



**OPTIMISATION OF
PROTEIN NUTRITION
WITH MAP-TYPE DIETARY SUPPLEMENTS**

Summary of Research Studies

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Koper: Institut.O d.o.o., 2016

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1. On the Significance of Proteins in Nutrition and the Discovery of MAP (Master Amino Acid Pattern)

Proteins are extremely important, not only as the building blocks of muscles: all enzymes and hormones in the human body are proteins, as are immunoglobulins (functioning as antibodies in immune response) and haemoglobin. Proteins also ensure the solidity of the bones. The human body obtains them through food, particularly through the consumption of meat, eggs, milk, soy and other legumes. Unfortunately, though, protein metabolism is difficult. The digestive organs need at least three hours to break down a protein into its basic elements – amino acids. The problem persists in cellular metabolism: over one half of amino acids are normally left unused by cells for the building of their own proteins. The body decomposes them into toxic nitrogenous waste, which is very burdensome for the liver and the kidneys. The net nitrogen utilisation (NNU) rate depends on the quantitative relations between the eight essential amino acids that the human body cannot produce on its own. It is the highest in chicken eggs (48 %) and meat (32 %) (INRC 2003). However, for several reasons, current mainstream nutrition science recommends moderation in meat consumption (BF 1997). Eating plant-based proteins, on the other hand, is safer, but their utilisation rate does not exceed 18 %, which means that by following a vegan or a vegetarian diet we risk protein malnourishment. Also, the digestion of all types of protein food generates large amounts of toxic waste - which is not a problem while we are still young and our excretory organs are strong. With age, however, the capacity of the digestive and excretory systems decreases considerably, as also happens in the sick, the convalescent and in people with poorer health in general. Athletes, pregnant women and nursing mothers also have larger requirements for protein food that can overstrain their excretory organs.

So what is the solution to this dilemma? When in 2001, at the threshold of my fifties, I tried to improve my protein nutrition, I studied the field and came across a scientific report on the discovery of the ideal composition of essential amino acids for humans (the composition was called MAP – Master Amino Acid Pattern). It was developed by a physician, Professor M. Lucà-Moretti, after twenty-two years of research (1998). This was a revolutionary discovery, one that numerous scientists had strived for since 1946. Prof. Lucà-Moretti patented the formula. Today, there is a manufacture of dietary supplements based on and in accordance with the discovered combination of MAP amino acids, which are available on the market under different brand names. Although in terms of the amino acid composition they are all the same, they may differ in other characteristics or ingredients. To avoid the use of brand names, they will all be referred to hereinafter as OCA (Optimal Combination of Amino acids) supplements.

The manufacture of OCA-type supplements is based on the production of essential amino acids through fermentation (these amino acids are not of animal origin) and their combining into a dietary supplement with a net utilisation rate of no less than 99 % (Lucà-Moretti 1998). There is virtually no metabolic waste (1 %).

Several clinical studies on the use of OCA were conducted in the 1990s, and the results are very encouraging. In May 1999, the doctors who are part of S.E.N.B. (Società Europea di Nutrizione Biologica), a natural nutrition organisation, dedicated their European conference exclusively to OCA. The present booklet contains the proceedings of 24 scientific articles published by physicians on the use of OCA. It is intended for those individuals who would like to improve their nutrition and well-being with the help of protein dietary supplements, but it can also be useful to physicians and nutritionists, as it contains a list of scientific sources as references for the information presented, which may also serve as a starting point for deepening knowledge about this topic. This topic is covered more extensively in my book *Beljakovine za življenje in smrt (Proteins for Life and Death, Ostan 2012)*.

The data in this booklet is only presented for the purposes of education and information. Before starting to consume any dietary supplements, it is advisable to consult a physician. Under current regulations, only physicians are competent to advise sick persons and pregnant women on nutrition.

