Skin
Tomato/Tomato-based foods and Disease Risk

Disease type	First Author	Study Title and Complete Citation	Date	Abstract	Study Type	G.Tom +, N, -	P.Tom +, N, -	F.Tom +, N, -	Lyco +, N, -	Other +, N, -
Skin	Naldi L	Dietary factors and the risk of psoriasis. Results of an Italian case-control study. Naldi L, Parazzini F, Peli L, Chatenoud L, Cainelli T. Br J Dermatol. 1996 Nov;135(5):858.	1996	We have conducted a case-control study to explore the relation between the consumption of selected foods and psoriasis. The out-patient services of nine teaching hospitals and five general hospitals in northern and southern Italy took part. Cases were newly diagnosed psoriatics with a history of skin problems of no more than 2 years. As controls, we selected subjects with newly diagnosed skin conditions, other than psoriasis, who were seen in the same out-patient clinics. Inclusion of cases and controls was limited to the age group 16-65 years. A total of 316 psoriatics and 366 controls were recruited. Anthropometric measures, including height and weight, were obtained. Diet was assessed by a semiquantitative food frequency questionnaire. Psoriasis appeared to be positively associated with body mass index (chi 2(1) trend 4.3, P < 0.05). Significant inverse relations with psoriasis were also observed for the intake of carrots (chi 2(1) trend 4.8, P < 0.05), tomatoes (chi 2(1) trend 26.3, P < 0.01), fresh fruit (chi 2(1) trend 11.7, P < 0.01) and index of beta-carotene intake (chi 2(1) trend 9.1, P < 0.01). Although largely explorative, these results provide some evidence for a potential role of diet in psoriasis.	CC	(-) ↓ risk psoriasis				
Skin	Sies H	Non-nutritive bioactive constituents of plants: lycopene, lutein and zeaxanthin.	2003	Lycopene, lutein, and zeaxanthin are major carotenoids in human blood and tissues but unlike beta-carotene do not contribute to vitamin A supply. These carotenoids are efficient antioxidants quenching singlet molecular oxygen which is formed in photooxidative processes and thus may	Interv		(-) ↓ erythema			

		Sies H, Stahl W. Int J Vitam Nutr Res. 2003 Mar;73(2):95-100.		contribute to the prevention of light-exposed tissue, skin and eyes, from light-induced damage. Increasing lycopene intake by daily consumption of tomato paste over a period of ten weeks provides protection against erythema formation following UV-irradiation. Lycopene and other carotenoids may be used as oral sun protectants and contribute to the maintenance of skin health. The yellow color of the macula lutea is due to the presence of the carotenoid pigments lutein and zeaxanthin. These macula carotenoids are suggested to play a role in protection against light-dependent damage. Filtering of blue light and scavenging of reactive intermediates generated in photooxidation are considered to be the underlying protective mechanisms. Epidemiological studies provide evidence that an increased consumption of lutein is associated with a lowered risk for age-related macular degeneration, a disease with increasing incidence in the elderly.						
Skin	Skovgaard GR	Effect of a novel dietary supplement on skin aging in post-menopausal women. Skovgaard GR, Jensen AS, Sigler ML. Eur J Clin Nutr. 2006 Oct;60(10):1201-6. Epub 2006 May 3.	2006	OBJECTIVE: The aim of the present study was to quantify the effects on skin in post-menopausal women of a novel dietary supplement (Imedeen Prime Renewal) that contained soy extract, fish protein polysaccharides, extracts from white tea, grape seed and tomato, vitamins C and E as well as zinc and chamomile extract. DESIGN: The study was a 6-month double blind, placebo controlled, randomized study on healthy post-menopausal females. SETTING: The study was performed at a commercial Contract Research Organisation (TJ Stephens & Associates Inc., TX, USA). INTERVENTIONS: Two tablets of Imedeen Prime Renewal or placebo were given twice daily for 6 months. SUBJECTS: Thirty-eight (active group) and 42 (placebo group) subjects completed the study out of 100. RESULTS: Clinical grading showed that	RCT				(-) ↓ wrinkles, pigmentatioin, skin sagging ↑ skin firmness	

