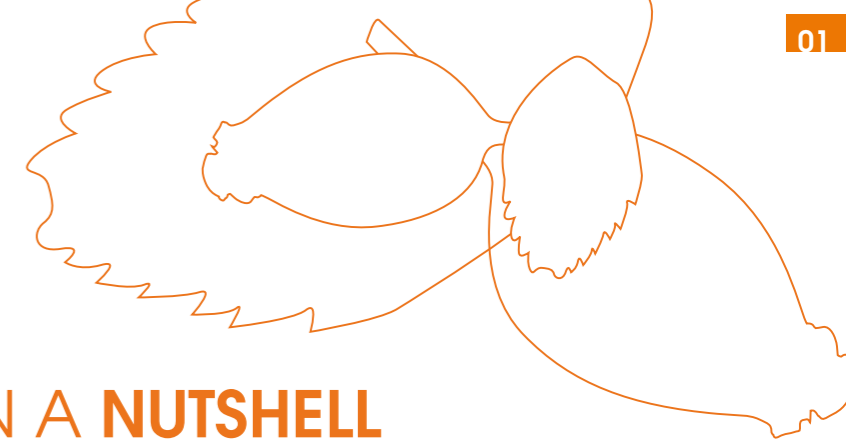


# SCIENTIFIC BROCHURE ON ROSEHIP POWDER

A new Opportunity for **Joint Health**

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## ROSEHIP POWDER IN A NUTSHELL

### A new dietary supplement for joint health

**Recent pre-clinical and clinical trials on the unique natural ingredient complex found in specially processed rosehip powder has demonstrated a powerful anti-inflammatory and anti-oxidative effect. Consistently positive clinical results and a favourable safety profile suggest that rosehip powder may receive increased attention as part of a modern treatment concept for improved joint health and possibly also for other chronic inflammatory and degenerative diseases.**

Rosehip powder has been clinically evaluated in numerous international scientific and clinical trials (1, 2, 3, 4, 5, 6, 7, 8, 9) where it has demonstrated clear benefits in people with inflammatory joint problems. Besides the generic constituents found in all fruits such as glucose and fructose, rosehip powder contains glycosides of mono- and diacylglycerols which comprises a group of galactolipids as well as vitamin C, vitamin E, minerals and bioflavonoids.

The ingredient complex found in specially processed rosehip powder provides distinct anti-inflammatory and anti-oxidative properties. A growing body of evidence suggests that the anti-inflammatory properties are the result of the presence of galactolipids while the other ingredients (vitamin C, vitamin E, bioflavonoids) account for the observed anti-oxidative effects.

The majority of the ingredients in rosehip powder appear to be heat-sensitive, breaking down at temperatures beyond 40 degrees. The cultivation, drying and manufacturing process therefore has a significant impact on the content levels of the respective active ingredients. Gentle drying methods in particular are crucial to the preservation of the active compounds believed to account for the joint health promoting properties of rosehip powder.

Critically, the conclusion that the ingredient complex in certain rosehip powders has anti-inflammatory effects is not only based on the inhibition of some inflammatory mediators - like with glucosamine - but on a significant inhibition of chemotaxis and subsequent migration of peripheral blood neutrophils and monocytes into the joint space and joint tissue, demonstrated

in in-vitro and in-vivo studies (1, 5, 6, 27). It is widely accepted that it is the relapsing and progressive accumulation of white blood cells combined with the subsequent release of chemical enzymes and toxic free radicals that causes destructive chronic inflammation with subsequent progressive joint damage, loss of function and joint pain (1, 6, 28, 40). The ingredient complex of rosehip powder is able to cope with both these mechanisms in parallel and may therefore break the vicious circle of chronic inflammation and cartilage destruction (1, 5, 6, 7).



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In summary, the natural ingredient complex found in specially processed rosehip powder has been shown in published clinical trials to reduce joint pain and improve flexibility and mobility in people suffering from osteoarthritis as scored by WOMAC\* (1, 2, 3, 4). Significant positive effects were demonstrated after three weeks of supplementation with specially processed rosehip powder (4), and in more than 80% of participants (3, 4). In an additional meta-analysis (n=360) of 4 clinical trials it was documented that rosehip powder significantly reduced pain (p<0.004) and disability (p<0.003) (12). In fact, the level of pain relief in clinical trials was in the same range as that of the NSAIDs paracetamol (acetaminophen) and aspirin (acetylsalicylic acid) (12, 13, 14, 15, 16). In terms of socio-economic benefits, the ingredient complex found in specially processed rosehip powder was able to demonstrate a significant 50% reduction of healthcare costs in osteoarthritis patients according to a comprehensive study conducted in Denmark by the well-known DIAS, Copenhagen University Hospital and the Danish University of Pharmaceutical Sciences (17).

The comprehensive scientific and clinical studies conducted on specially processed rosehip powder included more than 400 patients (1, 2, 3, 4, 5, 6, 7, 8, 9, 12) and revealed no clinically relevant side effects and no interactions with standard arthritis medications. Additionally, 40-50% of the participants in these studies reported being able to reduce their consumption of pain-killers and anti-inflammatory drugs when supplementing their diet with specially processed rosehip powder (3). Its consumption has also been shown to improve day-to-day life, energy levels and quality of life of people with pre-existing joint problems (3, 4). Interestingly, patients also reported an improvement in general well-being; including mood, sleep quality and energy (3).

