ZINZINO

Inspire Change in Life

# BalanceTest report

## Your test ID

| | | | |
|---|---|---|---|
| **Date** | .. | **BalanceOil** | Yes |
| **Country** | | **Other Omega-3** | Yes |
| **Sex** | Other | **BalanceOil AquaX** | Yes |
| **Age** | | **BalanceOil Vegan** | Yes |
| | | **Essent** | Yes |

Independently analyzed by:

VITAS ANALYTICAL SERVICES

# The facts you need to create a health routine that works

Your personal BalanceTest report provides key insights into your diet and lifestyle, and how it's reflected in your body. The test analyzes 11 different fatty acids in your blood, including your Omega-6:3 ratio. Your results are presented as six clear, science-based health markers, forming your unique fatty acid profile to guide a personalized diet and lifestyle routine.

## Check your status & track your progress

Use your test results as a reference point on your health journey to rebalance your body with less stress, fatty fish rich in EPA and DHA, and high-grade Omega food supplements such as BalanceOil+.
The first test gives you the facts about your current health status. The follow-up test reveals how well your body has responded to diet and lifestyle adjustments. We recommend waiting 120 days between tests to see meaningful changes from any adjustments.

## Confidential & objective analysis*

Your anonymous blood samples are third-party analyzed in strict confidentiality by an independent, Norwegian chemical laboratory* to ensure correct handling and unbiased results.

VITAS
ANALYTICAL SERVICES

*Vitas AS' contribution is limited to the chemical analysis of each dried blood spot (DBS) test, performed in accordance with applicable quality standards.

Please, note! This is a self-screening health test intended for informational purposes only, and the results should not be used to diagnose, treat, or cure.

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# KEY INSIGHTS

## #01

### Are you in the danger zone?

**95%** of the people tested do not have the optimal balance.

## #02

### **More** Omega-3, **less** Omega-6

Most people today have an imbalance of Omega-6 and Omega-3 and too low levels of Omega-3 due to our modern diet.

## #03

**Ratio 3:1**

Where you should be with a healthy diet or a supplement that works. Science recommends you have a 3:1 ratio between the essential fatty acids Omega-6 and Omega-3.

**Ratio 7:1**

People who take a traditional Omega-3 supplement are surprised, most of them have an average Omega-6:3 ratio of 7:1 instead of 3:1 or lower.

**Ratio 15:1**

Some people don't take any supplement and don't eat fatty fish regularly and have an Omega-6:3 ratio above 15:1. We find 30:1, 50:1, 80:1 and above. Don't worry! A recommended dosage of BalanceOil daily will correct it.

## #04

### We know the statistics

**5%** of those tested have a ratio of 3:1 or lower, which is the recommended Omega-6:3 ratio.

**20%** of those tested take an Omega-3 supplement, but their results are still not optimal.

**75%** of those tested do not take any Omega-3 supplement and often have a ratio of 15:1 or higher.

**95%** of those people taking a BalanceOil product daily have an Omega-6:3 ratio near 3:1 after 120 days.

## #05

### Zinzino BalanceOil a blend of polyphenols and omegas

BalanceOil contains a high amount of olive polyphenols combined with Omega-3, Omega-6, Omega-7 and Omega-9, which is exactly what you need to get your Omega-6:3 ratio to where it should be.

| | | | |
|---|---|---|---|
| **Your test ID** | | **BalanceOil** | Yes |
| **Date** | .. | **Other Omega-3** | Yes |
| **Country** | | **BalanceOil AquaX** | Yes |
| **Sex** | Other | **BalanceOil Vegan** | Yes |
| **Age** | | **Essent** | Yes |

This is a self-screening health test intended for informational purposes only, and the results should not be used to diagnose, treat, or cure.

# DIETARY ADVICE BASED ON THE RESULTS

**Omega-6:3 ratio**
The natural Omega-6:3 ratio according to our genes is below 3:1. When Omega-3 fatty acids make up more than 8% of all fatty acids, your Omega-6:3 ratio will be 3:1 or lower. The daily requirement of marine Omega-3's EPA and DHA is dependent on body weight. Adults weighing 80 kg need to consume approximately 3 grams of Omega-3's (EPA + DHA) daily to get their Omega-3 (EPA + DHA) level above 8%.

The daily recommended dosage of BalanceOil will safely increase the amount of Omega-3 to 8% in your body so that you can achieve a good Omega-6:3 ratio in 120 days. We also recommend that you incorporate a variety of fatty fish into your diet on a daily basis.