2. The Use of OCA (Optimal Combination of Amino acids) Supplements in Medicine

INRC (International Nutrition Research Center) in Florida is the institute with the longest experience of OCA use. The first pharmacies to sell this dietary supplement were those in Italy (1993), where according to the data of Dr. Lucà-Moretti there were over 7,000 physicians recommending it in 2004. This foodstuff is completely safe, even in large doses. According to the reports by Dr. G. F. Hermann and Dr. M. Lucà-Moretti, there has not been any record of dietary intolerance to OCA or any record of side effects due to its consumption (INRC 2003, Hermann 2000). In this section, we will limit ourselves to medical experience in treating diseases. Let us take a look:

a) impaired liver and kidney function

The decomposition of superfluous protein generates ammonia, which is processed by the liver into urea and passed from the body through the kidneys. If we substitute the protein of one daily meal with OCA, the levels of ammonia and urea in the blood decrease by 35–55%. This is very good for liver or kidney patients (Lucà-Moretti 1998, INRC 2003, ProShape 2003).

In an experiment led by Dr. N. Tamburlin, 12 chronic kidney patients (CRF – Chronic Renal Failure) had all protein food substituted by OCA for 30 days. All patients experienced considerable improvement in blood indices (less nitrogen, creatinine and phosphorus in the blood), their hemoglobin levels rose, while the level of potassium did not change in any considerable way. At the end of the experiment all the patients felt better, the quality of their lives had improved (they felt less tired, they reintegrated into the working process) and their skin had regained a healthier colour and tonicity (Tamburlin 1999).

b) diseases of the digestive system

Since OCA does not have to be digested and does not produce faecal residue, it is a very suitable food for patients with stomach illnesses (even in case of gastrectomy) and diseases of the intestine.

Dr. M. Del Prete reports on the successful use of OCA in the treatment of 10 patients suffering from inflammation of the bowels (ulcerative colitis and Crohn's disease) (Del Prete 2001). Dr. B. Fidone successfully used OCA in the treatment of ulcerative rectocolitis, obtaining visible results as soon as in two weeks (Fidone 1999).

c) diabetes

Much glucose is produced in the decomposition of amino acids, but until now, physicians had not taken this into account, because they thought that the human organism advantageously uses almost all assimilated amino acids. For this reason, diabetics were only advised against consuming carbohydrates. Since the substitution of one protein meal with OCA decreases the glucose level by 24%, its consumption is also recommended for diabetics (INRC 2003).

In all diabetic patients who completely substituted protein foods with OCA, Dr. N. Tamburlin established a considerable decrease of the blood sugar level (Tamburlin 1999).

d) food intolerance, allergies and asthma

In an experiment carried out under the guidance of Dr. N. Tamburlin on 208 patients with confirmed intolerance to various foods, one group was only prescribed an exclusion diet (excluding the foodstuffs that were not tolerated by the body), while the other group was put on a diet in which the proteins of one meal a day were substituted by OCA. The group that only excluded determinate foods registered an improvement of 58.9% after one month, 82.3% after two months and 99.3% after three months. The group who also consumed OCA, on the other hand, experienced an improvement of 83.9% in only one month and a complete (100%) recovery in two months.

e) treatment of anaemia caused by iron deficiency

Anaemia is not only caused by iron deficiency, but also by protein deficiency, for haemoglobin, which 'carries' the iron, is a protein, too. Studies have shown that this kind of anaemia is cured faster with OCA than with conventional therapy.