Based on meta-analyses of glucosamine, chondroitin sulphate and rosehip powder, it appears that the ingredient complex found in specially processed rosehip powder is more likely to reduce pain and disability than glucosamine and chondroitin sulphate while providing significant additional benefits (1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17, 18, 19, 20). Combined with the favourable safety profile demonstrated in all these clinical trials, this suggests that specially processed rosehip powder may be an ideal food supplement in the treatment of patients with joint problems such as osteoarthritis.

\* Western Ontario and McMaster Universities; Osteoarthritis Index



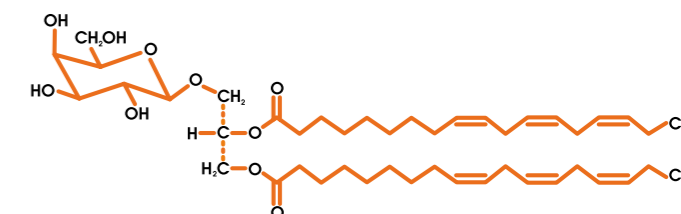
Considering the significant public interest in natural, low-risk alternatives to NSAIDs, corticoids and COX-2 inhibitors, particularly since the recall of Vioxx and other COX-2 inhibiting compounds, it is reasonable to predict that low-risk food supplements containing specially processed rosehip powder will receive more and more attention for inflammatory and partly inflammatory diseases including but not limited to osteoarthritis. For rheumatoid arthritis (9) and Crohn's disease (11) the first positive clinical results are already available.

## THE UNIQUE INGREDIENT COMPLEX FOUND IN SPECIALLY PROCESSED ROSEHIP POWDER

Galactolipids and other beneficial ingredients

**Glycosides, especially galactosides of mono- and diacylglycerides appear to be the main constituents of the active ingredient complex found in specially processed rosehip powder. Vitamin C and E also appear to play an important role, as do various minerals and bioflavonoids. Together, this active ingredient complex provides distinct anti-inflammatory and anti-oxidative properties.**

Specially processed rosehip powder contains an active ingredient complex composed predominantly of galactolipids, vitamin C, vitamin E, minerals and bioflavonoids. The primary active compounds are galactolipids of mono- and diacylglycerides. These special glycosides provide distinct anti-inflammatory properties while anti-oxidative effects predominantly result from the vitamin C, vitamin E and bioflavonoid content.



(2S)-1,2-di-O-((9Z,12Z,15Z)-Octadeca-9,12,15-trienoyl)-3--b-D-galactopyranosyl glycerol





## INFLUENCE OF CULTIVATION AND MANUFACTURING PROCESS ON THE INGREDIENT COMPLEX FOUND IN ROSEHIP POWDER

Heat-sensitive ingredients need special care

The ingredient complex found in rosehip powder is particularly heat- and light-sensitive so the growing, harvesting and processing of the raw rosehip material significantly influences the content of the joint health-promoting active compounds of any manufactured rosehip powder. Gentle, low-temperature drying and manufacturing techniques are needed in order to preserve these active compounds to maximise the beneficial effect on joint health.

Rosehips intended for use as a food supplement for inflammatory diseases like osteoarthritis should be cultivated and manufactured to high standards of product purity and potency. The rosehips should be cultivated without the use of herbicides or pesticides and the plants should be at least 3 years old before the fruit can be harvested.

The harvested fruits should pass through a separation step to remove the leaves - for example by laminar air current - and the resulting rosehip fruit should be frozen immediately to prevent unnecessary loss in quality. The fruit should then be dried in closed facilities using a low-temperature drying procedure in the absence of sunlight and at low humidity to achieve a gentle drying effect. The complete drying process should not last more than a few days to provide high content levels of all the heat- and light-sensitive active ingredients.

It should be noted however, that most commercially available rosehip products do not employ such a careful drying process. Instead, the rosehips are typically dried in the sun or in shaded pen-air areas with high day / night temperature variations in a process that lasts several weeks. These non-standardised drying procedures introduce a significant risk of dramatic decrease in active ingredient content, which may impact the efficacy of the product in promoting joint health.

After the gentle drying process and a separation step to remove the rosehip hairs, the remaining fruit flesh and seeds should be milled in a grinding mill. A powder or granular material may be obtained having a particle size of below 1 mm, although the 0.1 to 0.5 mm range is preferable. The resultant powder may then be placed into dosage forms such as capsules for use as food supplement.

In summary, the manufacturing procedure and particularly the drying process employed in the production of rosehip powder significantly affects the composition and content levels of the heat- and light-sensitive active ingredients.



## A NEW DIETARY SUPPLEMENT FOR JOINT HEALTH

Proven pre-clinical and clinical effects of rosehip powder

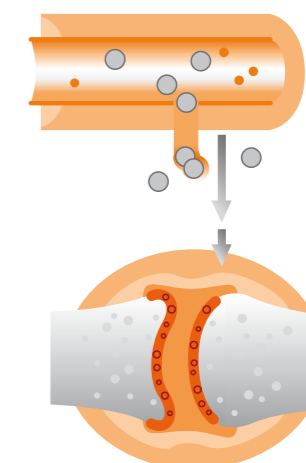
The active ingredient complex found in specially processed rosehip powder provides powerful anti-inflammatory and anti-oxidative properties (1, 5, 6, 27). The anti-inflammatory effect is based not only on the level of a few inflammatory mediators (as is the case with glucosamine), but on a powerful inhibition of the chemotaxis and subsequent migration of blood neutrophils and monocytes into the joint space and joint tissue at an inhibition level comparable to NSAIDs such as ibuprofen (1, 6, 29, 30, 31). At the same time, the ingredient complex found in specially processed rosehip powder provides significant anti-oxidative properties. Efficacy against both of these cyclic patho-physiological mechanisms means food supplements or medicinal drugs containing specially processed rosehip powder may reliably break the vicious circle of chronic inflammation and destruction. This makes it a valuable component in modern treatment programs for chronic inflammatory diseases such as osteoarthritis and rheumatoid arthritis.