Most people also need to reduce Omega-6 in their diet. If your values show that you belong to that group, you should then avoid products that contain vegetable oils high in Omega-6, such as sunflower oil, corn oil and soybean oil.

If your values are not what you expected them to be, check whether you have consumed the correct dosage of BalanceOil every day. If you have consumed plain Omega-3 oils, we suggest that you switch to an Omega Polyphenol Balance supplement instead (such as BalanceOil).

**Fatty acid score**
A daily intake of BalanceOil in the recommended dosage will increase your Omega-3 index[WB*] above 8% in 120 days and improve your score. We also recommend that you incorporate a variety of fatty fish into your diet on a daily basis. In order to reduce your Omega-6 level, you should avoid products that contain vegetable oils high in Omega-6, such as sunflower oil, corn oil and soybean oil.

**Omega-3 index[WB*]**
The natural level of EPA in the blood is 3.6%, while that of DHA is 4.7%, and combined they need to be above 8%, preferably 10%. The daily requirement of marine Omega-3's EPA and DHA is dependent on body weight. Adults weighing 80 kg need to consume approximately 3 grams of Omega-3's (EPA + DHA) daily to get their Omega-3 (EPA + DHA) level above 8%. The daily recommended dosage of BalanceOil will safely increase the amount of Omega-3 to 8% or more in your body in 120 days. We also recommend that you incorporate a variety of fatty fish into your diet on a daily basis.

If your values are not what you expected them to be, check whether you have consumed the correct dosage of BalanceOil every day. If you have consumed plain Omega-3 oils, we suggest that you switch to an Omega Polyphenol Balance supplement instead (such as BalanceOil).

*Measures fatty acids in whole blood (WB=whole blood), which means all parts of the blood.

**Cognitive fatty acid index**
The Cognitive fatty acid index value should be below 1:1 for a sufficient and balanced supply of polyunsaturated fatty acids (Omega-6's and Omega-3's) to the brain and the nervous system. Marine Omega-3 essential fatty acids Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA) levels reflect mood- and brain-related wellness and are scientifically documented as factors contributing to a normal brain function.

The daily intake of BalanceOil in the recommended dosage will increase the Omega-3 levels of both EPA and DHA in 120 days. We also recommend that you incorporate a variety of fatty fish into your diet on a daily basis.

**Fatty acid fluidity ratio**
The daily intake of BalanceOil in the recommended dosage will increase your Omega-3 level in 120 days. Using BalanceOil as recommended is also a proven method to lower the level, or maintaining a low level, of saturated fats in the human blood.

If the total of the two saturated fats is above 37%, this indicates an imbalance between your intake of carbohydrates (sugar) and your energy consumption, which over time is a risk factor for lifestyle diseases and increased body weight. Excess carbohydrates in your diet will be converted to and stored as saturated fatty acids both in cell membranes and in adipose tissues. Reducing your carbohydrate and starch intake will also reduce the level of saturated fats in the body. You may benefit from switching to low-fat versions of some products in your diet.

**Omega-6 (AA) level[WB*]**
Arachidonic acid (AA) is the most important Omega-6 fatty acid. The body can synthesize AA from linoleic acid (LA), an essential fatty acid obtained from the diet, but it can also be supplied directly through foods. AA is the starting point for the production of hormones involved in physiological inflammation processes which are triggered to protect the body from infections or after an injury.

Modern diets have a large surplus of Omega-6 Linoleic acid (LA), which regulates the subsequent production of the Omega-6 fatty acid AA to be at an optimum value in the body. Good average values are in the range of 6.5% to 9.5% with an optimum target value of 8.3%. Due to the surplus of dietary Omega-6 (LA), the AA value is only very slightly influenced by dietary changes for the average person.

Due to genetics, some people have a lower or higher than average AA production. If your value is below 5%, you may benefit from adding foods high in AA to your diet, such as chicken, turkey, pork and farmed salmon. If your value is higher than 10%, you may benefit from avoiding the same foods. These recommendations are useful for most people but cannot be guaranteed to work for everybody due to genetic differences that are unique from person to person.

*Measures fatty acids in whole blood (WB=whole blood), which means all parts of the blood.

# HOW YOUR RESULTS ARE CALCULATED

The Zinzino BalanceTest evaluates the level of fatty acids in blood samples obtained from a fingertip. The test measures 11 fatty acids, which together contribute to approximately 98% of the fatty acids in the blood. The fatty acids include saturated, monounsaturated (Omega-9) and polyunsaturated (Omega-6 and Omega-3) fatty acids.

