

October 3, 2011  
SBI ALA promo Co., Ltd.

**ALA Study Results Presented at Japanese Society of Parasitology, 71st Meeting.**

**- Findings of ALA's growth inhibiting effect against *P. falciparum* malaria parasite growth -**

SBI ALA promo Co., Ltd. (Head Office: Minato-ku, Tokyo; Representative Director and CEO: Yoshitaka Kitao; "SBI ALA promo"), a subsidiary of SBI Holdings, Inc. that conducts research and development of cosmetics, health foods, and pharmaceuticals using 5-aminolevulinic acid (ALA)<sup>\*1</sup>, has found that ALA, a natural amino acid, has a growth inhibiting effect on the *P. falciparum* malaria parasite growth, in joint research with Tokyo University.

The study results were presented at the Japanese Society of Parasitology of the Eastern Branch, 71st annual meeting, held on October 1, 2011.

Falciparum malaria is one of the world's three major infectious diseases that reportedly infects 300-500 million and kills 1.5-2.7 million people each year. Malaria is known to infect humans via the mosquito *Anopheles gambiae* and have a complex life cycle. The emergence of drug-resistant parasites is now a serious problem. Also, the expansion of infected areas due to global warming is an alarming concern.

The joint research found that ALA had a growth inhibiting effect against the malaria parasite (*P. falciparum*) and that the growth inhibiting effect was enhanced dose-dependently by concomitant administration of ALA and iron chloride. Further, it confirmed that the growth inhibiting effect was especially effective at the ring stage<sup>\*2</sup> in the life cycle of the malaria parasite and that at the ring stage intermediates of heme metabolism<sup>\*3</sup> over-accumulated in the apicoplasts<sup>\*4</sup>.

These findings suggest that ALA's growth inhibiting effect against malaria parasites is very likely different from that of any known antimalarial agents; and it is expected to lead to side effect-free treatment and prevention of malaria using natural amino acid.

ALA promo will make further efforts to pursue ALA research for malaria eradication, which is a global challenge. Research outcomes and up-to-date information about ALA will be available also from ALA plus Lab (URL: <http://www.ala-plus.jp/>).

Glossary:

**\*1: 5-aminolevulinic acid (ALA)**

"ALA" is a type of natural amino acid that has survived the last 3,600 million years and is contained even in food products such as red wine and radish sprouts. It is known to get involved in production of chlorophyll, which is essential for photosynthesis in plants, and in production of vitamin B12, blood constituents and intracellular energy in animals. "ALA" is well known as an extremely important and essential ingredient for any species. It is used in a wide range of applications from intraoperative diagnosis of brain tumors and cancer screening in the medical field, anemia prophylaxis in the health foods field, to care for pimples and rough skin in the cosmetics field.

**\*2: Ring Stage**

Malaria parasites have complicated life cycle. They initially infect to human liver via mosquitoes, then after destroying liver cells, they are released to blood stream. They invade to red blood cells and fed with hemoglobin inside red blood cells. Growth stage proceeds as "Ring Stage", "Trophozoite Stage", and "Cyzone Stage" inside blood cells. After destroying blood cells, Merozoites are released to blood stream again. At this stage, symptoms peculiar to malaria such as high fever occurs. Thus, suppressing growth at Ring Stage, the initial stage of blood cell infection, leads to malaria treatment.

**\*3: Heme Synthesis**

Heme is essential to higher organisms, regardless of animals or plants, but synthesis process and participant organelles are different between them. In animals, ALA, initial material of heme synthesis, is synthesized at mitochondria and metabolized into porphyrin at cytosol. Then porphyrin move toward mitochondria again and synthesized into heme. In plants, ALA is synthesized and metabolized into porphyrin at chloroplasts, and metabolized into heme at mitochondria. It is under investigation how heme at chloroplast is synthesized. Malaria parasites are unique organisms that have characteristics of both animals and plants. Their heme synthesis mechanism is of interest in related to evolution of organisms.

**\*4: Apicoplasts**

Malaria parasites have unique organelles called Apicoplasts that no other protozoa have, and their origin is thought to be chloroplasts.