Specially processed rosehip powder contains a unique active ingredient complex consisting mainly of galactolipids, vitamin C, vitamin E, minerals and bioflavonoids. The ingredient complex provides a powerful combined anti-inflammatory and anti-oxidative effect which has been demonstrated in numerous clinical trials (1, 6). The galactolipids provide the central anti-inflammatory effect and vitamins C and E provide the anti-oxidative effect. Therefore, the ingredient complex is able to cope with the two essential patho-physiological mechanisms of chronic inflammation and may be able to break the vicious circle of chronic inflammation and joint destruction.

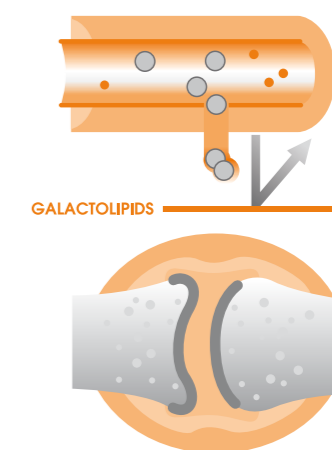
The ingredient complex found in specially processed rosehip powder demonstrated a marked inhibition of neutrophil chemotaxis in-vitro (1, 6) at a level comparable to NSAIDs such as ibuprofen (1, 6, 29, 30, 31). The galactolipids in rosehip powder demonstrated a marked inhibitory effect on the migration of human peripheral blood PMNs of 60% (from 100) with an in-vitro concentration of only 1µg/ml (6). For the sake of comparison, ibuprofen demonstrated PMN migration inhibition of only 50% (from 100) during in-vitro tests (1, 6, 29, 30, 31). Cell viability tests showed that the polymorphonuclear leukocytes (PMNs) were viable even at concentrations between 50 and 100µg/ml of the galactolipids found in specially processed rosehip powder, indicating that the inhibition of cell migration is reversible and not related to any toxic effects on the part of this active ingredient.

In line with these in-vitro results, clinical trials with osteoarthritis patients showed a pain relieving effect from specially processed rosehip powder

### Effects of galactolipids on chronic inflammatory diseases such as osteoarthritis



Migration of white blood cells into chronically inflamed tissue area



Galactolipids inhibit chemotaxis and the migration of white blood cells and break the vicious circle of joint pain



clinically comparable to that of NSAIDs such as acetylsalicylic acid (1). This positive clinical effect is likely to be the result of the unique ingredient complex of the present rosehip powder because the pain returned 12-14 days after discontinuation with rosehip powder supplementation (1). Consistent with these demonstrated anti-inflammatory effects, rosehip powder has been found to significantly reduce CRP levels in healthy volunteers and in patients with osteoarthritis (1, 27).

#### The anti-oxidative effect

It is the progressive accumulation of white blood cells and the subsequent release of chemical enzymes and toxic free radicals of these immune cells that causes and promotes cell and tissue damage and destructive chronic inflammation. Therefore, the involvement of oxidative stress is a well-known factor in the pathogenesis of most chronic inflammatory diseases.

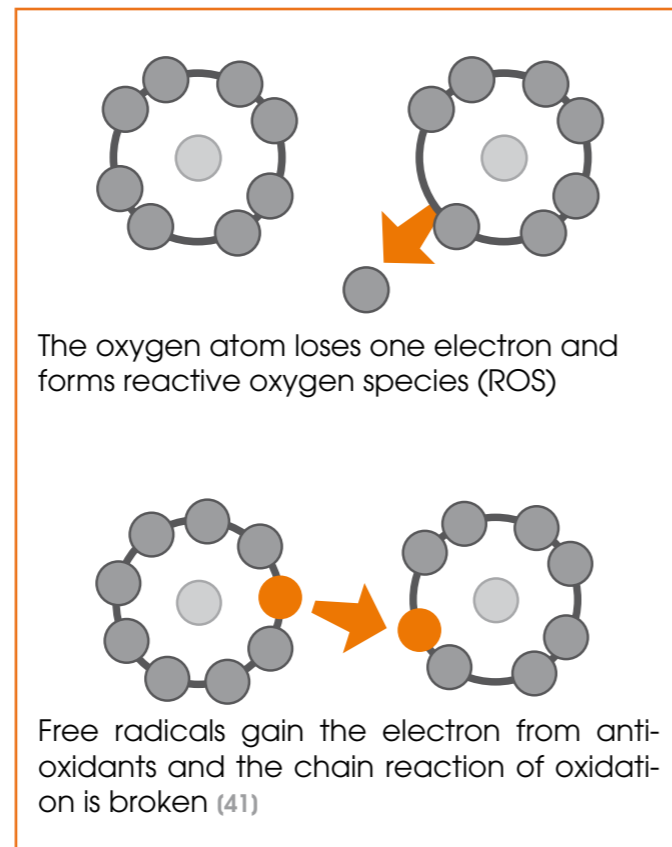
Oxidative stress is related to the production by all aerobic organisms of reactive oxygen and nitrogen species, including free radicals (7, 34, 35, 36, 37, 38, 39). Besides intra- and extracellular signalling, these reactive molecular species may initiate damaging cell structure. This is especially applicable when it comes to chronic inflammatory reactions, because the polymorphonuclear leukocytes (PMNs) and monocytes involved produce huge quantities of damaging proteolytic and hydrolytic enzymes as well as toxic oxygen radicals (1, 28).

