

Forside

The **IBI 217- Nutrition and Physical Activity** exam consists of two parts;

Part 1: Consist of multiple choice questions in general nutrition and has to be answered by all students.

Part 2: This part is divided between two fields of specialization: "*Specialization in nutrition and health*" and "*Specialization in sports nutrition*". You are to pick one of the specializations and answer all questions linked to that field. Follow the instructions given at the end of Part 1 and make sure you answer your desired specialization.

For multi-response tasks you will get one minus point for wrong answers. For tasks with just one answer only you will get 0 points for incorrect answers. There can be 1-3 correct alternatives per question.

Leave the specialization that you do not want to answer blank.
You cannot mix the specializations questions.

Carbohydrates

Where are carbohydrates stored in our body?

- In liver and muscles
- There are no good storage opportunities for carbohydrate
- In liver and kidneys
- In the subcutaneous fat tissue
- In the core region (central adiposity)

What are good foodsources for carbohydrates?

- White cheese
- Pasta
- Lean fish
- Liver
- Banana
- Bread

What is true about dietary fiber?

- Dietary fiber improves gut motility
- Dietary fiber is energydense
- Dietary fiber can reduce risk of cardiac disease and cancer
- Dietary fiber has antioxidant properties

Which of the following are carbohydrates:

- Alanine
- Pyruvate
- Monosaccharides
- Leucine
- Aminoacids
- Galactose
- Fructose
- Acetyl-CoA

The role of insulin in metabolism:

- Is to stimulate lipolysis and fat metabolism
- Is to stimulate cellular uptake of glucose
- Is to absorb carbohydrates from the digestive tract
- Is to increase carbohydrate availability in plasma

Energy

Individual needs of energy to cover basal metabolic rate, are dependent on:

- Physical fitness, body weight, body height and age
- Body size, body composition, gender, age
- Age, gender, level of physical activity
- Gender, BMI, age

Energy content of proteins, is

- 9 kcal / gram (38 kJ)
- 5 kcal / gram (21 kJ)
- 7 kcal / gram (29 kJ)
- 4 kcal / gram (17 kJ)

A fooditem consists of 12g carbohydrate, 10 gram protein, and 6 gram fat. The total energy content is 142 kcal pr 100 g (594.5 kJ). Which of the nutrients gives rise to most of the energy content?

- Carbohydrate
- Fat
- Protein

Lisa (16 yr's) consumes one 0.5L bottle of Coca cola during lunch time. Her total energy intake for the day is 1920 kcal, the bottle of Coca cola contains 50 g of carbohydrate, and she does not consume any other sweets, added sugars or soda water this day.

Is her consumption of added sugar according to the recommendations?

- No, it exceeds the recommendation of 10E% added sugar
- No, there are no recommendation for consuming added sugar
- Yes, she only consumes one small bottle
- Yes, it matches the recommendations of 10E% added sugar.
- Yes, it's within the recommendation, with 2.6E% added sugar

The total energy needed for an individual during a normal day, is normally due to

- Gender, ethnicity, age, physical activity
- BMR, gender, exercise
- BMR, physical activity, digestion
- Gender, age, exercise

Side 4

Energy availability

"Energy availability" describes the following situation:

- How much energy from energy intake is left for vital processes after exercise expenditure
- The total energy absorbed from the digestive tract
- The main cause to the obesity challenge in the western society
- The direction in which body weight changes towards, due to energy balance (energy intake Vs energy consumption)

Side 5

Fluids

Tick the right alternatives regarding facts on fluid and fluid needs:

- 60% of the total bodyweight are water
- Water is not harmful, and can be consumed in volumes with no negative effects
- Water regulates pH-levels, by participating in the bufferingsystem of acidity
- Water is needed for triglycerid production
- Water helps with thermoregulation in the body
- Our body is 30% water

Vitamins and minerals

Vitamins and minerals are essential nutrients we need to consume regularly. Which of the following claims are true?

- Vitamins and minerals are macronutrients that indirectly affects energy metabolism
- Vitamins and minerals are micronutrients needed in amounts ranging from micrograms (mcg) to milligrams (mg)
- Vitamins and minerals can be classified either as macronutrients or micronutrients. It all depends on the total daily need of the nutrient (RDI).

What is true about Vitamin-D?

- Vitamin D controls endogenous levels of calcium through effects on kidneys, bones and the digestive tract
- We do not need vitamin-D from food sources, as we effectively produce the vitamin endogenously
- Food sources of vitamin D are whole grains, avocado and olives
- Vitamin-D exerts its effects as a hormone in the body

Vitamin-D and calcium are both important to us. What is true about these nutrients?