In Spain, Dr. C. Montilla carried out an experiment on 12 anaemic patients with clinically proven iron deficiency. The group that received conventional treatment (taking iron supplements, vitamins and minerals) registered a 46% recovery, while the group of patients that received a combined treatment of conventional therapy and a daily dose of 10g of OCA achieved recovery of all the patients. The patients of this latter group also showed a considerable increase in the levels of haemoglobin and haematocrit (Montilla 1999).

f) pain caused by excess weight

Dr. G. Muratori published the results of an experiment with 30 patients following a 10-day diet with OCA. He was particularly interested in its effect on pain in the extremities, which is a frequent occurrence accompanying obesity. As expected, the patients' weight decreased (by 3.5 kg on the average), but more importantly, the pain in their extremities was alleviated. The patients also experienced less pain in other parts of the body, during the day as well as at night, and their morning rigidity diminished considerably (Muratori 1999).

g) heart weakness

Dr. B. Fidone described a 3-month experiment using OCA in 12 patients aged between 69 and 90 suffering from cardiac insufficiency. The patients received classical treatment and were also administered up to 10 OCA supplement pills and a vitamin-mineral supplement. The doctors observed a decreased incidence of heart arrhythmia, fewer toxic substances in the blood and reduced water retention in the patients. They were able to gradually decrease the dosage of diuretics (in some patients they even cancelled them completely) and some other medicines (Fidone 2001).

h) respiratory problems

Dr. G. P. Ivaldi tested the effects of OCA-including nutrition in patients with exacerbated chronic respiratory problems. A group of 8 patients aged between 56 and 83 undergoing conventional therapy were additionally administered 10 OCA supplement pills daily and a vitamin-mineral supplement. The patients had been hospitalised for experiencing an acute phase of their chronic illnesses (two even had to be resuscitated). All of them registered greater and faster improvements in their health compared to when they had only received conventional therapy, and were discharged from hospital. Body weight normalised in no fewer than 7 patients of the group (dropping in overweight patients and increasing in underweight ones) (Ivaldi 2000).

i) multiple sclerosis (MS)

Dr. L. Bufalini studied long-term effects of a diet improved with OCA and a vitamin-mineral supplement in 9 patients with MS. They basically took 16 OCA supplement pills daily, in the first three days of the acute phase even more (25). In only a month, this diet improved their health so much that they were able to carry out their work satisfactorily and live normal family and social lives (Bufalini 2000).

j) recovery from fractures, injuries and surgery

Physicians recommend taking OCA especially in the phase of preparation for surgery, after surgery and also after various types of trauma, for the human organism regenerates faster and better with the help of OCA than with conventional protein food (INRC 2003).

Other diseases and health problems in which physicians recommend OCA include:

k) alcoholism (INRC 2003)

l) anorexia (Bufalini 2001)

- m) vomiting (continual) (Lucà-Moretti 1998)
- n) bulimia (Corgna 2000)
- o) chemotherapy (INRC 2003)
- p) diarrhoea (Lucà-Moretti 1998)
- r) feebleness (e.g., in cancer and AIDS patients) (Lucà-Moretti 1998)
- s) loss of appetite (INRC 2003)
- t) increased catabolism (Lucà-Moretti 1998).

In his conferences, Dr. Lucà-Moretti mentioned achievements with the use of OCA in other diseases, too (e.g., osteoporosis, muscular dystrophy, weakening of the immune system), but there are no scientific records about that yet.

OCA Supplements Dosage in Diseases

The physicians in the mentioned studies followed the recommendations of INRC and the scientific findings of dr. Lucà-Moretti (Lucà-Moretti 1998) regarding the net requirements of protein: the normal requirement per one kilogram of ideal body weight is usually 0.4 g of MAP or 1 g of protein with high nutritional value. In some of the cases described, the physicians prescribed higher dosages than 3 to 5 g (pills) of OCA daily, as is recommended on the packaging of dietary supplements of this type.

OCA supplements dosage does not depend on the consumption of any medicines. In such cases, as with all dietary supplements, the control of a treating physician is necessary, for due to a speedier recovery it is sensible to decrease the dosage of certain drugs.

OCA supplements can be consumed anytime, but preferably with meals. It is compatible with any type of food.

Let me underline again that OCA, as with all dietary supplements, is intended to improve nutrition and has no curative effects. Of course, a better diet can help strengthen the body even in times of illness. The information in this section is for reference only. In case of illness, one should inquire for recommendations on a suitable diet with their treating physician.