By definition, a free radical is any atom (e.g. oxygen, nitrogen) with at least one unpaired electron in the outermost shell, which makes them highly reactive (41). A free radical is easily formed when a covalent bond between entities is broken and one electron remains with each newly formed atom (41).

When free radicals abstract an electron from a surrounding organic compound, unstable molecules like fatty acid peroxides can form, which can dissociate to produce two reactive radicals starting a chain reaction which can be "thousand of events long" (41, 42, 43). This can cause severe damage to all cells and biological structures affected by the free-radical induced oxidation (44).

Free radicals are essential for the defence of life so the body not only needs to be capable of producing them but also to control them. For that purpose the body has a number of mechanisms to minimise free-radical induced da-

mage and to repair any damage which does occur. These mechanisms include the enzymes superoxide dismutase, catalase, glutathione peroxidase and glutathione reductase, but antioxidants (like vitamins A, C and E) play a key role in these defence mechanisms as well, by quenching these reactive free radicals. This is why the powerful anti-oxidative properties of several key compounds in specially processed rosehip powder are so significant in the context of joint health; they help reduce oxidative stress caused by toxic free radicals, which helps prevent subsequent tissue damage.



In fact, osteoarthritis sufferers who eat large quantities of antioxidant-containing foods have been reported to exhibit a much slower rate of joint deterioration compared to people eating food containing lower amounts of antioxidants (46). Similarly, vitamin E has been demonstrated to reduce symptoms of osteoarthritis in both single-blind (47) and double-blind clinical trials (48, 49) at a dose of between 400 to 1,600 IU per day.

#### Safety information on rosehip powder

100% natural rosehip powder falls within the Safety Rating of the American Herbal Products Association (AHPA) for rosehips (*Rosa canina*), where it appears as a Category 1 herb. This means no precautions are required when the herb is consumed in doses consistent with usual label recommendations (21). All other available international monographs on rosehip powder

certify that the safety of preparations containing dried rosehip fruits (*Rosa canina*) is well-established (22, 23, 24, 25).

In addition, the comprehensive clinical studies conducted with specially processed rosehip powder, including more than 400 patients, revealed neither relevant side effects nor interactions with the standard pain-killers or anti-inflammatory arthritis drugs (1, 2, 3, 4, 5, 6, 7, 8, 9, 11). In summary, there are no known contraindications for the use of joint health supplements containing the present rosehip powder.

#### Recommended intake of specially processed rosehip powder

The recommended daily dose of specially processed rosehip powder depends on individual well-being, but experience suggests an optimal dose of about 4.5g per day for the first three months. After the first three months, the dosage can be reduced according to individual condition, but should not fall below 2.25g per day.

#### Conclusion

The unique ingredient complex found in specially processed rosehip powder may be an ideal supplement for consumers with chronic inflammatory diseases such as osteoarthritis. In scientific and clinical studies, the ingredient complex has demonstrated favourable tolerability and significant benefits for joint health. 40-50% of participants in these studies reported a reduced consumption of pain-killers and anti-inflammatory drugs, many of which can have severe side effects (3). It is therefore reasonable to predict that clinically proven low-risk products containing specially processed rosehip powder will receive more and more attention for their joint health promoting properties. There is even evidence of significant benefits for other inflammatory conditions. Indeed, for rheumatoid arthritis (9) and Crohn's disease (11) the first positive clinical results are already available.





# IMPROVED JOINT HEALTH WITH SPECIALLY PROCESSED ROSEHIP POWDER

A joint health supplement with a promising future

**The huge impact of joint problems and joint pain on mobility and quality of life on the one hand, and the obvious disadvantages and risks of the mainstay of current drug treatment on the other hand underline the need for improved treatment concepts. Especially chronic arthritis such as osteoarthritis and rheumatoid arthritis need to be diagnosed and treated as early as possible to prevent further irreversible joint damage and disability. Food supplements containing specially processed rosehip powder may play a major role in providing improved treatment concepts for chronic joint problems.**

## Musculoskeletal Problems: Significant impact on everyday life

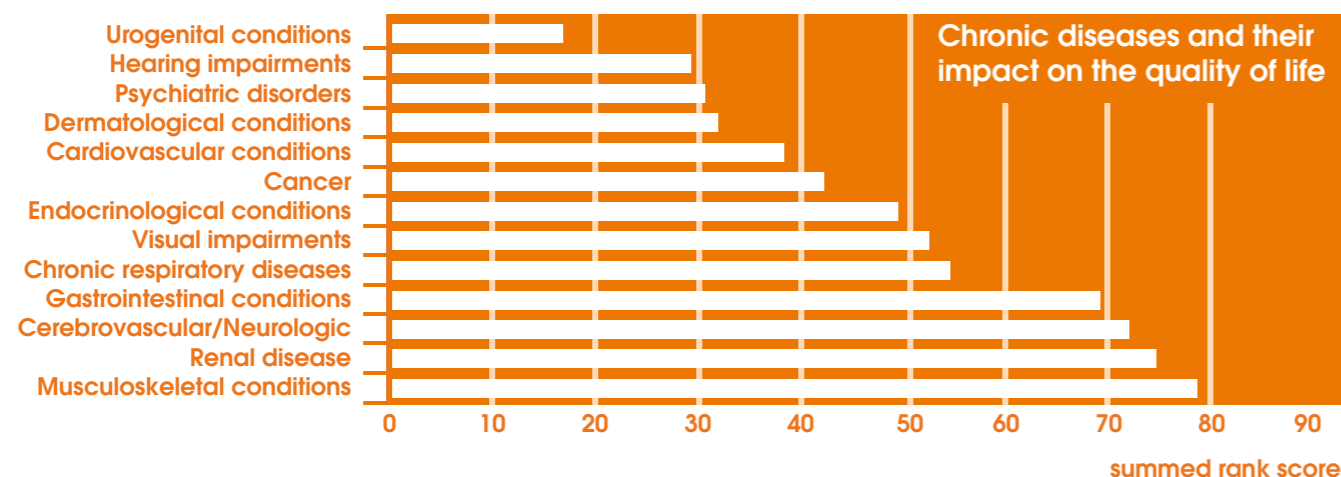
Every year throughout the world, bone and joint conditions or injuries account for millions of visits to doctors, hospital outpatient wards and emergency departments, often leading to hospitalisation and medical procedures. Musculoskeletal conditions are the second most common reason for consultation with a doctor, and in most countries account for 10 to 20% of primary healthcare care practice (53). These conditions affect all ages but become more common with age. They are the most common cause of severe long-term pain and the major cause of physical disability (50, 51).

