

FTO GENE VARIANT



FTO, also known as the **human fat-mass and obesity associated** gene, is found on chromosome 16 and is one of the strongest risk factors for obesity. Individuals with both variant genes are likely to have a 1.7x increased risk of developing obesity compared to individuals not carrying this gene variant. FTO appears to play a key role in regulating energy metabolism although the actual way it does that is not clear yet. One theory is that the FTO gene is involved in making ghrelin, the hormone that stimulates feelings of hunger. If ghrelin is still produced *even after eating a regular meal*, then the brain gets the signal to keep eating; it is therefore easy to consume more food than needed. This risk may be seen in a preference for high calorie foods, in having a difficult time recognizing when enough food has been eaten, coming back for seconds and thirds on a regular basis.

DETAILED DIETARY RECOMMENDATIONS

- 1. Eat five or more small meals a day.** FTO carriers do best eating several small, portion controlled small meals in a day. Eating smaller meals more frequently will promote the feeling of fullness and reduce overeating. Frequent small meals will also keep metabolism high and will minimize the biochemical effect that the FTO variant has on the brain. This small change helps control cravings and increase weight loss success.
- 2. Eat a higher amount of calories from protein and a lower amount of calories from fat.** For the best results 25% of daily calories should be from protein and 20% should come from fat, leaving 55% of daily calories from carbohydrates.
- 3. Choose vegetables and fruits as the main source of carbohydrates.** FTO carriers thrive on a Mediterranean type diet where there is a high intake of vegetables and fruits to provide lots of fiber. Eat at least 5 servings of vegetables and 3 servings of fruit daily.

Top Tips:

Living With The FTO Gene Variant

- *Portion control is very important as this variant results in reduced feelings of satiety which increases the risk of eating more than is needed.*
- *Eat five small meals each day to burn more calories and to help control hunger.*
- *Reduce net calorie intake to 60% of the calories needed to maintain weight.*
- *Eat a higher amount of protein (25% of calories) and a lower amount of fat (20% of calories).*
- *Choose polyunsaturated and monounsaturated sources of fat and avoid saturated fats.*
- *Choose vegetables and fruit with skins as the main carbohydrate sources.*
- *Exercise at a moderate intensity for 30 minutes 5 - 7 days a week.*



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4. **Avoid saturated fat and trans-fats.** These fats are not only bad for heart health but they are also more likely to cause FTO carriers to gain weight. Saturated fat is found in animal based fats: fat in meat, poultry skin, and butter. Trans-fats are found in margarine, pastries, and candies. Choose plant based fats instead: olive oil, nuts, seeds, and avocado, but keep overall fat intake down for the best results.

5. **A low calorie diet is important for weight loss in FTO carriers.** FTO protein levels decrease when net calorie intake is lowered to 60% of the calories the body needs in a day. This is an unusual feedback mechanism: the lower the food amount, the lower the protein signaling levels that come from the FTO gene, and therefore the lower the feelings of hunger. Keeping food intake at 60% of needs can be achieved through a combination of careful food choice and exercise.

6. **How to calculate calorie needs:** Net calorie intake is the total calories eaten minus any calories burned through activity.

(Dietary Calories – Calories Burned During Activity = Net Calorie intake)

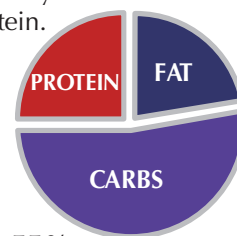
First – calculate the activity level using one of the following equations:

- A) For sedentary individuals multiply body weight in pounds x 10. OR
- B) For moderately active (3 aerobic sessions per week) multiply body weight in pounds x 13. OR
- C) For active individuals (5-7 aerobic sessions per week) multiply body weight x 15.

To maintain a healthy metabolism *never eat less than 1200 calories daily*. If 60% of calories is below 1200, it is important that the difference be made up through physical activity. However, at every size the greater the exercise, the greater amount of calories can be eaten as long as it remains in the preferred ratio.

Protein 25%

1200 calorie per day diet:
60 grams of protein.



Fat 20%

1200 calorie per day diet:
25 grams of fat.

Carbohydrates 55%

1200 calorie per day diet: 165 grams of carbohydrates.

FTO CARRIERS DAILY CALORIE CALCULATIONS BY BODY WEIGHT - SEDENTARY

Body Weight (pounds)	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Basal Metabolic Rate (Sedentary)	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000
60% Calories	900	960	1020	1080	1140	1200	1260	1320	1380	1440	1500	1560	1620	1680	1740	1800
Daily Calories	1200	1260	1320	1380	1440	1500	1560	1620	1680	1740	1800	1860	1920	1980	2040	2100
Minimum Daily Calories Burned Through Exercise	300 to 500 calories daily, can spread this over the week but aim for a minimum of 5 exercise days a week. 500 calories x 7 days of exercise = 3500 calories in a week (the same number of calories in a pound of fat).															

PHYSICAL ACTIVITY RECOMMENDATIONS

Daily exercise is important to burn calories and to moderate FTO expression in the body.

Perceived Level of Exertion: “Feels like” moderate effort. Similar to a brisk walk on an incline. Moderate exercise is very important for successful weight loss with this variant. The best results are seen at 150 - 210 minutes of moderate intensity exercise per week. This equals 30 minutes of exercise 5 - 7 days a week. A recommended amount will be around 300 calories burned per day in moderate exercise. Exercise has been shown to reverse the effect that FTO has on an individual’s tendency to gain weight, so moving the body regularly is vital.

Maximum Heart Rate (MHR): Exercise at an upper moderate intensity (70 - 80% of MHR) for the majority of the workout. Adding quick 1 - 2 minute bursts of hard intensity (80 - 90%) of MHR will give a quick boost to overall calories burned.