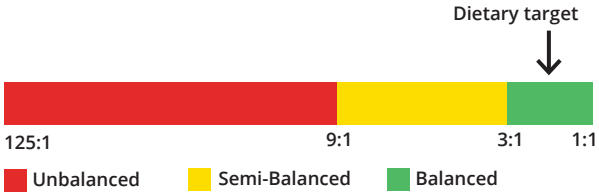
## The fatty acid profile derived from the analysis is used to calculate 6 different dietary indicators:

- Omega-6:3 ratio
- Fatty acid score
- Omega-3 index[WB*]
- Cognitive fatty acid index
- Fatty acid fluidity ratio
- Omega-6 (AA) level[WB*]

*Measures fatty acids in whole blood (WB=whole blood), which means all parts of the blood.

### Omega-6:3 ratio

Omega-6:3 ratio is measured as the ratio between the C20:4 Omega-6 Arachidonic acid (AA) and marine Omega-3 Eicosapentaenoic acid (EPA). This ratio is an approximate expression for the distribution between fatty acids and fish fatty acids in your diet. A surplus of vegetable Omega-6 fatty acids will make a diet unbalanced and pro-inflammatory. The ratio of Omega-6 (AA) and Omega-3 (EPA) should preferably be below 3:1. If this ratio is above 3:1, you may benefit from changing your diet. A low ratio of Omega-6 and Omega-3 is important for maintaining normal cell and tissue development (homeostasis), and it also help the body control inflammation.

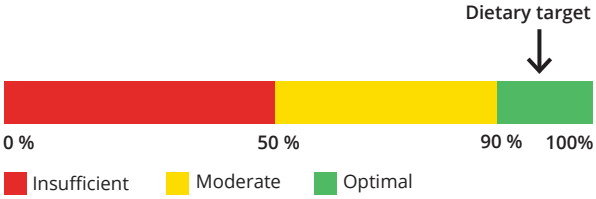



### Fatty acid score

First, the following 3 recognized health indicators are calculated:

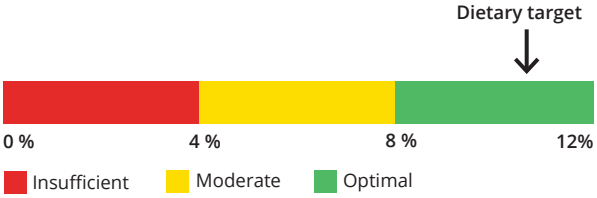
1. The value for the Omega-6 ratio is calculated like this: (DGLA+AA) * 100 / (DGLA+AA+EPA+DPA+DHA)
2. The value for the Omega-3 index[WB*] is the sum of EPA+DHA
3. The Omega-6:3 ratio is calculated as Omega-6 (AA) / Omega-3 (EPA).

Each indicator value is given the same weight in a second calculation and assigned a value between 0 and 100, which is then divided by 3 to get the Fatty acid score that ideally should be above 90. Note! EPA and DHA values have a high impact on all the calculations and if EPA and DHA percentages are low, then as a result very low or even zero Fatty acid score are not uncommon.



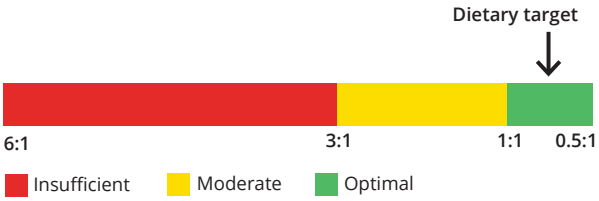

### Omega-3 index[WB*]

The Omega-3 index[WB*] is a combined percentage value of the marine Omega-3 fatty acids EPA and DHA out of the total amount of fatty acids found in the blood. Omega-3's have many benefits because they are the primary building blocks of your cells. EPA is dominant in the blood, muscles and tissues, while DHA is dominant in the brain, sperm and eyes. In the test report, the ideal range is 8% or above. The European Food Safety Authority (EFSA) has approved claims that EPA and DHA contribute to the maintenance of normal heart function. DHA also contributes to the maintenance of normal vision and the maintenance of normal brain function.