3. Physicians on the Use of OCA Supplements in Healthy People

In 2004, just before the All Saints' Day, I visited a 95-year-old relative. She was so feeble that her chin and hands trembled. She said she wouldn't be able to visit the grave of her late husband, but when we invited her over, she agreed – more as a goodbye, as she whispered, than in hope of improvement. However, after two weeks of taking the optimal combination of essential amino acids and live juices she was so revitalised that she even read a book and eventually went with us to the graves of her relatives and on a trip to Sveta gora (Holy Mountain), which she had always enjoyed visiting so much. Every time we would take our relative in for two or three weeks, OCA helped her recover.

This experience was probably not a coincidence. The groups of people recommended OCA by physicians are primarily the elderly, pregnant women, children, professional and recreational athletes, vegetarians and vegans, and people on a reducing diet.

The Elderly

Professor Sanseverino from the University of Bologna led a two-month clinical test of the effects of OCA on elderly people. Twenty people aged between 65 and 92 participated in the test. The majority of these individuals were weak - 65% of them were unable to endure more than 2 minutes of a test walk on a treadmill. Many of them were forced to stay in due to their poor mobility.

They took 6–8 OCA supplement pills daily the first month and 3–4 pills daily the second month. For better assimilation, which is usually reduced in the elderly, the daily doses of OCA were divided into two (morning and noon) rations. Twice a week their physical activity was slightly increased with walks.

All the participants improved their muscle tonus during the test and every single one of them considerably strengthened their physical abilities. While in the beginning they could only walk for 2.6 minutes on the treadmill on average, they already managed 11.4 minutes after two months, which is a 4.3-fold increase (Riva Sanseverino 1999: 17–19).

Through ageing the number of cells in our organs diminishes. A healthy 70-year-old only preserves 25 to 33 percent of the kidney cells they had at the age of 35. Their kidneys may be healthy, but this ‘pump’ of theirs is able to excrete three to four times less toxic waste than it used to. Dr. Minkoff finds that “an average 70-year-old only preserves 30% of the youthful functions of the kidneys” (Minkoff 2006a). Since the body requires a lot of energy and time to excrete protein metabolism waste, the building of the body’s own protein (anabolism) is slower and less efficient.

But ageing brings along another problem, as Dr. Minkoff points out in his articles. After the age of 45, our digestion changes considerably. “When people enter middle age the quantity of hydrochloric acid in the stomach, which activates the enzyme pepsin in charge of the digestion of proteins, is reduced to half the normal level.” (Minkoff 2006b). This means that a large part of proteins we consume in these years is left unused by the body and is excreted in the faeces.

That is why elderly people spontaneously avoid protein food (which produces a lot of waste). But even if they don’t, its metabolic utilisation is lesser than in their youth. The majority of elderly people are therefore malnourished, although they do not suffer any shortage of food.

The consequences of malnourishment are manifold, especially in the elderly. They first appear in the less important parts of the body (diminished muscle mass, impaired quality of the teeth, hair, nails and skin), for a weakened organism devotes the micronutrients primarily for the nutrition and regeneration of vital organs. Though later on these lose vitality, too.

Until now, it has been difficult to regenerate the vitality of the elderly precisely due to the difficult metabolism of protein food. Easily digested and not burdensome for the excretory organs, OCA opens new possibilities in geriatrics, finds Professor Sanseverino. And according to Dr. David Minkoff, only these supplements made it possible for the scientists to discover how the organism of an older person hungers for proteins. Minkoff observed this in his clinical practice mainly in women with menopause problems (hot flashes, night sweats, sleep disorders, mood swings, fatigue, hair loss and brittle nails). Until recently, it was believed that this was a normal result of ageing, but now we know that these difficulties are the consequence of protein malnourishment, which cannot be corrected with the help of ordinary protein food, but only with OCA (Minkoff 2006c).