				the active group had a significantly greater improvement (P < 0.05) compared to placebo for the face after 6 months treatment for: forehead, periocular and perioral wrinkles, mottled pigmentation, laxity, sagging, under eye dark circles and overall apperance; skin on the decolletage after 2, 3 and 6 months treatment and skin on the hand after 3 and 6 months treatment. Photo evaluation showed that the active group had a significantly greater improvement (P < 0.05) on the face after 3 and 6 months for several parameters. Ultrasound measurements showed that the active group had a significantly greater improvement (P < 0.0001) for density measurements after 6 months treatment. CONCLUSION: In summary, this novel dietary supplement, Imedeen Prime Renewal, provides improved condition, structure and firmness of the skin in post-menopausal women after 6 months.						
Skin	Stahl W	Dietary tomato paste protects against ultraviolet light-induced erythema in humans. Stahl W, Heinrich U, Wiseman S, Eichler O, Sies H, Tronnier H. J Nutr. 2001 May;131(5):1449-51.	2001	Carotenoids are efficient antioxidants capable of scavenging reactive oxygen species generated under conditions of photooxidative stress. It has been shown that supplementation with high doses of beta-carotene protects skin against UV-induced erythema. This study was designed to investigate whether intervention with a natural dietary source rich in lycopene protects against UV-induced erythema in humans. Tomato paste (40 g), providing approximately 16 mg/d of lycopene, was ingested with 10 g of olive oil over a period of 10 wk by 9 volunteers. Controls (n = 10) received olive oil only. Erythema was induced by illumination of dorsal skin (scapular region) with a solar simulator at the beginning of the study, after 4 wk and after 10 wk. Intensity of erythema was measured by chromatometry; the a-value was determined directly before and 24 h after irradiation. Serum carotenoid levels were measured by HPLC. At the beginning of the study, carotenoid levels did not differ	RCT		(-) ↓ erythema			(+) ↑ serum [lyco] with DS

				between the two groups. Serum levels of lycopene increased in supplemented subjects; the other carotenoids did not change significantly, and no change in serum carotenoids was observed in the control group. At wk 10, dorsal erythema formation was 40% lower in the group that consumed tomato paste compared with controls (P = 0.02; Wilcoxon-Mann-Whitney test). No significant difference between groups was found at wk 4 of treatment. The data demonstrate that it is feasible to achieve protection against UV light-induced erythema by ingestion of a commonly consumed dietary source of lycopene.						
Skin	Stahl W	Carotenoids and protection against solar UV radiation. Stahl W, Sies H. Skin Pharmacol Appl Skin Physiol. 2002 Sep-Oct;15(5):291-6.	2002	Upon exposure to UV light photooxidative reactions are initiated which are damaging to biomolecules and affect the integrity of cells and tissues. Photooxidative damage plays a role in pathological processes and is involved in the development of disorders affecting the skin. When skin is exposed to UV light, erythema is observed as an initial reaction. Carotenoids like beta-carotene or lycopene are efficient antioxidants scavenging singlet molecular oxygen and peroxyl radicals generated in during photooxidation. When beta-carotene was applied as such or in combination with alpha-tocopherol for 12 weeks, erythema formation induced with a solar light simulator was diminished from week 8 on. Similar effects were also achieved with a diet rich in lycopene. Ingestion of tomato paste corresponding to a dose of 16 mg lycopene/ day over 10 weeks led to increases in serum levels of lycopene and total carotenoids in skin. At week 10, erythema formation was significantly lower in the group that ingested the tomato paste as compared to the control group. No significant difference was found at week 4 of treatment. Thus, protection against UV light-induced erythema can be achieved by ingestion of a commonly	RCT		(-) ↓ erythema			(+) lyco in serum and skin