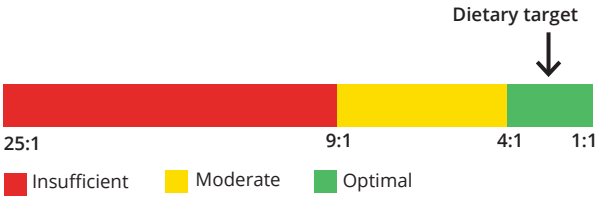

### Cognitive fatty acid index

This is the ratio between Omega-6 (AA) and Omega-3's (EPA+DHA). A sufficient supply of marine Omega-3 fatty acids EPA and DHA in the diet contributes to the maintenance of normal brain function. Daily administration of 3 g of marine Omega-3's EPA and DHA for 4 months significantly decreased feelings of anger and anxiety among substance abusers, compared with the placebo group in a study. Several other clinical studies show that cognitive performance improves with increased consumption of anti-inflammatory marine Omega-3's EPA and DHA. Childhood and old age are two critical and vulnerable stages of life, and Omega-3 deficiency is associated with learning and memory deficits, as well as mood swings. This value should be below 1:1.



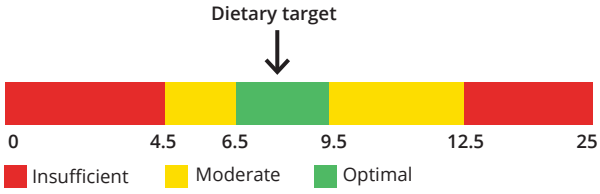

### Fatty acid fluidity ratio

The ratio between saturated fatty acids and the marine Omega-3 essential fatty acids Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA) is indicative of fatty acid fluidity ratio. The more saturated fats there are in a membrane, the more rigid that membrane is. Conversely, the more poly-unsaturated the fats are in a membrane, the more fluid that membrane is. Cell membrane composition and structural architecture is critical for the health of the cells and hence the body. On the one hand, the membrane needs to be rigid enough to provide sound cellular structural architecture. On the other hand, the membrane needs to be fluid enough to let nutrients in and waste products out. This ratio should be below 4:1.




### Omega-6 (AA) level[WB*]

The Omega-6 (AA) level[WB*] shows the measured value of the Omega-6 fatty acid Arachidonic acid (AA) as a percentage out of the total fatty acids measured. Good average values are in the range of 6.5 to 9.5% with an optimum target value of 8.3%. The AA percentage is part of several of our calculations and if your AA value is low or high, then it has an undesirable impact on the calculations for the Fatty acid score, the Omega-6:3 ratio and the Cognitive fatty acid index, therefore results might appear a bit odd.




*Measures fatty acids in whole blood (WB=whole blood), which means all parts of the blood.

# HOW TO CHANGE YOUR DIET – GUIDE

***Longer term dietary advice is based on the fact that main dietary sources have different fatty acid group profiles.***

## Fat groups with main sources in your diet

**Saturated fat**

- Fatty dairy products: milk, butter, cream cheese
- Meat
- Cakes and pastries
- Biscuits and crackers
- Sauces
- Fast food, hamburgers, pizza
- Surplus carbohydrates: sugar, starch, white bread, potatoes, rice and pasta

**Monounsaturated fat (Omega-9)**

- Olives and oliveoil
- Rapeseed oil
- Almonds
- Avocado
- Peanuts
- Brazil nuts
- Cashew nuts
- Hazelnuts
- Pistachio nuts

**Polyunsaturated vegetable fat (Omega-6)**

- Vegetable margarine, vegetable oils, mayonnaise
- Meat
- Sunflower oil and corn oil
- Soy bean oil
- Grapeseed oil
- Sesame seeds

**Polyunsaturated fish fat (Omega-3)**

- Fatty fish: salmon, trout, herring, mackarel, tuna, sardines, wolf-fish, flounder
- Zinzino BalanceOil (to restore and maintain balance)

**All diets, including a balanced diet, will show some deviation from an average balanced diet. If your 'Fatty acid score' is above 90%, you do not need to balance your diet. The advice to increase energy intake should not be followed if your body mass index is above 25 (BMI = your weight in kg / (height in meter × height in meter)).**

**Saturated Fats (non-essential)**
If you need to reduce your intake of saturated fats to improve your 'Fatty acid score' and 'Fatty acid fluidity ratio', you should avoid the products listed under "Saturated Fats" in Figure 1, or you may shift to low-fat versions of the same products. Note that excess sugar in your diet will be converted to and stored as saturated fatty acids both in cell membranes and in adipose tissues. Thus, reducing your sugar and starch intake will also reduce the level of saturated fats in your body.

Increased consumption of pure meat combined with a limited intake of cheese and other dairy products is advised if your saturated fat intake needs to be increased. In general, we do not recommend increased intake of any other product groups listed under "Saturated Fats".

**Monounsaturated Fats (non-essential)**
If you need to reduce your intake of monounsaturated fats to improve your 'Fatty acid score' and 'Fatty acid fluidity ratio', avoid the products listed under "Monounsaturated Fats" (Omega-9) in Figure 1.

