The beneficial effects of medicinal mushrooms such as Shiitake, Maitake, Reishi on human health and well-being are well recognized. Yet, not all mushroom extracts are alike. The biologically active polysaccharides present in raw mushrooms have a molecular weight of more than 100,000 Daltons, which is too large to be absorbed efficiently by the human body. Active Hexose Correlated Compound (AHCC®) is produced by a long-term cultivation of the medicinal mushroom Coriolus versicolor, leading to the generation of smaller and unique polysaccharides with remarkable health-supporting properties.

AHCC® is produced through a unique, patented fermentation process. AHCC® was developed in the late 1980’s by the Japanese biotechnology company Amino Up Chemical, in collaboration with scientists from the University of Tokyo. It started with the screening of hundreds of medicinal mushroom species, looking for those with the highest capacity to boost natural killer (NK) cell activity. A process of mycelium culture was then developed, during which enzymes from the mushroom’s cells process the naturally occurring polysaccharides into smaller sized (5,000 Daltons) alpha glucans. These unique, specific compounds confer remarkable properties to AHCC®, which has become Japan’s #1 specialty immune supplement and is used for a variety of applications including immune support, anticancer, liver protection, reduction of cancer therapy side effects.

AHCC® and immune function support
The effects of AHCC® on immune function are extensively documented, with studies conducted in both rodents and humans. In one of these human studies, a double blind, placebo-controlled trial on healthy volunteers, AHCC® consumption for 4 weeks led to a significant increase of total dendritic cell number (Terakawa et al., 2008).

Assessing the full effects of nutraceuticals on healthy subjects can be somewhat challenging, since the baseline values of immune parameters in these people are already optimal. One approach can be to perform trials on populations with altered immune function, such as elderly people. One study performed on 30 healthy adults aged 50 years and more, taking AHCC® for 60 days, showed an effect of AHCC® treatment on CD4+ and CD8+ immune cell activity, with an increased production of cytokines IFN-γ and TNF-α (Yin et al., 2010).

Another recent study (Takanari et al., 2015) investigated the effects of AHCC® on the seasonal variations of immune function. The study took place in Japan, at the beginning of the cold season (November and December), which is a period where people experience suppression of immune competence, leading to an increased risk of infection (suppression of local immune response and a decrease in NK cell number). In healthy volunteers consuming 1 g AHCC® daily for 4 weeks, the number of NK cells was maintained throughout the treatment whereas it decreased significantly in a placebo group. A score of immunological vigor, which integrates 7 different parameters related to immune cells (counts and ratios of several B and T cell subtypes) was also maintained in the AHCC® group, while it decreased significantly in the placebo group.

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Research continues to accumulate, confirming the role of AHCC® as an immune function enhancer, that will improve the ability of our body to fight against various types of infections.

Protection against infections
The positive effects of AHCC® on immune cell function suggest that it can confer protection against various external microbial infections. Multiple animal studies, reviewed in Mura et al., 2010, have indeed confirmed the protective effects of AHCC® against pathogens like Candida albicans, Pseudomonas aeruginosa, methicillin-resistant Staphylococcus aureus, as well as influenza virus and West Nile virus. A remarkable study (Roman et al. 2013) investigated the influence of AHCC® treatment on the response to influenza B virus. In that study, healthy adults began AHCC® supplementation immediately after receiving a shot of influenza vaccine. Three weeks after the shot, the number of NK and CD8+ cells were higher in the AHCC® treated group than in the control group; most interestingly, AHCC® supplementation also increased the titers of protective antibodies to influenza B. Therefore, it appears that AHCC® improves our body’s protection against pathogens by modulating both natural and acquired immunity.

AHCC® as an adjuvant therapy for cancer treatment
The immune-supportive activity of AHCC®, as well as its capacity to protect the liver, make it a supplement of choice for use in combination with conventional cancer therapies. Indeed, chemotherapies and radiation weaken immune defenses, making patients more vulnerable to opportunistic infections. On the other hand, many chemotherapy drugs can cause significant liver damage. Several human clinical studies have looked whether AHCC® could limit these side effects, improve the patient’s quality of life or even increase the efficacy of chemotherapy. One study followed the evolution of 269 hepatocellular carcinoma patients for up to 5 years after surgery. 113 of these patients took 3 g AHCC® per day all over the period. The AHCC®-treated group had a significantly longer no recurrence period and an increased overall survival rate than the control group (Matsu et al., 2002). Another study, involving 245 patients with gastric or colon cancer, gave similar results (Kawaguchi, 2009). A third study, with patients suffering from various types of cancer (colon, pancreas, lung, ovary), focused on the reduction of chemotherapy adverse effects. AHCC® provided significant beneficial effects on hematopoesis and hematotoxicity; it also significantly improved several parameters related to global quality of life, including appetite loss and dyspnea (Ito et al. 2014).

Conclusion
AHCC® is one of the most researched immunomodulatory nutraceuticals with close to 50 Pubmed references documenting its effects in various fields of medical science. As AHCC® works indirectly, by boosting the number and activity of immune cells, it shows similarly broad range of benefits with demonstrated efficacy in the fight against viral, bacterial, fungal infections as well as cancer cells. AHCC® has been used in more than 20 countries for more than 20 years, and has been proven to be safe and devoid of side effects.

Contact Information
For any further information regarding AHCC® studies, regulatory status and availability, please contact VF Bioscience SAS, 310 rue Jules Valles 59120 Loos-lez-Lille, France.

References
• Chutaputthi et al., 2010. Immunological effect of active hexose correlated compound (AHCC) for the eradication of HPV infections in women suffering from various types of cancer (colon, pancreas, lung, ovary), focused on the reduction of chemotherapy adverse effects. AHCC® provided significant beneficial effects on hematopoesis and hematotoxicity; it also significantly improved several parameters related to global quality of life, including appetite loss and dyspnea (Ito et al. 2014).

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