

- **Individual optimum:** to be determined for each individual case; much higher quantities (up to 70 grams/day) may help in treatment of degenerative conditions;
- **Minimum** (EC RDA) not yet established; estimated at 0.54% of calories (1 - 2 grams/day);
- **Less than RDA:** no official figures; estimated over 95% of population;
- **Deficiency** of ALA from lack in diet — refined foods, choice of omega-3 poor foods; increased requirement;
- **Symptoms include:** visual disturbances, motor incoordination, tingling sensations in arms & legs (multiple sclerosis-like), failure of growth; dry skin, lack of energy & stamina, increased blood triglycerides, proneness to tumours, increased platelet stickiness; excess series 2 prostaglandins in tissues;
- **Toxicity:** excess energy (sleeplessness); nausea (from weak liver);
- **Reversed by:** lowering intake;

### ***Therapy with ALA***

- Therapeutic dose: 15 to 35 grams/day or even more;
- Alleviates symptoms of ALA deficiency;
- Increases energy level & stamina; increases metabolic rate; shortens time necessary for fatigued muscles to recover from exercise; speeds wound healing; may improve visual function, colour perception & mental acuity in older people; may induce feeling of calmness; may improve behaviour of delinquents resistant to counselling;
- Softens dry skin; makes hair & nails strong; enhances beauty of show animals;
- Decrease platelet stickiness; lower blood triglycerides; lower high cholesterol in some;
- Lowers amount of insulin required by diabetics (close monitoring required);
- May be helpful in allergies, asthma; may improve liver function;
- Decrease water retention (oedema); decrease inflammation & arthritis pain;
- Enhances immune function; helps fight strep and malarial infections;
- Reverses & inhibit tumour formation; transformed human cancer cells in tissue culture are killed by ALA;

### ***GAMMA-LINOLENIC ACID (GLA)***

**General:** essential fatty acid derivative; omega-6;

- Rarely found in oils; best studied source is evening primrose oil;
- **History:** identified in 1949 in oil of evening primrose; studies of effects of GLA on health began in 1959; first GLA-containing evening primrose oil marketed in 1972;

### ***Nutrition***

- **Sources:** best: evening primrose oil; fair: borage, black currant seeds, hemp seeds;
- **Supplements:** encapsulated 10% GLA cold-pressed (no solvent) evening primrose oil, evening primrose oil and borage oil blends.
- **Absorption** from intestine; also absorbed through skin;
- **Improved by:** sufficient bile;
- **Antagonized by:** insufficient bile;
- **Stability:** destroyed by light (generates free radicals), oxygen (peroxides = rancidity) & heat (increases rate of spoilage by light & oxygen; above 160°C, twisted trans-fatty acids begin to form); frying & deep-frying is very destructive;

- **Storage:** in fat (adipose) cells; in cell membranes; in membranes surrounding intracellular organelles;
- **Excretion:** not excreted; converted to other important substances;
- **Metabolism:** converted into derivatives and prostaglandins;
- **Caution:** may worsen temporal lobe epilepsy & manic depressive symptoms;

### ***Functions of GLA***

- Precursor from which body makes DGLA, the parent of beneficial series-1 prostaglandins;
- Through prostaglandins, lower blood pressure, make platelets less sticky, decrease inflammation, enhance sodium & water excretion by kidneys; enhance immune function;
- Lower cholesterol & triglycerides;

### ***Quantities***

- **Measurement:** milligrams; grams;
- **Optimum** (SONA) average ranges not established; estimated optimum: 300 to 500 mg/day (from 3000 - 5000 mg. of evening primrose oil/borage oil);
- **Individual** optimum needs to be determined individually;
- **Minimum** (EC RDA) not yet established; healthy body can convert LA into GLA;
- **Less than RDA:** no official figures;
- **Deficiency** of GLA from lack of omega-6 oils in diet; inability to convert LA to GLA due to faulty diet, lack of necessary minerals & enzymes, slowed enzyme activity due to age or genetic inability to convert;
- **Symptoms** might include: dry skin; PMS; atopic eczema;
- **Toxicity:** rare, usually due to traces of solvents in GLA-containing oil;
- **Reversed by:** changing to oil not solvent extracted;

### ***Therapy with GLA***

- Treatment of PMS (combined with vitamins C & B-6 & minerals zinc & magnesium);
- Treatment of atopic eczema;
- Improve skin texture & smoothness; useful in skin moisturizer creams;
- Prevent alcohol hangover;
- Reduces both high blood pressure (hypertension) and platelet aggregation, as well as decreasing cholesterol and triglyceride levels, reducing risk of heart attack;
- May relieve symptoms of rheumatoid arthritis. About two-thirds of patients suffering from moderate cases of the disease reported complete freedom from symptoms;
- Infants who develop eczema when switched from mother's milk (rich in DGLA) to cow's milk (no DGLA) respond extremely well to GLA supplementation;
- Hyperactive children, who generally exhibit low levels of PGE1 and GLA, respond positively to oral administration of GLA;
- Transformed human cancer cells in tissue culture, that lose their capacity to transform LA into GLA & to make series-1 prostaglandins, are killed by GLA;
- Useful for losing weight;
- Used successfully to treat fibrocystic (benign) breast disease;
- Helpful in Sjogren's syndrome in which tear & salivary glands dry up;
- Patients with multiple sclerosis, a disease characterized by faulty metabolism of unsaturated fatty acids, benefit from GLA supplementation; most MS patients receiving GLA supplements report feeling better & show objective improvements;