Monounsaturated fats are generally considered to be healthier than saturated fats, although the body is able to produce both fatty acid groups from other "raw materials" like proteins and carbohydrates. In the traditional low-calorie Mediterranean diet, the dietary ratio between monounsaturated and saturated fatty acid groups is close to 2:1. In Zinzino Balance products, the ratio between monounsaturated and saturated fatty acids is 2:1, just like in the Mediterranean diet.

**Polyunsaturated Vegetable Fats (essential)**
If you need to reduce your intake of polyunsaturated vegetable fats to improve your 'Fatty acid score' and 'Omega-6:3 ratio', avoid the products listed in Figure 1 under "Polyunsaturated Vegetable Fats" (Omega-6), or you may shift to low-fat versions of the same products.

Try to avoid products that are formulated with high amounts of Omega-6 vegetable oils, such as sunflower oil, corn oil and soy bean oil. You can reduce your intake of Omega-6 by simply shifting to products that are formulated with vegetable oil sources low in Omega-6, such as olive oil and rapeseed oil. If your results indicate that your intake should be increased, then you may increase the intake of the same products.

**Polyunsaturated Fish Fats (essential)**
Today's Western diets are generally deficient in Omega-3's, compared with the diet on which humans evolved, and which helped establish our genetic patterns. Thus, most people need to increase their dietary intake of polyunsaturated fish fat. Since the vegetable Omega-3 (ALA) is not sufficiently converted to EPA and DHA in the body, the only food sources available to increase your intake of polyunsaturated fish fats are the various fatty fish species, such as those listed under Polyunsaturated Fish Fats (Omega-3)" in Figure 1.

Intake of polyunsaturated fish fats (Omega-3) improves the following dietary indicators:

- Omega-6:3 ratio
- Fatty acid score
- Omega-3 index[WB*]
- Cognitive fatty acid index
- Fatty acid fluidity ratio

The daily requirement of marine Omega-3's EPA and DHA is dependent on body weight. Adults weighing 80 kg need to consume approximately 3 grams of Omega-3 (EPA+DHA) daily to increase their Omega-3 (EPA+DHA) level above 8%. A minimum of 4% Omega-3 (EPA+DHA) level in the fatty acid profile requires at least 0.5 gram Omega-3 (EPA+DHA) daily. Most Omega-3 supplements on the market recommend daily dosages of marine Omega-3's in the range of 150 mg to 1.5 grams. This is far too low to reach the dietary target of above 8% Omega-3 (EPA+DHA) level if such Omega-3 supplements are not combined with daily consumption of fatty fish. A daily intake of 0.15 ml/kg body weight of BalanceOil will provide you with the required amount of marine Omega-3's.

*Measures fatty acids in whole blood (WB=whole blood), which means all parts of the blood.

# SOURCES OF FATTY ACIDS IN YOUR DIET

## The following is only a guideline providing examples of food sources for the 11 different fatty acids measured in our home test:

**Palmitic acid, C16:0, saturated**
**Stearic acid, C18:0, saturated**
**Oleic acid, C18:1, Omega-9**
**Linoleic acid, C18:2, Omega-6**
**Alpha-linolenic acid, C18:3, Omega-3**
**Gamma-linolenic acid, C18:3, Omega-6**
**Dihomo-gamma-linolenic acid, C20:3, Omega-6**
**Arachidonic acid (AA), C20:4, Omega-6**
**Eicosapentaenoic acid (EPA), C20:5, Omega-3**
**Docosapentaenoic acid (DPA), C22:5, Omega-3**
**Docosahexaenoic acid (DHA), C22:6, Omega-3**

Your diet is reflected in the fatty acid profile of your blood. Your personal fatty acid profile is presented in your home test results and forms the basis for our suggestions on how you may change your diet. The fatty acid profile provides an overview of the 11 most important fatty acids in your blood (98% of total fatty acids). To be able to change your diet efficiently, you need to know the fatty acid content of some common foods.

Almost all foods contain many different fatty acids, including saturated, monounsaturated and polyunsaturated Omega-6 and Omega-3 fatty acids. However, the amount of those fatty acids varies from one food to another, making it possible to change the intake of fatty acids by changing the types of foods consumed.