Currently, nearly one in four adults are affected by longstanding musculoskeletal problems, which limit everyday activities and quality of life, inflicting enormous costs on health and social care systems (61). They significantly affect the psychosocial status of the people concerned as well as their families and carers (50, 51). Musculoskeletal problems are the most common cause of health-related work limitations, causing up to 60% of early retirement and long-term sick leave (54). Chronic disease has been ranked in terms of impact on quality of life by identifying SF-36 or SF-24 data in 8 compre-

hensive data sets of 15,000 people in the Netherlands (61). The summed rank showed that musculoskeletal conditions had the greatest negative impact on the quality of life.

Between 1990 and 2020, the number of people over the age of 50 is expected to double, which, combined with the changes in lifestyle occurring throughout the world, will dramatically increase the need for new treatment concepts for joint health problems. This has been recognised by the UN and WHO with their endorsement of the "Bone and Joint Decade" (55), an initiative that is globally supported by professional, scientific and patient organisations (56, 57, 58, 59).

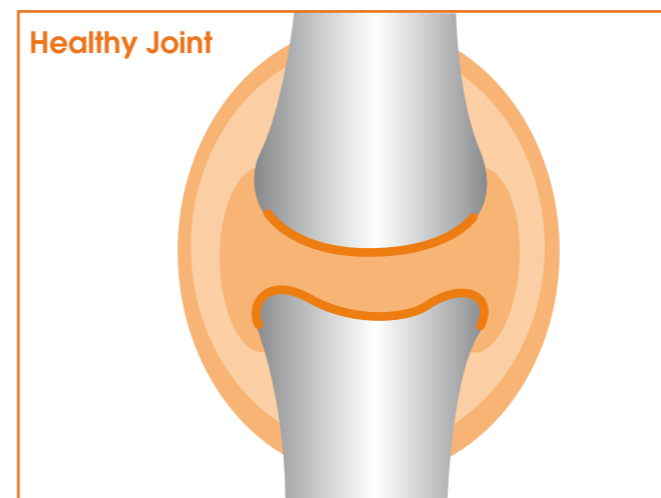
Similar initiatives have been implemented all over the world to improve the current situation and to prevent future musculoskeletal problems, which limit everyday activities and the quality of life (55, 56, 57, 58, 59, 60). The "WHO Health For All Programme" has called for people with disabilities to have substantially improved opportunities for health, requiring health promotion and protection at earlier ages to help achieve this target. Meanwhile Health21 emphasises the importance of integrated care and rehabilitation to enable people with chronic disease to achieve an active independent life (60).



## Acute and chronic arthritis

There are more than 100 different kinds of arthritis, the two most familiar being osteoarthritis and rheumatoid arthritis (62, 66, 67). However, conditions such as lupus, gout, psoriasis and many others may affect the joints as well.

Arthritis means inflammation of a joint, which is usually accompanied by symptoms of pain, tenderness and swelling as well as stiffness and deformity of the joints, especially in the case of chronic inflammation.



Arthritis may be short-term or "acute", as a result of injury or unusual stress on a joint, in which case nature will often take its course and symptoms will improve without any special treatment. Sometimes, however, arthritis may last longer or may relapse frequently leading to chronic inflammation of the joint tissue which will not improve without special intervention. Chronic arthritis means arthritis that has persisted for more than three months, and is more likely to be part of a longer-term illness. Chronic arthritis leads to a loss of articular cartilage, which is the cartilage lining the surface of the joint. Normally articular cartilage is a soft, smooth tissue, there to act as a bearing surface to allow the joint to move freely. When damaged, however, the surface becomes rough and no longer glides, causing pain and stiffness within the joint. Meanwhile, the damaged surface leads to further inflammation of increasing severity, which sparks a vicious circle of joint inflammation and progressive joint destruction.

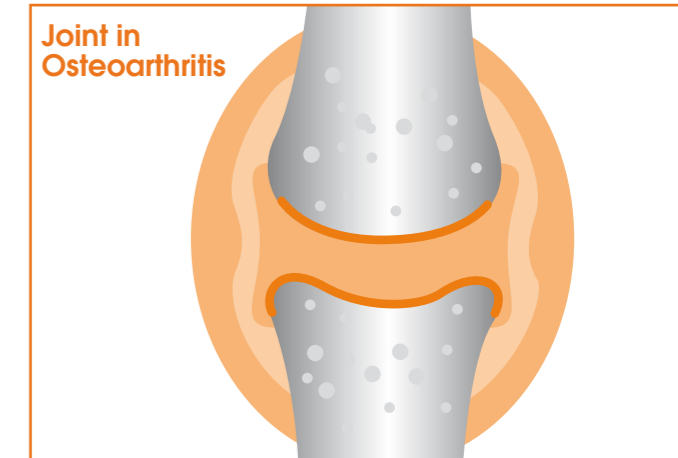
## Osteoarthritis

Osteoarthritis is the most common type of arthritis and tends to be more common in older people (62). It affects about half of all people over the age of 65 and is more common in women than in men (62).

