to use insulin effectively (World Health Organization).
- According to Singh et al., India has one of the highest percentages of Type 2 Diabetes in the world, estimated 75m plus by 2030 (1).
- Persons with Type 2 Diabetes have difficulty processing insulin, along with being hyperglycemic (G).

Insulin Resistance and Yoga

Ashley Freidel
Carliana Carpenter
Courtney Rokowski
Kristin Costanzo



How can we manage insulin resistance before it develops into type 2 Diabetes?

- In 2012 a study was done on sixteen postmenopausal obese Korean women with more than 36% body fat to determine the effects of yoga exercise on serum adiponectin and metabolic syndrome factors.
 - Body weight, percentage of body fat, lean body mass, body mass index, waist circumference, and visceral fat area had significantly decreased.
 - HDL cholesterol and adiponectin had significantly increased, but total cholesterol, triglyceride, LDL cholesterol, blood pressure, insulin, glucose, and homeostasis model assessment-insulin resistance had significantly decreased. (5)

Increase Adiponectin Release

- Yoga's effects increase the release of an adipocyte-derived hormone called adiponectin.
- Adiponectin decreases insulin resistance by decreasing triglyceride content in muscle and the liver. This effect results from increased expression of molecules involved in both fatty-acid combustion and energy dissipation in muscle. (5)

For our presentation we looked into the effects of the practice of yoga on individuals with Insulin Resistance and Type 2 Diabetes, focusing in on as to whether or not the practice would benefit them with both short and long term effects.

Type 2 Diabetes

Overweight
Smoking
Sedentary Lifestyle
High Fat and Cholesterol Levels