Athlete quantitative analysis of consumption: macro and micronutrient: functional interventions

Leo Fischer Analysis of Athlete Ellie

Ellie's highest RMR estimate is 1735 kcal/day from the DeLorenzo equation and lowest RMR estimate is 1460 kcal/day from the Katch-McArdle equation.

Ellies EAT, exercise activity thermogenesis, is around 400 kcal/day based off her average three mile runs 3 days a week, with some resistance training.

Ellies NEAT, non-exercise activity thermogenesis, is around 400 kcal/day

Ellies TEF, thermic effect of food, is around 200 kcal/day

Total estimated TDEE, total daily energy expenditure, is around 2460 kcal/day with the lowest estimated RMR. [1]

22 years old
5'8" or 172.72 cm or 68 in (2.54 cm per 1 in)
Weight 140lb or (63.5029 kg)
19% body fat calculated by ultrasound /Body Metrix
22% body fat calculated by Skulpted
20.5% average body fat based off two measurements

Ellie's Food Journal

Sunday Nov 5	**Monday Nov 6**	**Tuesday Nov 7**
8 oz water	8 oz water	16 oz water
½ banana	½ tbs butter	½ tbs butter
1tbs peanut butter	½ tbs strawberry preserves	½ tbs strawberry preserves
8 oz water	1 slice sourdough bread, toasted	1 slice sourdough bread,
12 oz coffee, black	1 egg, scrambled	toasted
turkey sandwich (1/2) –	8 oz water	2 tbs raw hemp seeds
ciabatta, roasted red peppers,	1 banana	¼ cup greek yogurt, plain
turkey, brown mustard,	¾ cup pineapple, frozen	3 tbs honey
tomato, avocado, red onion,	1 cup spinach, fresh	¼ cup blueberries, frozen
pickle quarter	¾ cup orange juice	8 oz water
TJ's dark chocolate PB cups – 7	3 tbs raw hemp seeds	16 oz water
16 oz water	½ cup coconut water	½ c brown rice

[1] Aragon, Alan & Schoenfeld, Brad & Wildman, Robert & Kleiner, Susan & VanDusseldorp, Trisha & Taylor, Lem & Earnest, Conrad & Arciero, Paul & Wilborn, Colin & Kalman, Douglas & Stout, Jeffrey & S. Willoughby, Darryn & Campbell, Bill & Arent, Shawn & Bannock, Laurent & Smith-Ryan, Abbie & Antonio, Jose. (2017). International society of sports nutrition position stand: Diets and body composition. Journal of the International Society of Sports Nutrition. 14. . 10.1186/s12970-017-0174-y.

1/3 cup hash browns, homemade 1 egg, fried 2 oz cheddar cheese 2 tbs black beans 1 tbs salsa authentica – Trader Joe's 8 oz water 1 cup lentil pasta ¼ cup onion ½ cup tomato sauce ¼ cup mushrooms 3 oz chocolate – Tony's Chocolonely 16 oz water 4 oz red wine ½ pomegranate 1 cup popped popcorn, air popped ½ tbs butter, grassfed, salted	4 walnut/date/cocoa/coconut oil energy balls – see below* 16 oz water ¼ cup sunflower seeds 16 oz water, heated with fresh ginger, lime wedge, splash coconut water ½ tomato sliced 1 tbs feta 1 tbs balsamic vinegar ½ tbs olive oil ½ c brown rice 4 oz ground beef, 90% lean, grassfed 2 tbs salsa 1/3 cup bell peppers 1/3 cup onion ¼ cup pepper jack cheese 3 Peanut butter cookies (recipe makes 24 – 1 c PB, 1 c sugar, 1 egg) 16 oz water 8 oz water	4 oz ground beef, 90% lean, grassfed 2 tbs salsa 1/3 cup bell peppers 1/3 cup onion ¼ cup pepper jack cheese 24 oz water 12 oz coffee 1 tbs butter, grassfed, salted ½ avocado 1 tbs black beans 1 tbs cotija cheese 1 tbs raw pumpkin seeds 1 oz cilantro leaves, raw 2 oz tomato .33 oz lime juice 2 Tbs beet hummus 1 stalk celery 3 slices cucumber 3 oz tempeh, cooked 3 wheat crackers 3 tbs peanut sauce (PB, garlic, ginger, chilis, coconut milk) 3 tbs hummus 16 oz water 1 c chili ¼ c pepper jack cheese cinnamon roll

Methods

Used the software NutritionData to analyze the nutrition from each whole day and % are based off general RDAs. Important information is selected below. The whole analysis is from each day is also attached.