There is a serious risk that in mature years we will fall into the vicious cycle of protein metabolism. Since proteins are difficult to digest, our organisms start to lack hormones (these are proteins, too), and since our organisms also lack various enzymes, the digestion of all foodstuffs – including protein – deteriorates and we become increasingly malnourished. However, it seems that OCA can help us break this vicious cycle.

Pregnant Women

The excretory organs in pregnant women are overburdened. This gives rise to a high concentration of waste matter in the blood, especially nitrogen, which causes water retention in the organism. Also, pregnant women should eat more proteins than usual, but protein food generates a lot of toxins. That is why many pregnant women suffer from protein malnourishment, which is reflected in the deterioration of their teeth, hair and particularly their skin, which becomes inelastic (stretch marks). Often during this period women suffer from cardiovascular problems. The lack of protein during pregnancy is also detrimental to the development of the foetus (López-Torres, Barja 2008).

According to Dr. M. M. Mariani’s study presented at the 3rd S.E.N.B. Conference in 2001, OCA opens entirely new possibilities in the nutrition of people at a higher risk of cardiovascular diseases, including pregnant women (Mariani 2001: 33–40). Dr. Lucà-Moretti finds OCA to be particularly recommended for them. As already said, OCA is a completely safe foodstuff, which is most important in the nutrition of pregnant women. Still, according to the current regulations, only physicians are competent to give advice on the diets of pregnant women.

Recreational and Professional Athletes and Bodybuilders

Dr. Enrico Mariani tested the effects of OCA in a 4-week-long experiment on 10 runners. Each runner consumed 20g of OCA supplement daily on the days of intensive training sessions and 10g on other days. Compared to the athletes of the control group, who did not take OCA, the runners showed increased muscle mass and strength, achieved equal strength in both legs, and the quantity of lactic acid in their bodies decreased, which indicates a cleaner organism (Mariani et al. 1999a).

Similar results were obtained in an international study led by Dr. M. Lucà-Moretti, in which 20 runners took part (Lucà-Moretti 2003b).

Protein and amino acid dietary supplements have been in use in sports and bodybuilding for a long time. The above studies show that OCA is a suitable dietary supplement for athletes as well, but unfortunately we have no knowledge of any comparative study between the use of OCA and other ordinary amino acid/protein products in sports and bodybuilding.

The use of OCA has no side effects. When used in sports, it helps strengthen the muscles, tendons, bones, blood vessels, internal organs and other parts of the organism. Dr. Lucà-Moretti also tested on himself the effects of taking OCA on muscle growth and strength. He discovered that the muscle mass is preserved even after the discontinuation of the training, if one continues to take OCA, of course. My experience with the use of OCA in regular fitness training (in the years 2001–2003) confirms these findings.

The Utility of OCA Supplements in Extreme Circumstances

OCA is very durable (the shelf life marked on the bottle is three years), it can tolerate temperature fluctuations, requires little space (can be carried easily) and has a high nutritional value. For this reason, it is recommended as food in case of natural disasters, catastrophes and other extreme living conditions (Costanzo 1999: 39–42). The INRC Institute has prepared a set of essential foodstuffs called NEK (*Nutrition Emergency Kit*), intended for survival in extreme circumstances. In addition to OCA, it also includes water, essential minerals and vitamins as well as other essential foodstuffs for covering the daily requirements of an individual (NEK 2001) in sufficient amounts.

In a practical test of the efficiency of OCA and other essential nutrients included in the NEK set in extreme living conditions, a 50-year-old Italian crossed the Chinese desert. In 21 days she walked for 540 kilometres. She carried a 30-pound backpack and tolerated daily temperature fluctuations from -5 °C to +30 °C. In this experiment she met all the daily requirements for protein with OCA. Despite extreme strains her body weight changed only minimally (decreased by 2%), while her muscle mass above the knee strengthened by 10%. Her muscle strength increased by nearly as much and her general fitness improved (her heart rate and oxygen consumption decreased, while energy utilisation improved) (Mariani et al. 1999b: 20–25).