				consumed dietary source of lycopene. Such protective effects of carotenoids were also demonstrated in cell culture. The in-vitro data indicate that there is an optimal level of protection for each carotenoid. Copyright 2002 S. Karger AG, Basel						
Skin	Stahl W	Lycopene-rich products and dietary photoprotection. Stahl W, Heinrich U, Aust O, Tronnier H, Sies H. Photochem Photobiol Sci. 2006 Feb;5(2):238-42. Epub 2005 Aug 12.	2006	Plant constituents such as carotenoids and flavonoids are involved in the light-protecting system in plants and contribute to the prevention of UV damage in humans. As micronutrients they are ingested with the diet and are distributed into light-exposed tissues where they provide systemic photoprotection. beta-Carotene is an endogenous photoprotector, and its efficacy to prevent UV-induced erythema formation has been demonstrated in intervention studies. Lycopene is the major carotenoid of the tomato and is a very efficient singlet oxygen quencher in the group of carotenoids. Following ingestion of lycopene or tomato-derived products rich in lycopene, photoprotective effects have been demonstrated. After 10-12 weeks of intervention a decrease in the sensitivity towards UV-induced erythema was observed in volunteers. Dietary carotenoids may contribute to life-long protection against harmful UV radiation.	RCT	(-) ↓ erythema			(-) ↓ erythema	
Skin	Rizwan M	Tomato paste rich in lycopene protects against cutaneous photodamage in humans in vivo: a randomized controlled trial. Rizwan M, Rodriguez-Blanco I, Harbottle A, Birch-Machin MA,	2011	BACKGROUND: Previous epidemiological, animal and human data report that lycopene has a protective effect against ultraviolet radiation (UVR)-induced erythema. OBJECTIVES: We examined whether tomato paste--rich in lycopene, a powerful antioxidant--can protect human skin against UVR-induced effects partially mediated by oxidative stress, i.e. erythema, matrix changes and mitochondrial DNA (mtDNA) damage. METHODS: In a randomized controlled study, 20 healthy women (median age 33 years, range 21-47;	RCT				(-) Acute photodamage	Erythema Matrix changes Mitochondrial DNA (mtDNA) damage

		Watson RE, Rhodes LE. Br J Dermatol. 2011 Jan;164(1):154-62. doi: 10.1111/j.1365-2133.2010.10057.x. Epub 2010 Nov 29		phototype I/II) ingested 55 g tomato paste (16 mg lycopene) in olive oil, or olive oil alone, daily for 12 weeks. Pre- and postsupplementation, UVR erythemal sensitivity was assessed visually as the minimal erythema dose (MED) and quantified with a reflectance instrument. Biopsies were taken from unexposed and UVR-exposed (3 × MED 24 h earlier) buttock skin pre- and postsupplementation, and analysed immunohistochemically for procollagen (pC) I, fibrillin-1 and matrix metalloproteinase (MMP)-1, and by quantitative polymerase chain reaction for mtDNA 3895-bp deletion. RESULTS: Mean ± SD erythemal D(30) was significantly higher following tomato paste vs. control (baseline, 26·5 ± 7·5 mJ cm(-2); control, 23 ± 6·6 mJ cm(-2); tomato paste, 36·6 ± 14·7 mJ cm(-2); P = 0·03), while the MED was not significantly different between groups (baseline, 35·1 ± 9·9 mJ cm(-2); control, 32·6 ± 9·6 mJ cm(-2); tomato paste, 42·2 ± 11·3 mJ cm(-2)). Presupplementation, UVR induced an increase in MMP-1 (P = 0·01) and a reduction in fibrillin-1 (P = 0·03). Postsupplementation, UVR-induced MMP-1 was reduced in the tomato paste vs. control group (P = 0·04), while the UVR-induced reduction in fibrillin-1 was similarly abrogated in both groups, and an increase in pCI deposition was seen following tomato paste (P = 0·05). mtDNA 3895-bp deletion following 3 × MED UVR was significantly reduced postsupplementation with tomato paste (P = 0·01). CONCLUSIONS: Tomato paste containing lycopene provides protection against acute and potentially longer-term aspects of photodamage.						