Chlorella: Search of pharmacological action

(At the 61st Japanese Society of Nutrition and Food Science)

[Research purpose]

Various pharmacological actions by chlorella were confirmed by many examinations in humans or animals. Such actions are seemed to come not only from miscellaneous amino acids, vitamins and minerals etc. and also from bioactive component C.G.F. (chlorella growth factor)

Moreover, chlorella contains various biological active agents besides C.G.F., and it may still have unknown pharmacological actions up to the present examination. Then, we studied pharmacological actions paying attention to the disease related enzymes and receptors out of a huge number of enzymes [Please refer (1)] and receptors [Please refer(2)] which are participating in maintenance of bioactivity.

[Test method]

The influence of Chlorella powder to the activities for 118 kinds of enzymes and 129 kinds of receptors is studied by using the in vitro assays (test-tube examination).

[Result]

As the result of this study, inhibition of 21 kinds of enzymes and 21 kinds of receptors by chlorella powder were confirmed. Some expectable effects on the enzymes and the enzymes by chlorella powder are shown in Table 1

Cyclooxygenase-2 (COX-2) in this table is involved in inflammation, so new potential effects of the prevention and the moderation of inflammation related disease by chlorella were suggested.

These predicted test results were required to be clarified by additional tests.

Table I. Expectable actions by ingestion of chlorella

Inhibited enzymes and receptors	Expectable actions by ingestion of chlorella
Cyclooxygenase-2 (COX-2)	Anti-inflammation and some mitogenic actions
Peptidase CTSS, Calpain-1	Allergy, An autoimmune disease, and muscular dystrophy
Protein/ Threonine Kinase AURKA	Anti-cancer action
Protein Tyrosine phosphatase, PTPRF	Medical treatment of insulin resistance
Glutamate receptor NMDA, AMPA, Kainate	Anti-spasm and nerve protection, Anti-mental disease
Tachykinin NK_1, NK_2	Anxiety and depression
Serotonin 5-HT_{2B}	Migraine
Adenosine Transporter	Ischameia reperfusion
Leukotriene $CysLT_1$, $CysLT_2$	Asthma, nasal inflammation, itchiness
Purinergic $P2_Y$	Thrombosis

[Definition]

(1) Enzyme

A enzyme is a protein produced in vivo for the smooth biochemical reaction. Each enzyme supports corresponding biochemical reaction for the survival of living matter. Smooth and orderly biochemical reaction of the enzyme brings healthy state, but excess or inadequate enzyme reaction brings ill health.

(2) Receptor

A receptor is a protein exists in and/or on a cell, and receives information from in vivo and/or ex vivo and transfers to the other cells. Abnormal propagation of the information causes abnormal cellular activities, and accordingly brings unhealthy state.

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