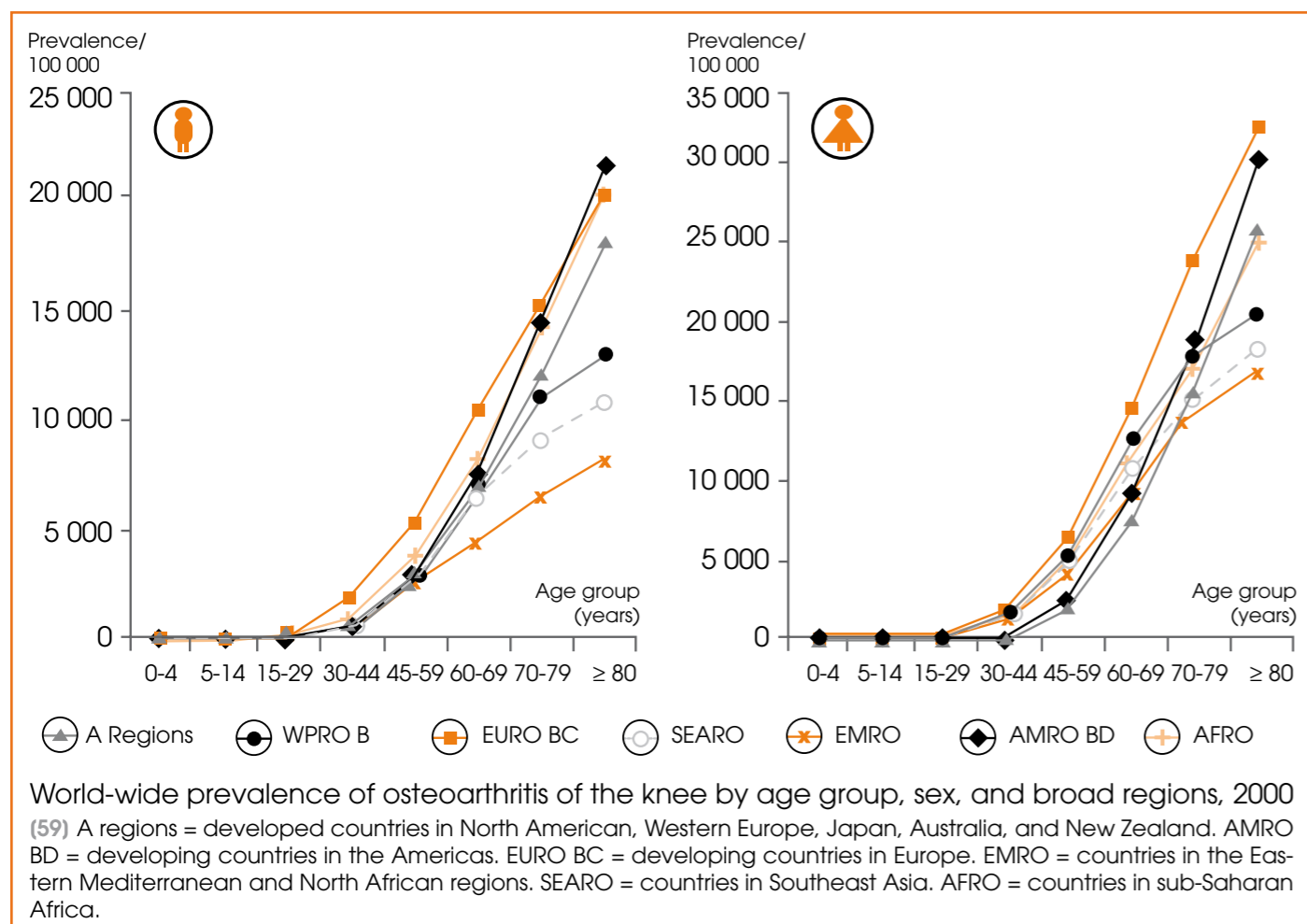
Why people develop osteoarthritis is not well understood, but it is not a natural part of ageing. Some people may inherit the tendency to develop osteoarthritis, and some cases may develop because of injury to a joint. Studies have shown that obesity, inactivity, and muscle weakness can increase a person's chances of developing the disease.

The "WHO Global Burden of Disease Monitoring Programme" has identified osteoarthritis as one of the top ten causes of disability for countries within the EU, while back pain is cited as a major cause of work incapacity. In terms of disability adjusted life years (DALYs), osteoarthritis is the 4th most frequently predicted cause of problems world-wide in women, and the 8th in men (52).

Osteoarthritis affects the weight-bearing joints like knees, hips and ankles, and causes the smooth surface of the articular cartilage to become rough. Normally, cartilage helps bones to glide over one another. In an OA patient, however, the cartilage is broken down and eventually wears away. As a consequence, instead of gliding, bones rub against each other, causing pain, swelling, and loss of motion.



This results in friction, which causes the joint to become deformed, painful and stiff and the muscles holding the joint together to become weak. At present, joint damage due to osteoarthritis is not reversible, so early detection and immediate intervention are critical to its successful management (72), especially as the course of osteoarthritis is often progressive (63, 64, 65).