**Palmitic acid, C16:0, saturated**

- Milk and milk products, such as butter, cream, ice cream, sour cream, yoghurt, cheese, etc.
- Red meat and products made from red meat
- Palm oil and products that contain palm oil, such as pastry, crackers, fried potatoes, potato chips, etc.
- Coconut and coconut oil
- Avocado and products made from avocado
- Poultry and products made from poultry
- Eggs and egg products
- Various nuts, such as almonds, peanuts and Brazil nuts
- Wheat and products made from wheat

**Stearic acid, C18:0, saturated**

- Milk and milk products, such as butter, cream, ice cream, sour cream, yoghurt, cheese, etc.
- Red meat and products made from red meat
- Palm oil and products that contain palm oil, such as pastry, crackers, fried potatoes, potato chips, etc.
- Coconut and coconut oil
- Avocado and products made from avocado
- Poultry and products made from poultry
- Eggs and egg products
- Various nuts, such as almonds, peanuts and Brazil nuts
- Wheat and products made from wheat

**Oleic acid, C18:1, Omega-9**

- Vegetable oils, such as olive oil, rapeseed oil and sesame oil
- Avocado and products made from avocado
- Various nuts, such as almonds, peanuts, walnuts, hazelnuts and Brazil nuts
- Zinzino Balance products

**Linolic acid, C18:2, Omega-6**

- Vegetable oils, such as corn oil, sunflower oil and soy bean oil
- Pork meat and fat and products made from pork
- Palm oil and products that contain palm oil, such as pastry, crackers, fried potatoes, potato chips, etc.
- Avocado and products made from avocado
- Poultry and products made from poultry
- Eggs and egg products
- Wheat and products made from wheat

**Alpha-linoleic acid, C18:3, Omega-3**

- Vegetable oils, such as rapeseed oil and linseed oil
- Found in spinach and Brussels sprouts
- Found in berries like blueberries and lingonberries
- Found in walnuts

**Gamma linoleic acid, C18:3, omega-6**

- Found in minor amounts in vegetable oils and meat

**DihomoGamma linoleic acid, C20:3, Omega-6**

- Found in minor amounts in evening primrose oil and blackcurrant seeds

**Arachidonic acid (AA), C20:4, Omega-6**

- Red meat and products made from red meat
- Pork meat and fat and products made from pork
- Lamb and products made from lamb
- Poultry and products made from poultry
- Eggs and egg products

**Eicosapentaenoic acid (EPA), C20:5, Omega-3**

- Fatty fish and products made from fatty fish
- Liver of white fish
- Seafood and algae
- Zinzino Balance products

**Docosapentaenoic acid (DPA), C22:5, Omega-3**

- Fatty fish and products made from fatty fish
- Liver of white fish
- Seal oil
- Seafood and algae
- Zinzino Balance products

**Docosahexaenoic acid (DHA), C22:6, Omega-3**

- Fatty fish and products made from fatty fish
- Liver of white fish
- Seafood and algae
- Zinzino Balance products

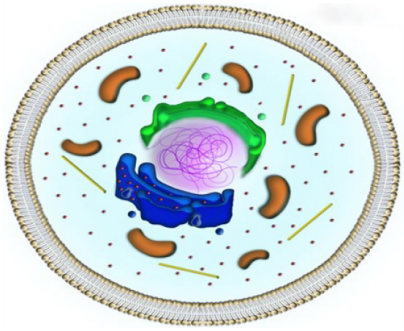
# DIET AND HEALTH

Rapid dietary changes over a short period of time (i.e. those that have occurred in the past 100-150 years) are a totally new phenomenon in the history of human evolution.

This is especially true in regard to the intake of Omega-6 and Omega-3 essential fatty acids, as well as antioxidants from vegetarian sources [3].

Ready meals and processed foods have pushed our calorie consumption towards vegetable oils, meat, sugar and starch, and away from complex carbohydrates, fibers and fresh vegetables [4, 5]. These unhealthy trends have been exacerbated by a 50% decrease in physical activity. In brief, our diet during the last 100-150 years has changed from balanced and anti-inflammatory to unbalanced and pro-inflammatory. Such dietary changes and reduction in physical activity have had a profound impact on our health.

Fatty acids carry out many functions that are necessary for normal physiological health. The contribution of fats to our energy supply is important both qualitatively and quantitatively. In addition to being a mere storehouse of energy, they are critical for cell membrane structure and function, as well as for local "hormonal" signaling. Imbalances in fatty acid levels are known to affect the clinical course of several lifestyle-related disorders [6, 7, 8, 9, 10].



