Nicotinamide

Nicotinamide, also known as niacinamide and nicotinic acid amide, is the amide of nicotinic acid (vitamin B_3 / niacin). Nicotinamide is a water-soluble vitamin and is part of the vitamin B group. Nicotinic acid, also known as niacin is converted to nicotinamide and though the two are identical in their vitamin functions, nicotinamide does not have the same pharmacologic and toxic effects of niacin, which occur incidental to niacin's conversion. Thus nicotinamide does not reduce cholesterol or cause flushing, a known side effect of niacin, although nicotinamide may be toxic to the liver at doses exceeding 3 g/day for adults.

Nicotinamide is naturally present in small quantities in yeast, lean meats, fish, nuts and legumes. It is also often added to cereals and other foods. Oral nicotinamide is available as 20-30 mg in multivitamin combinations, and on its own as inexpensive 500-mg tablets. It has also been incorporated in many topical agents including sunscreens and cosmetic agents.

Nicotinamide used as a medicine may benefit the skin in several different ways. It has been reported to:

- Have anti-inflammatory properties, which may be used for the treatment of bullous (blistering) diseases.
- Effectively treat acne by its anti-inflammatory action and reducing sebum
- Improve skin barrier function through decreasing water loss through the epidermis (the outer skin layer) thus increasing skin hydration.
- Improve the complexion, by improving the pigmentation, blotchiness and redness of ageing skin- it is used in a number of cosmetic products.
- Reduce actinic keratoses and reduce the risk of skin cancer

How does nicotinamide work?

The broad clinical effects of nicotinamide may be explained by its role as:

- a cellular energy precursor
- a modulator of inflammatory cytokines
- an inhibitor of the nuclear enzyme poly(adenosine diphosphate-ribose [ADP]) polymerase [PARP], which plays a significant role in DNA repair, maintenance of genomic stability, and cellular response to injury including inflammation and apoptosis (cell death).

Nicotinamide in skin cancer

Research by Dr Michael Freeman from the Gold Coast showed that Nicotinamide 500 mg tablets, taken once daily with an extra when you go into the sun, reduces the production of new solar hyperkeratosis significantly, and reduces existing BCCs and SCCs by around 20 to 30%. Other researchers have used up to 1500 mg daily, but over 3000 mg daily can be toxic. Ongoing research as yet unpublished would suggest there appears to be a similar positive benefit in melanoma as well.

Other probable nicotinamde benefits- research projects

As mammals age, the number and function of their vascular endothelial cells diminishes. In humans, this begins at about age 40. This vascular aging leads to diminished muscle mass (promoting frailty), and it contributes to many

age-related diseases. Regular exercise moderates vascular aging, but exercise becomes progressively less potent as we age.

An international team reports that in mice studies, the nicotinamide mononucleotide (NMN) increases levels of nicotinamide adenine dinucleotide (NAD), which stimulates production of a molecule in endothelial cells that promotes response to angiogenic signals. Dietary intake of this supplement increased capillary density, improved blood flow through muscle, and increased endurance in old (but not young) mice. This effect was augmented further by exercise. It cannot be presumed that this research will apply to human health.

A small pilot study at University of Colorado has used 1000mg of nicotinamide daily appears to improve arterial health. This awaits a formal study, but at this stage no problems of any consequence were noted.

After using nicotinamde for around 10 years in large numbers in skin cancer, other potential benefits have been observed. In a small pilot trial of 10 patients, testing bone turnover before and after starting nicotinamide using a simple blood test (CTX assay) showed a reduced level of turnover suggesting there may be some value in management of osteoporosis. This study has also been launched.

Nicotinamide 4% cream has also be shown to improve fine lines and wrinkles, hyperpigmented spots, red blotchiness, and skin sallowness (yellowing) as well as elasticity. One study showed nicotinamide to increase the skin's production of ceramides, which are natural emollients and skin protectants, thus improving skin hydration.

A double-blind, placebo-controlled, split-face, left-right, randomised 12-week study in 50 women evaluated the effects of 5% topical nicotinamide on various signs of skin aging. The researchers reported topical nicotinamide resulted in significant improvement in fine lines/wrinkles, pigmentation, texture and red blotchiness.

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https://www.colorado.edu/today/2018/03/28/pill-staves-aging-its-horizon

Nicotinamide in osteoporosis

Over the past years since Dr Michael Freeman launched his research on the use of nicotinamide (Vitamin B3) in skin cancer, a few patients with other disease processes appeared to have benefits in their other conditions. In particular this was found in osteoporosis.

In osteoporosis it does not appear to provide a complete answer, but it does appear to slow bone turnover as measured using CTX testing. Again dosing is planned at 1 or 2 daily. People enrolling in this study should have the CTX (blood test) done prior to commencing nicotinamide, then repeated at 6th monthly intervals.

As data emerges from other diseases in the skin cancer treated patients, I expect that this will be expanded to reducing PSA progression and cardiovascular disease.