

PROTEIN CALCULATOR

Methodology

The Protein Calculator is a tool was developed by Roam to help you estimate your daily protein requirements. Its purpose is to empower you to make informed dietary decisions based on your specific protein needs.

This tool is based on scientific research; however, it has certain limitations. For example:

- The estimated daily calories will vary depending on whether you want to gain, lose, or maintain weight. But the estimated range for protein intake remains the same.
- In certain situations, it may be preferable to increase your protein intake beyond the “**protein you should aim for**” value. This can be relevant if you aim to increase muscle mass or if you are focused on weight loss.
- The protein needs of young children, pregnant individuals, and older adults may differ from the calculator’s recommendations. It is important to consider individual circumstances and consult with a healthcare professional for specific dietary advice in these cases.

Now, let's explain how we calculate your calorie needs (Resting Energy Expenditure and Daily Energy Expenditure) and protein requirements.

Resting Energy Expenditure (REE)

The resting energy expenditure or resting metabolic rate (RMR) is the amount of energy your body needs to maintain basic physiological functions at rest.

We estimate REE using an equation that considers your **age, weight**, your **gender** and **height**. Our calculation is based on the equation developed by *ten Haaf et al. (2014)* that has been validated for active individuals and athletes.

$$\begin{aligned}
 REE \text{ (kCal per day)} &= 11.936 \times \text{weight(kg)} + 587.728 \times \text{height(m)} - 8.129 \times \text{age(years)} \\
 &+ 191.027 \times \text{sex} \text{ (M = 1, F = 0)} + 29.279
 \end{aligned}$$

The most accurate way to estimate your REE is through expensive gas analysis equipment in physiology labs. This method requires specific environmental conditions, fasting, and being well-rested.

Estimated Daily Energy Expenditure

Your estimated daily expenditure is a function of your Resting Energy Expenditure, your Physical Activity Level (PAL) and weight goals (maintain, gain, or lose):

$$\begin{aligned} & \text{Estimated Daily Energy Expenditure (kCal per day)} \\ & = REE \times PAL \times \text{Weight Goal (Maintain = 1, Gain = 1.15, Lose = 0.85)} \end{aligned}$$

For the 'weight goal' component, we assume that you should increase or decrease your daily calorie intake by 15% to gain or lose weight at a rate that would not compromise your health.

Physical Activity Level (PALs)

PAL is a measure of the physical activity an individual engages in relative to their total energy expenditure. It is commonly used in nutrition and exercise science to estimate an individual's daily energy needs.

Your Daily Energy Expenditure is calculated by multiplying your Resting Energy Expenditure by a PAL value.

For sedentary people, the PAL value is usually 1.2, indicating they don't burn much excess energy beyond their basic metabolic needs. However, PAL for endurance athletes can be higher than 2.0, which means high daily energy demands.

The amount of exercise we each engage in varies, making physical activity-related energy expenditure the most variable component of total energy expenditure.

It's important to note that these PAL values are general guidelines, and individual variations and circumstances can influence the PAL value. Numerous studies attempt to predict PAL for different activity levels.

To define physical activity levels, we categorised them into groups as follows:

Physical Activity Level group	PAL Score
Sedentary	1.2
Low active	1.5
Moderate active	1.75
Active	2.15
Highly active and competitive	2.4

For detailed information on each PAL group and the research behind the associated PAL scores, please refer to [Appendix A](#).

Daily protein intake targets based on PAL

To determine your protein intake targets, we consider your body weight, PAL, and specific protein measure (grams of protein per kilogram of body mass) that we assign to each PAL group. These measures have been determined by considering a range of scientific research.

Please refer to [Appendix B](#) for more information on this research.

$$\text{Upper Protein Target (grams protein per day)} = \text{Weight (kg)} \times \text{Upper Protein Measure}$$

$$\text{Lower Protein Target (grams protein per day)} = \text{Weight (kg)} \times \text{Lower Protein Measure}$$

The protein factors for each PAL group are outlined in the table below:

PAL Group	Upper Protein Measure	Lower Protein Measure	Reference
	(g protein / kg body mass)		
Sedentary	1.0 grams	1.2 grams	<i>Kerksick et al.</i>
Low active	1.2 grams	1.4 grams	<i>Rodriguez et al.</i>
Moderately active	1.4 grams	1.6 grams	<i>Kerksick et al. & Rodriguez et al.</i>
Active	1.4 grams	2.0 grams	<i>Jager et al.</i>
Highly active	1.7 grams	2.2 grams	<i>Kerksick et al.</i>