- If you spend enough time exposed for the sun during summertime, there are adequate stores of vitamin-D to cover your needs during winter.
- The need for calcium can be covered just by adequately increase the intake of calcium. If doses are high enough, vitamin-D are not needed for optimal absorption.
- Vitamin-D regulates the plasma concentration of calcium. This need is taken care of, before the need for optimal bone calcification.
- Older people have impaired skin stimulated production of vitamin-D. They need supplements to avoid rickets.

Iodine is important for the following processes:

- Normal mental and physical fetal development
- Normal insulin function, preventing development of diabetes type 2
- Normal metabolism
- Normal/optimal endurance capacity

Food sources of iron are

- Oranges and lemons
- Red meat
- Liver
- Margarin and butter
- Tomatoes
- Whole grain

Protein

What are the correct definitions of an essential amino acid?

- An amino acid that cannot be produced in sufficient amounts to cover the demand for this amino acid
- An amino acid that we cannot produce in the body
- An amino acid which is essential for the gluconeogenesis process
- An amino acid containing nitrogen
- An amino acid containing sulfur

What determines the chemical score in proteins?

- The first limiting essential amino acid
- The relative amount of essential amino acids compared against the estimated need
- The total amount of amino acids
- The total amount of essential amino acids
- The digestibility of the protein

How much of the protein in a meal is normally absorbed?

- 10-20% of protein from fruit and vegetables
- 90-95% of protein from animal sources
- 50-90% of protein from fruit and vegetables
- 50% of protein from milk and meat
- 30-40% of protein from animal sources

Which of the following statements characterizes the amino acid leucine correctly?

- It is one of three branched-chain amino acids
- It is an essential amino acid
- It does not contain nitrogen
- It can be produced in our body
- It is a non-essential amino acid
- It is not converted to other amino acids when passing the liver

Which of the following recommendations are appropriate for protein intake in an elite endurance athlete training 15 hours per week?

- The daily intake should be 0.8-1.2 g protein per kg body mass per day
- The daily intake should be 4-6 g protein per kg body mass per day
- The protein intake should correspond to 10-20% of the total daily energy intake
- The protein intake should correspond to 5-10% of the total daily energy intake
- The daily intake should be 1.4-1.8 g protein per kg body mass per day

Which of the following recommendations are appropriate for protein intake in an adult with normal levels of physical activity?

- The protein intake should correspond to 10-20% of the total daily energy intake
- The daily intake should be 0.8-1.2 g protein per kg body mass per day
- The daily intake should be 4-6 g protein per kg body mass per day
- The protein intake should correspond to 5-10% of the total daily energy intake
- The daily intake should be 0.4-0.6 g protein per kg body mass per day

Why protein has become a popular supplement among athletes. Which of the following statements characterizes whey protein correctly?

- Whey protein is slowly digested and absorbed
- Whey protein contains high amounts of leucine
- Whey protein supplementation improves muscular endurance by 30%
- Whey protein is rapidly digested and absorbed

Fill in the correct word!

Proteins are built up by .

We have a total of 20 that we use for protein synthesis.

Fett

Which of the following statements are correct for poly-unsaturated fatty acids with cis-configuration

- EPA is poly-unsaturated fatty acid belonging to the omega-3 family of fatty acids
- The carbon chain forms a straight line
- The hydrogen molecules attached on the carbon atoms on each side of the double bindings are on the same side of the carbon chain
- The hydrogen molecules attached on the carbon atoms on each side of the double bindings are on the opposite side of the carbon chain
- The carbon chain is bend at each double binding between carbon atoms

Which of the following statements characterizes unsaturated fatty acids with trans-configuration correctly

- The hydrogens attached to the two carbon atoms sharing a double binding are located at the same side of the carbon chain
- The hydrogens attached to the two carbon atoms sharing a double binding are located at opposite sides of the carbon chain
- Unsaturated fatty acids with trans-configurations has similar physical properties as saturated fatty acids
- Unsaturated fatty acids with trans-configurations has similar physical properties as unsaturated fatty acids with cis-configuration
- They are essential fatty acids

Which of the following statements characterizes medium chain fatty acids correctly?

- They are oxidized very slowly because they must be build up to longer chains before oxidation
- They contain 4-6 carbon atoms
- They cannot be built into triglycerides
- They contain 6-12 carbon atoms
- They can be oxidized rapidly because they can diffuse into the mitochondria

Which of the following statements characterizes low-density lipoproteins (LDL) correctly?

- LDL transports fatty acids into the mitochondria
- LDL transports cholesterol to cells and organs
- LDL cholesterol levels may be increased by eating large amounts of saturated fat
- LDL transports fatty acids into the muscle cells
- LDL transports cholesterol from peripheral vessels back to the liver

Which of the following statements characterizes high-density lipoproteins (HDL) correctly?