### Rheumatoid arthritis

The estimated incidence of rheumatoid arthritis ranges from 4–13 per 100,000 for adult males and 13–36 per 100,000 for adult females. Estimates of the prevalence range from 1–6 per 1,000 for men and 3–12 per 1,000 for women (66, 67). In all studies, the prevalence was higher in women than men, the ratio varying from 1.7 to 4.0, and the peak age of onset is between 35 and 45 years (66, 67).

Rheumatoid arthritis affects the lubricating mechanism and cushioning of joints and is probably caused by an aberrant immune response, whereby the system designed to protect the body from foreign invaders attacks healthy tissue. It usually manifests itself in pain, stiffness and symmetrical swelling of the small joints of the hands and feet, but may also affect any other synovial joint. Symptoms of fatigue, weight loss and malaise can also occur.

The disease is usually progressive, affecting further joints as it develops and there may also be a systemic involvement of other organ systems. The destructive course of rheumatoid arthritis causes irreversible bone erosion and structural deformity of the joints leading to long-term pain and disability. RA has a significant impact on patients' physical, emotional and social well-

being, even early on in the onset of symptoms. Health status is significantly impaired from onset as measured by generic instruments (SF36, Euroqol 5D) or disease-specific instruments (HAQ) (68, 69, 70). Evidence suggests that within 10 years at least 50% of patients become unable to hold down a full-time job (71). Those whose disease starts early, before the age of 45 years, are more likely to become severely disabled. At present, tissue damage due to rheumatoid arthritis is not reversible so early diagnosis and treatment is crucial (73, 74, 75, 76, 77, 78, 79).

### The treatment concept in chronic arthritis

Treatments for chronic arthritis may be best started earlier (72, 73, 74, 75, 76, 77, 78, 79, 80) and management of arthritis usually involves several strategies, which work together to help bring relief for people in pain and an improvement in their quality of life. The goals in managing osteoarthritis are pain control, improved functional independence and enhanced quality of life.

Medicines and beneficial food supplements usually complement interventions such as exercise, physiotherapy, hydrotherapy and weight loss programmes aimed at maintaining function. Other treatments, such as meditation or stress management courses, aim to reduce the psychological consequences of arthritis. Com-

plementary therapies, such as acupuncture, yoga, massage therapy or tai chi, may also be helpful.

### Medical treatment

A wide variety of medication is available for the treatment of arthritis. Over-the-counter (OTC) medicines span a broad range of products including dietary supplements and complementary medicines, such as herbal and natural remedies, which are readily available in supermarkets, health-food shops and other outlets. Some medicines can only be obtained at pharmacies and sometimes only with a prescription.

### The goals of treatment are to:

- Reduce symptoms and signs
- Maintain joint function
- Minimize disability
- Limit structural changes
- Improve the quality of life

### Treatment is based on:

- How severe your symptoms are
- How symptoms affect your daily activities
- The success or failure of prior treatments
- The amount of joint damage
- Your treatment history
- The risks and benefits offered by the various treatment options
- Your personal preferences for treatment options, such as cost, side effects, and daily schedules

### The initial treatment plan for osteoarthritis may include:

- Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)
- Food supplements (including specially processed rosehip powder, glucosamine, chondroitin)
- Exercise to keep the joints mobile
- Weight loss, if the person is overweight
- Changing activities to reduce additional stress on joints
- Heat and cold therapy, such as hot compresses or cold packs
- Patient seminars about the natural course of arthritis

### Additional interventions in case of rheumatoid arthritis may include:

- Disease-Modifying Anti-Rheumatic Drugs (DMARDs)
- Analgesics (such as acetaminophen, codeine, or hydroquinone)
- Corticosteroids may be used to control flares

The mainstay of arthritis treatment are still pain-killers and anti-inflammatory drugs such as NSAIDs and corticoids, but these medicines can have side effects, and people with ongoing arthritis may need to juggle several different medicines to find an optimal balance. For these and other reasons it is worth looking at compounds with no known side effects and interactions, which could assist with treatment, and where possible reduce the dependency on pain-killers and anti-inflammatory drugs.

### Food supplements in joint health

Among dietary supplements claimed to be effective for arthritis, the ingredient complex found in specially processed rosehip powder, glucosamine and chondroitin have attracted particular attention.

Glucosamine and chondroitin sulphate can both be described as anti-degenerative and partly reparative; although glucosamine has shown only marginal anti-inflammatory activity. There is some experimental in-vitro evidence suggesting that glucosamine may have a beneficial role in cartilage metabolism and repair, but a chondro-protective effect has not been demonstrated in-vivo. Due to the mode of action it is not surprising that both substances show only partial pain relief for people suffering from joint complaints in clinical and scientific studies (18, 19, 20). Additionally, glucosamine and chondroitin are both characterised as slow-acting substances, taking several weeks or months to show a significant effect.

By contrast, the unique active ingredient complex of the specially processed rosehip powder provides powerful anti-inflammatory and anti-oxidative properties. Indeed the present rosehip powder has been shown in clinical and scientific trials to inhibit the chemotaxis of peripheral blood neutrophils and monocytes into the chronic inflammatory tissue (1, 5, 6). It is widely accepted that the relapsing and progressive accumulation of white blood cells combined with the subsequent release of chemical enzymes and toxic free radicals causes joint pain and destructive chronic inflammation. The ingredient complex found in specially processed rosehip powder is able to cope with these inflammatory and oxidative mechanisms in parallel and may therefore be able to break the vicious circle of chronic inflammation and joint destruction (1, 5, 6, 7).