**Omega-6 and Omega 3 Fatty Acids**

The increased consumption of soy bean oil in the US has increased the intake of the essential Omega-6 Linoleic acid (LA) from an average of 0.01 kg/year in 1909 to the present level of 12 kg/year [11]. The dietary Omega-6 Linoleic acid (LA) is converted to Omega-6 Arachidonic acid (AA) in the body, which is stored in our cell membranes. Bioactive components made from Omega-6 Arachidonic acid (AA) are responsible for both initiating acute inflammation and the continuation of chronic inflammation in the body, which may lead to several lifestyle-related health problems [6, 12].

Compared to the diet on which humans evolved, today's Western diets are generally deficient in Omega-3's. An alternative to the marine essential Omega-3 fatty acids EPA and DHA that the body needs as building blocks is the vegetarian Omega-3 fatty acid Alpha-linolenic acid (ALA). However, vegetable ALA is not sufficiently converted to EPA and DHA in the body to be able to act as a substitute for marine Omega-3 sources. Hence, they must be supplied by direct intake of EPA and DHA from marine sources. Using isotope-labeled ALA, the range of conversion of ALA to EPA has been estimated to be up to 8% in men and up to 21% in women of reproductive age [13, 14]. The overall efficiency of conversion from ALA is 0.2% to EPA, 0.13% to DPA and 0.05% to DHA [15]. An ALA-rich vegetarian diet generally provides less than 4% Omega-3 (EPA+DHA) in the fatty acid profile in whole blood (BioActive Foods, in-house results).

The key message is that a balanced Omega-6/Omega-3 fatty acid ratio is an essential part of a balanced diet aimed to promote good health.

**Polyunsaturated Essential Fatty Acids**

Omega-3's and Omega-6's are polyunsaturated fatty acids (PUFAs), which means that these fatty acids have more than one double bond. In the Omega-3 fatty acids, the first bond is located between the third and fourth carbon atom from the methyl end (CH3) on the carbon chain. Omega-6 fatty acids have their first double bond between the sixth and the seventh carbon atom from the methyl end. In the human body, saturated and unsaturated fats can be synthesized from carbon groups in carbohydrates and proteins, but we lack the necessary enzymes to produce the essential polyunsaturated fatty acids, such as Omega-3's and Omega-6's. Essential fatty acids (EFAs) are fatty acids that the body cannot produce itself. Therefore, they must be provided through diet. The most important of these fatty acids are Linoleic acid (LA, C 18:2, Omega-6) and Alpha-linolenic acid (ALA, C 18:3, Omega-3). From LA and ALA the body can synthesize, under optimal conditions, Arachidonic acid (AA, C20:4, n-6), Gamma-linolenic acid (GLA, C18:3, Omega-6), Dihomo-gamma-linolenic acid (DGLA, C20:3, Omega-6), Eicosapentaenoic acid (EPA, C20:5, Omega-3) and Docosahexaenoic acid (DHA, C22:6, Omega-3).

The synthesis is performed through a number of desaturation (i.e. addition of double bonds) and elongation (i.e. addition of two carbon atoms) steps. LA and ALA compete for the same desaturation and elongation enzymes in the synthesis of the long-chained fatty acids AA, EPA and DHA, meaning that even though ALA is a preferred substrate in the process, a higher production of AA will occur due to our high dietary intake of Omega-6 fatty acids, compared to Omega-3 fatty acids.

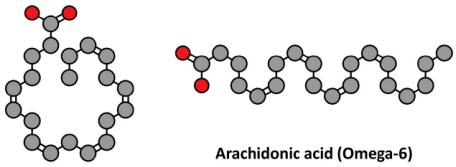
### Prostaglandin Synthesis

Further on in the process, locally functioning hormones and signaling molecules (eicosanoids) will be produced from AA and EPA in what is called prostaglandin synthesis. The eicosanoids are formed after an enzyme, cyclooxygenase is released, and the prostaglandin synthesis is initiated by oxidation of the fatty acids AA and EPA. When these fatty acids are oxidized, the initial structure changes into the type of prostaglandin needed in the body at that particular time. COX1 is the enzyme responsible for maintaining normal prostaglandin levels in the body, while COX2 is initiated when tissue damage or infection occurs. Prostaglandin synthesis takes place in almost all of the cells in the body. They belong to the group "eicosanoids" because they consist of 20 carbon atoms. Prostaglandins have 1 to 5 double bonds, shown by the number after "PG E" so PG E1 has one double bond, PG E2 has two, etc.