- HDL transports cholesterol from peripheral vessels back to the liver
- HDL transports fatty acids into the muscle cells
- HDL transports fatty acids into the mitochondria
- HDL transports cholesterol to cells and organs
- HDL cholesterol levels may be increased by eating large amounts of saturated fat

Fill in the correct recommendations!

The intake of saturated fatty acids should be less than % of the total energy intake.

The intake of monounsaturated cis-fatty acids should be % of the total energy intake

Fill in the correct recommendations:

The intake of polyunsaturated fatty acids should be % of the total energy intake

The intake of essential fatty acids (omega-6 and omega-3) should be at least % of the total energy intake

Side 9

Forside

The next part of the exam will consist of the two specializations offered in IBI217.

If you want to answer the Specialization in Nutrition and health part, you will answer the first set of questions and leave the last part of the exam.

If you want to answer the Specialization in Nutrition and Physical performance you will SKIP the first set of questions and answer the last set of questions.

Nutrition and Health

Weight Reduction: 11 points

- a) How would you estimate energy requirement for weight reduction? **(3 points)**
- b) When working with weight reduction, what would be reasonable advices and realistic goals? How fast should one lose weight and why? by which method/diet? and what would be important considerations/focus for future diet/lifestyle (after goal has been reached)? **(8 points)**

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Cardiovascular disease: 10 points

a) What would be your best advices to reduce high LDL-cholesterol? Make sure you mention nutrients of importance, and give practical examples. Explain in detail how at least one of these advices will affect the cholesterol levels **(7 points)**

b) What would be your top 3 advices on lifestyle/diet change to reduce the risk of hypertension? Make sure to mention specific nutrients, and whether it is important to reduce or increase intakes **(3 points)**

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Weight gain: 5 points

Identify two important reasons why some people don't easily gain weight. Explain..

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Osteoporosis: 8 points

- a) Describe the normal development of bone mass through different stages of life (3 points)
b) Point out 3 lifestyle/diet factors that is important in improving bone mineral density (BMD). Why are these important? how do they improve BMD? (5 points)

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What “lifestyle disease” (noncommunicable disease) does obesity increase the risk for?

- Osteoporosis
- Cardiovascular disease
- Allergies
- Diabetes type 1
- Diabetes type 2

What is classified as normal fasting blood glucose levels?

- 2 - 4 mmol/L
- 4 – 6 mmol/L
- 6 – 8 mmol/L
- 8 – 10 mmol/L

Metabolic syndrome is a cluster of the following abnormalities:

- Central adiposity, hypertension, low levels of HDL-cholesterol, hyperglycemia
- Central adiposity, diabetes type 2, chronic back pain, high cholesterol
- Central adiposity, osteoporosis, high cholesterol, lactose intolerance
- High LDL-cholesterol, high triglyceride levels, osteoporosis, fatigue

Regulation of LDL-cholesterol improves with:

- High intakes of soluble fiber
- High intakes of saturated fat
- Good vitamin D-status
- Weight reduction

The female athlete triad is a serious health threat that can affect especially athletes. It describes the relationship between:

- High physical activity level, increased iron needs, and reduced aerobic capacity
- Bad energybalance, hormonal disorders, and low bone mineral density
- High sugar intake, low iron intake, and reduced ability for restitution
- High carbohydrate intake, high sugar intake, and increased level of triglyceds

Nutrition and performance

Fluid and energy intake during competitions

a) You shall compose a sports drink that should give optimal hydration and energy during a competition lasting 5 hours with high intensity exercise. Describe the content of your sports drink and what kind of volumes would you recommend for the intake during the competition? The sports drink shall ensure optimal fueling of fluid and energy during the competition. (7 points)

b) What is hyponatremia and in what kind of situations are athletes in risk of developing hyponatremia? (3 points)

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Weight management and changes in body composition (10 points)

a) A female handball player wants to gain 2-3 kg in muscle mass. What would be your focus in the nutrition plan for this player and what would be the length of the period to reach this goal? (5 points)

b) Describe briefly an optimal strategy for a wrestler to lose 7 kg body mass in front of the world championship! (from 77 to 70 kg) (5 points)

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Ergogenic substances (10 points)

What are the physiological effects of the following substances and in which sports do they potentially improve performance?

- a) Bicarbonat (2.5 p)
- b) Beta-alanine (2.5 p)
- c) Caffeine (2.5 p)
- d) Creatine (2.5 p)

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Hydration (10 points)

- a) How can you evaluate athletes' hydration status? Describe briefly a strategy which ensures good hydration status before competitions! (3 p)
- b) How can you calculate the sweat rate during training and how can you use this information to optimize hydration during competitions? (3 p)
- c) Describe and optimal rehydration strategy after a 3 hour moderate-intensity workout in which your athlete lost 2 kg body mass. (4 p)

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