Since OCA does not produce faecal residue, it is a foodstuff suitable for extreme conditions when faeces are a source of infection, and also in the treatment of intestinal diseases. And this is also its limitation in everyday life. Since it does not reach the large intestine, it does not stimulate peristalsis or the regeneration of a good intestinal flora. For that the organism needs suitable fibre food, whereas OCA is generally only a food supplement (although physicians, when necessary, may prescribe it for covering all the patient's protein needs).

Vegetarians and Vegans

Among healthy people to whom physicians recommend the use of OCA are also *vegetarians and vegans*. In plant-based foodstuffs the utilisation of essential amino acids is very low – according to Dr. Lucà-Moretti's findings it does not reach over 18%. In order to keep the organism adequately nourished with protein it would be necessary to consume a lot of plant-based protein foods. Vegetarians and vegans generally do not do that, because it is difficult to digest large amounts of plant foods. That is why Lucà-Moretti recommends OCA to them, too (INRC 2003).

Dr. Minkoff finds: “Protein levels may actually be normal in standard blood panels; but in deeper tests of serum, many individuals have deficient amino acid levels. We have never seen a vegetarian who is not protein deficient” (Minkoff 2006b). And due to the previously mentioned reasons, the risk of protein malnutrition increases with ageing in other individuals, too.

But the fear of protein malnutrition is not reason enough to give up vegetarianism or veganism if we have opted for them. Detoxification regimes, which also include veganism, are especially necessary in the old age. The older we are, the weaker are our excretory organs and the more toxins accumulate in the body. They also collect in cellular fat (lipofuscins) and in the adipose tissue. The body of an average 70-year-old has up to 100% more fat than it had in youth (Minkoff 2006a).

As explained previously, the amino acids used for the production of OCA supplements are not of animal origin. This is important in as much it means they are suitable for vegans, too, yet immaterial in terms of the quality of the essential amino acids. In fact, each amino acid of a certain type has the same characteristics, regardless of whether it has been extracted from animals or plants. Plants and animals (each species with its own specificity) differ in proteins - i.e., combinations of amino acids they contain - while the basic building blocks of amino acids are the same in all types of protein.

Body Weight Control (Reducing Diet)

The field of OCA use in *reducing or slimming diets* is medically well-researched. Several studies have been conducted and published:

In his 9-month experiment, Dr. G. D'Andrea compared the effects of dieting with OCA (a group of five participants) to those achieved by dieting according to the standard method (five participants). The weight loss programme lasted for 3 months. For the next 6 months no diet was prescribed, the two groups were only given recommendations on healthy nutrition. In the six months following the completion of the weight loss programme, the group that had followed the classic method of dieting regained all the previously lost weight. On the other hand, the group that had taken OCA in the first 3 weeks of their 3-month weight loss programme only gained a little weight in the following six months (+2%); nine months after the beginning of the diet this group still registered a 12.5% lower weight on the average than before undertaking the diet (men 11%, women 14% lower than before) (D'Andrea 2001).

At the beginning of the previous decade, another study on the use of OCA in dieting was carried out. It was an international project involving 500 participants. The reducing diet with approximately 1,600 kcal/day lasted 3 weeks on average, and all protein requirements were covered exclusively by OCA. After completing this weight loss programme the participants were not given any diets or any more OCA, they only received recommendations regarding healthier nutrition. The results of the follow-ups carried out 90 and 120 days after the commencement of the experiment showed that “none of the subjects had regained the lost weight; on the contrary, the majority succeeded in bringing their weight even lower” (Lucà-Moretti et al 2003c, d).

4. OCA Supplements Usage and Dosage

OCA producers recommend taking three to five 1g OCA supplement pills daily as a dietary supplement either during meals (in combination with any kind of food) or between meals or even on an empty stomach. Taken in the morning with a freshly pressed clear or pulp juice, an OCA supplement pill provides the body with a light, yet rich protein breakfast, ideal for overcoming daily exertion; taken in the evening, at bedtime, it improves the regeneration that takes place during sleep.