APPENDIX A

Physical Activity Level Group	Reference
<p>Sedentary</p> <p>PAL score 1.2: PAL score range 1.0 to 1.4</p> <p>Individuals who have minimal physical activity beyond what is required for daily living. They engage in mostly sedentary behaviours such as desk jobs, watching TV.</p>	<p>Tremblay, M. S. et al. (2017). https://doi.org/10.1186/s12966-017-0525-8</p>
<p>Low active</p> <p>PAL score: 1.5 PAL score range: 1.4 to 1.59</p> <p>Individuals who participate in some physical activity, but it is insufficient to meet the recommended guidelines for health benefits (30 minutes of moderate intensity exercise 5 times per week). They may engage in light activities such as light household chores, occasional walking, or a minimal exercise routine.</p>	<p>Haskell, W. L. et al. (2007). https://doi.org/10.1249/mss.Ob013e3180616b27</p>
<p>Moderately active</p> <p>PAL score: 1.75 PAL score range 1.6 to 1.89</p> <p>Individuals who engage in moderate-intensity activities on most days of the week, or at least 30 minutes of moderate intensity exercise at least 5 times per week. They may participate in activities such as fast walking, jogging, hiking, cycling, or recreational sports.</p>	<p>Physical Activity Guidelines Advisory Committee. (2018). Physical Activity Guidelines Advisory Committee Scientific Report.</p>
<p>Active</p> <p>PAL score: 2.15 PAL score range: 1.9 to 2.4</p> <p>Individuals who engage in regular physical activity at a higher intensity level. They would exercise 5 to 7 times per week for more than 30 minutes and would include 1 or 2 high intensity sessions during the week. They may participate in activities such as running, swimming, CrossFit, or vigorous team sports.</p>	<p>Ainsworth, B. E. et al. (2011). https://doi.org/10.1249/MSS.Ob013e31821ece12</p>
<p>Highly active</p>	<p>Black A. E. (2000). https://doi.org/10.1038/sj.ejcn.1600971</p> <p>Institute of Medicine (US) Committee on Military Nutrition Research. (2006). Nutrient Composition of Rations for Short-Term, High-Intensity Combat Operations.</p>

APPENDIX B

In the interest of full transparency, we provide the papers and relevant statements that informed our protein factor estimates:

Statement	Reference
<p>“Current data suggest that dietary protein intake necessary to support metabolic adaptation, repair, remodelling, and for protein turnover generally ranges from 1.2 to 2.0 g/kg/d”</p>	<p>Thomas, D. T. et al. (2016). https://doi.org/10.1249/MSS.0000000000000852</p>
<p>“The overall daily protein intake in the range of 1.4-2.0 g protein/kg body weight/day (g/kg/d) is sufficient for most exercising individuals”</p>	<p>Jäger, R. et al. (2017). https://doi.org/10.1186/s12970-017-0177-8</p>
<p>“Protein recommendations for endurance and strength-trained athletes range from 1.2 to 1.7 g/kg”</p> <p>“Protein requirements are slightly increased in highly active people. Protein recommendations for endurance athletes are 1.2 to 1.4 g/kg body weight per day, whereas those for resistance and strength-trained athletes may be as high as 1.6 to 1.7 g/kg body weight per day.”</p>	<p>Rodriguez, N. R. et al. (2009). https://doi.org/10.1016/j.jada.2009.01.005</p>
<p>“Non-exercising, older individuals (53–71 years) may also benefit from a higher daily protein intake (e.g., 1.0–1.2 g/kg/day of protein)”</p> <p>“For building and maintaining muscle mass, an overall daily protein intake of 1.4–2.0 g/kg/d is sufficient for most exercising individuals”</p> <p>“It is recommended that athletes involved in moderate amounts of intense training consume 1.2–2.0 g/kg/day of protein”</p> <p>“Athletes involved in high volume, intense training consume 1.7–2.2 g/kg/day of protein”</p>	<p>Kerksick, C. M. et al. (2018). https://doi.org/10.1186/s12970-018-0242-y</p>

OTHER REFERENCES

ten Haaf, T., & Weijs, P. J. (2014). <https://doi.org/10.1371/journal.pone.0108460>

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