

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

What are good foodsources for carbohydrates?

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

What is true about dietary fiber?

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

Which of the following are carbohydrates:

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

The role of insulin in metabolism:

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

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
- Gender, BMI, age
- Age, gender, level of physical activity

Energy content of proteins, is

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

- Protein
- Fat
- Carbohydrate

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?

- 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
- No, there are no recommendation for consuming added sugar
- No, it exceeds the recommendation of 10E% added sugar

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

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

Seksjon 4

Energy availability

"Energy availability" describes the following situation:

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

Seksjon 5

Fluids

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

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

Vitamins and minerals

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

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

What is true about Vitamin-D?

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

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

- Older people have impaired skin stimulated production of vitamin-D. They need supplements to avoid rickets.
- 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.

Iodine is important for the following processes:

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

Food sources of iron are

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

Protein

What are the correct definitions of an essential amino acid?

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

What determines the chemical score in proteins?

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

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

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

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

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

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

- 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 1.4-1.8 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 4-6 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 5-10% 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 0.4-0.6 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

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

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

Fill in the correct word!

Proteins are built up by .

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

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

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

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 opposite sides of the carbon chain
- They are essential fatty acids
- The hydrogens attached to the two carbon atoms sharing a double binding are located at the same side 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

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
- The 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 muscle cells
- 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 mitochondria
- LDL transports cholesterol from peripheral vessels back to the liver

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

- HDL transports fatty acids into the mitochondria
- HDL transports fatty acids into the muscle cells
- HDL transports cholesterol from peripheral vessels back to the liver
- 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

Seksjon 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

Osteoporosis (8 points)

How can bodyweight, exercise, and nutrients affect bone health? Give examples of both negative and positive effects.

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Cardiovascular diseases (8 points)

1. What is arteriosclerosis? give at least two examples of lifestyle related changes that can improve the situation.
2. The Mediterranean diet is often recommended to prevent or treat cardiovascular diseases. What characterizes this diet, and which contrasts do you see to the western, modernized diet? Argue with focus on both nutrients and food items.

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Weight reduction (8 points)

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 for future diet/lifestyle (after goal has been reached)?

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Cancer (6 points)

Mention at least two different food related recommendations to prevent cancer, and explain the effect on cancer development by that food, or by its nutritional constituents.

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1. The most effective factor in improving insulin sensitivity is:

- Quit smoking
- Weight reduction
- Weight gain
- Reduced cholesterol levels

Metabolic syndrome is a cluster of the following abnormalities:

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

What is it with meat intake that makes it associated with increased risk of cancer?

- Iron content
- Formation of heterocyclic amines
- Vitamin B12 content
- Lack in protective effect from carbohydrates

What is oxidative stress?

- A situation in the body that occurs when the amounts of free radicals exceeds the antioxidant defence
- A type of bowel disease
- A metabolic response to a high carbohydrate intake that exceeds the bowels capacity for digestion
- A situation that occurs when the immune system is reduced

Nutrition recommendations for reduced risk of cancer is:

- Increased intake of fruit and vegetables
- Increased calcium intake
- Prepare food with high temperature
- Increased intake of red meat

Optimal weight reduction equals to results in terms of:

- 0,5 kg weight reduction in 7 days
- 10 kg weight reduction in 30 days
- 2 kg weight reduction in 1 week
- 10% weight reduction in 1 week

What increases risk in developing diabetes type 2?

- Low intakes of calcium
- Sedentary lifestyle
- Obesity
- Moderate intake of chocolate

In people with diabetes type 2, decreased blood sugar levels can be obtained with

- Increased physical activity level
- Decreased intake of salt (sodium)
- Decreased intake of red meat
- Weight loss (if overweight)

Nutrition and performance

Energy intake during training and competitions

a) What is the recommended intake of carbohydrates for athletes in different categories of training volume (4 points)

b) Describe an effective method for carbohydrate loading before an important competition and discuss possible challenges related to this method. In which sports/events can carbohydrate loading be important? (6 points)

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Weight management and changes in body composition (10 points)

a) A male alpine skier wants to gain 1-2 kg in muscle mass. What would be your focus in the nutrition plan for this skier and what would be the length of the period to reach this goal? (5 points)

b) Describe briefly an optimal strategy for a female lightweight rower to lose 5 kg body mass in front of the world championship! (from 62 to 57 kg). Include measurements that ensure a safe weight reduction! (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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Preparations to and recovery after training and competitions (10 points)

a) How would you plan the last meal before an important match for an elite football player (timing, food items and important nutrients)? (4 p)

b) You are responsible for the nutritional recovery plan for the players in an elite football club. What would you do the first 4 hours after a tough match to ensure optimal recovery till the next match played in three days? (4 p)

c) How can you calculate the sweat rate during training for football players and how can you use this information to optimize hydration during matches for individual players? (2 p)

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