Professional and Recreational Athletes

Athletes should take 5 to 10 OCA supplement pills 30 minutes prior to the commencement of a sports activity or as per doctor's advice. Dr. Lucà-Moretti recommends that the largest single dosage should not exceed 10 pills. During most intense and long-lasting sports activities it is sensible to take 10 OCA supplement pills every two hours, but no more than 30 pills a day. Too large dosages of OCA are not harmful, their anabolic utilisation, however, is poorer.

Pregnant Women and Nursing Mothers

Pregnant women need an additional 10 g gross protein (Leslie 2003), which equals 4 additional OCA supplement pills daily.

Nursing mothers can meet their gross requirements for protein with an additional 15–20 g of protein, i.e., additional 6 to 8 OCA supplement pills a day.

Concrete advice on the nutrition of pregnant women and nursing mothers, however, is solely the province of doctors.

In Dieting

The INRC Institute has developed a special dieting method with the help of OCA which includes a special dietary regimen, physical activity and the consumption of increased doses of OCA.

People with Medical Conditions

Only physicians are competent to give advice on the diets of people with medical conditions. People on prescription drugs should also consult their doctors before taking OCA, for as OCA can improve the absorption of drugs, prescribed dosages may have to be adjusted. Summaries of clinical studies on the use of OCA in people with health issues are presented in Section 2 (The Use of OCA Supplements in Medicine), complete with the dosages recommended by doctors for the various conditions.

Optimisation of the Required OCA Supplements Amounts

Protein requirements differ from one individual to another. For calculating the optimal amount (for an adult engaging in normal physical activity) follow the procedure below (Ostan 2012):

a) Calculate the ideal body weight (I)

The formula to apply is $(\text{body height in centimetres} - 100) \times 0.9$ for men and $(\text{body height in centimetres} - 100) \times 0.8$ for women. For example, the ideal body weight for a 183 cm tall man (from here onwards person X) is 75kg.

b) Calculate the daily protein requirement (P)

The approximate gross amount of protein requirements is calculated by multiplying the ideal body weight (I) by 0.96. Thus, a 183 cm tall man needs 72g of protein daily.

c) Calculate the gross weight of protein consumed daily (U)

To do that, use the data from the table below.

Foodstuff	Coefficient of Equivalence	Protein Content
	EC	(in %)
Eggs (medium sized = 60 g)	1.25	13.0
Red meat, poultry, fish	1.25	20.0
Farm cheeses	1.0	14.0
Hard cheeses (Swiss, Edam)	1.0	30.0
Beans – dry	1.0	20.0
Peas – dry	1.0	22.0
Lentils – dry	1.0	24.0
Soy – dry	1.0	38.0
Soy – fresh	1.0	8.0
Tofu	1.0	7.0
Mixed vegetables and cereals	1.0	3.5
OCA	2.4	100.0

The contained gross amount of protein is calculated by applying the following formula: $\% \text{ protein content } (p) / 100 \times \text{the amount of foodstuff } (q) \times \text{the coefficient of equivalence } (EC)$. If person X eats 110g

cheese and 500g mixed vegetables and wholegrain cereal daily, he will obtain 50.5g protein in gross value terms (33 from cheese and 17.50 from mixed vegetables).

d) Calculate the gross daily protein deficiency or surplus (R)

Do that by applying the formula $R=P-U$. Since person X needs 72 g protein in gross value terms (P), but only consumes (U) 50.5g, his protein deficiency (R) equals 21.50g protein (gross value).

e) Calculate the net daily deficiency (N)

N equals the necessary amount of MAP according to the formula $N= R/2.4$. Person X thus needs 9 MAP pills daily ($21.5/2.4 = 9$)

Before taking an amount of OCA that exceeds the maximum dosage recommended by the manufacturer, consult your physician.

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