Day One	**Day Two**	**Day Three**
Calories 2423 kcal **Carbs** 1044 kcal %43 of TEC **Protein** 87.4 g **Fats** 955 kcal %40 of TEC **Omega 3 to Omega 6 Ratio** 1/13 **Low Vitamin or Minerals** Iron %61 Calcium %78 Vitamin D %7	**Calories** 1916 kcal **Carbs** 759 kcal %39 of TEC **Protein** 80g **Fats** 837 kcal %43 of TEC **Omega 3 to Omega 6 Ratio** 1/9 **Low Vitamin or Minerals** Vitamin D %5 Vitamin E %44 Pantothenic Acid %38	**Calories** 2610 kcal **Carbs** 1011 kcal %39 of TEC **Protein** 119g **Fats** 1133 kcal % 43 of TEC **Omega 3 to Omega 6 Ratio** 1/12 **Low Vitamin or Minerals** Vitamin D %2 Vitamin E %65 Vitamin B12 %66

Zinc %51 Vitamin B12 %23 Thiamin %51 Vitamin E %42 Pantothenic Acid %52 **Water** 60oz from beverages + 25oz from food	B12 %67 Calcium %46 Copper %55 **Water** 72oz from beverages + 29oz from food	**Water** 35oz from food + 92 oz from beverages

Discussion

Vitamins and Minerals

Ellie consistently shows low in a few vitamins.

Vitamin D was below 7% each day. Based on her subjective interview Ellie is outside a lot during the summer and probably has enough Vitamin D stores built up in the summer from the sun. She also sometimes eats meat products which contain small amounts of vitamin D and based on the bodies recycling and use of Vitamin D there is no reason to be concerned. That is also the case with Ellie's low levels of vitamin b12. If Ellie feels there might be a possible, concern she can pop a vitamin pill once a month or so and target seafood.

Ellie was low on Vitamin E out of all three days, which is weird because it is also one the least common vitamin deficiencies since it is found in most processed fats like processed vegetable oils. Targeting whole foods like, grain, nuts and seeds will be the best way to increase levels of vitamin E.

Omega 3 to Omega 6 ratio

Most research says that a ratio of 1 to 4 is ideal. Supposedly the lower the ratio, the better anti-inflammation protection and reduced prevalence of heart disease research seems to suggest. Evidence to support this theory is still debated.

Timing

Not enough information was given to make an assessment on timing of food consumption based around workout periods. Usually calories and protein should be consumed about 3 hours before and right after workout periods.

TDEE

Met 2 out of the three days based on estimated TDEE. Caloric intake for Ellie is acceptable at the low range of her estimated RMR. At the high and middle range of her estimated RMR her TEC does not meet Ellies estimated TDEE. Ellie might see higher athletic performance by increasing her TEC.

Fat

Ellie consistently ate more than %40 of daily calories as fat. Although some people and guidelines say lipid content should not exceed 30% there is no evidence for this, and large amounts of counter

evidence. As long as fats are from healthy sources, such a whole foods and mostly plant based, there is no reason to be concerned. Evidence includes the recent research study "Prospective Urban Rural Epidemiology" conducted in 18 countries for 10 years. Countries and blue zones with highest average life expectancy have high fat diets that also create nutrition paradoxes, including most researched France, Switzerland, Netherlands, Sweden and Spain.

Protein [2], [3]

New IAAO methodology for determining protein requirements says recommendation might be around 1.2 g/kg/day. Which would mean Ellie should be eating around 75g of protein a day, which she easily meets.

ISSN has reviewed research and determined that athletes who want to increase training adaptation to exercise, can safely consume between 1.4 – 2.0 of protein per kg of body weight a day and have small but noticeably statistically significant result in muscle building performance. Note* these are only short-term studies, long-term very high protein diets have not been looked at by the ISSN regarding longevity and potential health consequences.

The average of the high protein lifestyles for an athlete is around 1.6g/kg/d. Which would mean Ellie should consume around 102g of protein a day if she desires to try a very high protein diet for muscle building. Ellie met or exceeded 102g of protein on one of the three days of her food journal.

Leucine[4],[5]

According to lecture and the studies referenced, leucine is a key component to muscle synthesis, recovery and degradation protection. Studies have shown that consumption of 5g or more of leucine provides better muscle synthesis, even with lower levels of total protein intake. If Ellie is interested in potentially building more muscle, try targeting the most common whole foods highest in leucine. Beans, Seeds, seafood, Seaweed, Cheese

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[2] Campbell, Bill & Kreider, Richard & Ziegenfuss, Tim & La Bounty, Paul & Roberts, Michael & Burke, Darren & Landis, Jamie & Lopez, MD, CSCS, FAAPMR, Hector & Antonio, Jose. (2007). International Society of Sports Nutrition Position Stand: Protein and Exercise. Journal of the International Society of Sports Nutrition. 4. 8. 10.1186/1550-2783-4-8.

[3] Erratum for Marini. Protein requirements: are we ready for new recommendations? J Nutr 2015;145:5–6. *The Journal of Nutrition*. 2015;145(4):839. doi:10.3945/jn.115.210245.

[4] Churchward-Venne TA, Breen L, Di Donato DM, et al. Leucine supplementation of a low-protein mixed macronutrient beverage enhances myofibrillar protein synthesis in young men: a double-blind, randomized trial. *Am J Clin Nutr. 2014;99*(2):276-286.

[5] J Nutr. 2006 Feb;136(2):533S- 537S.
Leucine regulates translation initiation of protein
synthesis in skeletal muscle after exercise.
Norton LE, Layman DK.