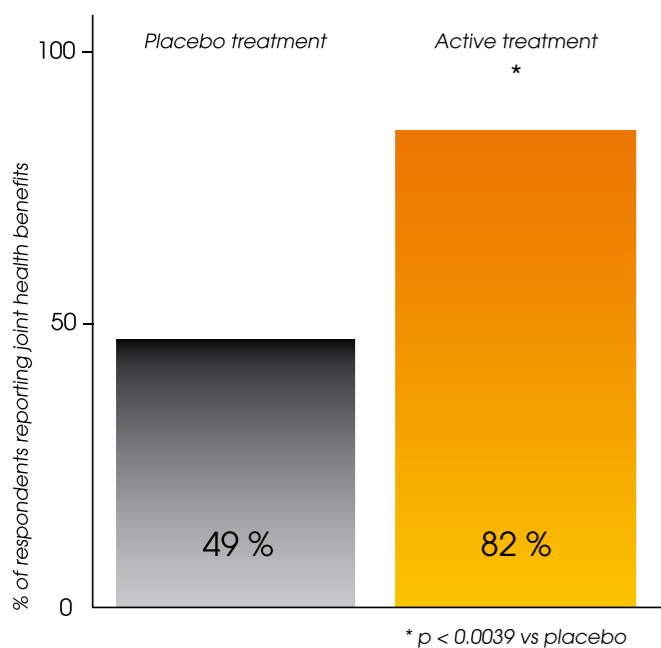
## RESULTS FROM SCIENTIFIC STUDIES AND CLINICAL TRIALS WITH SPECIALLY PROCESSED ROSEHIP POWDER

### Consistent results and clear clinical benefits

The reviewed studies comprise seven clinical and pre-clinical trials including more than 400 patients, with consistent results demonstrating pain relief and an improvement in joint function in patients suffering from arthritis. Combined with a favourable safety profile, this may make rosehip powder an ideal food supplement for joint health. In fact, specially processed rosehip powder may be beneficial for all diseases where chronic inflammation and free radicals play a major pathophysiological role

#### Main conclusions from clinical trials on specially processed rosehip powder

Unlike most nutritional supplements, specially processed rosehip powder has consistently been shown in clinical trials to reduce joint pain and stiffness and to improve flexibility and mobility as scored by WOMAC (1, 3, 4, 5, 8, 9). Its effects were detected in as little as 3 weeks (4) and in more than 80% of the people who used it (3, 4). In a meta-analysis (12) (n=360) of four independent clinical trials, the authors concluded that specially processed rosehip powder used as a food supplement significantly reduced pain ( $p < 0.004$ ) and disability ( $p < 0.003$ ) (12). In fact, the level of pain relief was found to be in the same range as that of the NSAIDs paracetamol (acetaminophen) and aspirin (acetylsalicylic acid) (12). Two of the clinical trials concluded



Data published by Winther et al. in 2005 in the Scandinavian Journal of Rheumatology, Vol. 34, 302-308.

that specially processed rosehip powder also improved day-to-day life, general well-being and energy levels in people with pre-existing joint problems (3, 4).

The clinical studies carried out with specially processed rosehip powder included more than 400 patients (1, 2, 3, 4, 5, 6, 7, 8, 9) and revealed no relevant side effects nor known interactions with standard arthritis medications. Additionally, 40-50% of the people who used the specially processed rosehip powder reported a reduced consumption of pain-killers and anti-inflammatory drugs (3).

Based on meta-analyses it appears that the special ingredient complex found in specially processed rosehip powder is more likely to reduce pain and disability than glucosamine and chondroitin sulphate. In a three-year study published in The Lancet in January 2001, only 20-25% of participants stated that pain in their knees and hips was reduced after taking glucosamine for 3 months (19). Scientists also failed to show that taking glucosamine improved mobility and flexibility or reduced the use of pain-killers or anti-inflammatory drugs. Meanwhile, a comprehensive Cochrane analysis including 20 studies (n=2,570 patients) evaluated on the basis of WOMAC questionnaires demonstrated that the pain relief offered by glucosamine is no better than placebo (18). Similarly, the recent GAIT study conducted by the National Institute of Health in the USA showed that glucosamine and chondroitin were unable to show efficacy and reduce pain when used as monotherapies (20). In fact, even the combination of glucosamine and chondroitin was only 25% effective at reducing pain (20).

## FUTURE USE OF SPECIALLY PROCESSED ROSEHIP POWDER FOR JOINT HEALTH

### Natural effective joint health products

In most regulatory environments, rosehip products are mainly classified as food or dietary supplements. Efficacy has been scientifically and clinically demonstrated and a favourable safety profile has been documented.

Due to the favourable safety profile and the consistently positive clinical and scientific results, the unique ingredient complex found in specially processed rosehip powder is likely to receive increased attention within the health care community for its potential joint health-promoting properties.

The scientific studies undertaken to investigate the active ingredients contained in rosehip powder have led to the granting of several national and international and national patents. In these patents the ingredient complex found in specially processed rosehip powder is consis-

tently outlined as an anti-inflammatory natural agent for alleviating or reducing symptoms associated with inflammation in general, including inflammatory symptoms related to arthritis.

Due to the clear and scientifically tested benefits of the unique ingredient complex found in specially processed rosehip powder it is reasonable to predict that this product will be a major feature in the joint health supplement market in the future. In fact, there are already two products available containing this special ingredient complex and the response from consumers has so far been extremely positive.





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## NOTES



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