PG E2 is produced from the Omega-6 fatty acid AA, via LA, or directly from AA which we find, for instance, in the meat of grain-fed animals. PG E2 is prothrombotic, meaning that it is responsible for stopping bleeding, as well as wound healing, but PG E2 can also cause thrombosis, affects blood pressure and the contraction of involuntary muscles. PG E2 is involved in all inflammatory and pain processes in the body, hence it is important that PG E2 is balanced by PG E3, among others, to avoid chronic inflammatory situations in the body as a result of high LA and AA intake.

PG E3 is produced from the Omega-3 fatty acid EPA, via ALA, or directly from EPA consumed as part of a diet rich in fatty fish. PG E3 has anti-coagulation effects in the blood and anti-inflammatory functions in the body [16].

### Omega-6/Omega-3 Fatty Acid ratio and Prostaglandin Balance In The Body




The production of some prostaglandins is strongly affected by our diet, but also by the hormonal balance of the body, our health status, medication, etc. Many people have, due to a high intake of vegetable oils and meats, too much Omega-6 fatty acid AA in their body, resulting in high PG E2 production. If the diet is not balanced with an adequate intake of the Omega-3 fatty acids EPA and DHA, an imbalance between PG E2 and PG E3 can occur, resulting in an increased risk of developing chronic inflammation in the body. Prostaglandin synthesis may be balanced through a diet rich in Omega-3 fatty acids, which promotes the production of more of the beneficial prostaglandin PG E3.

### Oxidative Stress and Health

All cells produce free radicals and reactive oxygen that can turn polyunsaturated fatty acids, such as Omega-3's and Omega-6's, in cell membranes rancid. The body has therefore developed its own defense mechanism against rancidity. Oxidative stress is a condition that arises when there is an imbalance between the production of rancidity products (free radicals) in the body and the body's defense against rancidity (antioxidants). This often occurs after prolonged physical activity and is exacerbated by a diet that is unbalanced and pro-inflammatory. The imbalances that create oxidative stress in the body can be corrected by changing the diet. Good protection requires an intake of antioxidants found in about 5 to 9 portions of fruits, green vegetables or extra virgin olive oil every day [17, 18]. However, most people consume less than half of the recommended amount. People who exercise regularly but do not eat a balanced diet may have a level of oxidative stress that is too high. This suggests that active individuals with genetic susceptibility to disease are especially vulnerable if their daily diet is unbalanced and pro-inflammatory.

**Commercially Available Oils**

Before modern technology was introduced to food processing, organically sourced and unprocessed oils for dietary consumption were the only options available. Nowadays, most of the commercially available oils are processed or refined. The refining process eliminates all flavors, odors and contaminating agents that might be harmful or spoil the smell, taste or look of the product. However, the process also removes natural antioxidants, vitamins and other minor components like polyphenols that have beneficial anti-inflammatory properties. The removal of nutrients and important anti-inflammatory components is only partly compensated by the addition of antioxidants for stabilization purposes. The removal of these important nutritional components from the oils we consume enhances the pro-inflammatory profile of our present diet. A very recent example is olive oil. During the refining process of olive oil, the polyphenols are removed. In October 2011, the European Food Safety Authority (EFSA) approved a heart health claim related to olive oil polyphenols: "Olive oil polyphenols contribute to the protection of blood lipids from oxidative stress". Thus, removal of minor components during refining can affect the bioactivity of oils. A similar example is the removal of vitamin A and vitamin D during the refining of fish oil.

**Zinzino Balance Products**

To compensate for the loss of important nutritional components during the fish oil refining process, unique Zinzino Balance products contain a combination of biologically active antioxidants from cold-pressed olives (polyphenols), vitamin D and an adequate dose of marine Omega-3's EPA and DHA from fish.

These components work together in a synergy, which is beneficial. Omega-3 EPA and DHA from fish that circulate in the blood are activated rapidly when inflammation occurs locally. They are converted into biologically active substances (resolvins and protectins) that ensure a balanced immune response. Polyphenols are also powerful anti-inflammatory agents blocking inflammatory and tissue-damaging enzymes [19, 20]. Polyphenols such as those from olives (tyrosol, hydroxytyrosol and more) also possess antioxidant properties protecting the cells and blood lipids from oxidative stress proportionally to intake [21, 22]. Vitamin D contributes to the normal function of the immune system.

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# ADDING LIFE TO YOUR YEARS

Red blood cells in our bodies have a lifespan of 120 days, and the health of our  cell membranes is determined by our diet. When we change our habits and eat a healthy diet high in Omega-3's, we can see positive changes in our cells and their membranes after 120 days.

Our mission is to help you live a life in balance, and with the help of our BalanceTest you can measure and track your progress.

**Life in balance is a lifelong commitment.**

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