

*The MHE Research Foundation's  
Humanitarian and Scientific Achievement Award*



**Is presented to  
Yu Yamaguchi, M.D., Ph.D.  
Professor Developmental Neurobiology Program,  
The Burnham Institute, La Jolla, CA**

**This Award has been created to show our Foundation's appreciation to scientists who have shown years of extraordinary commitment to the better understanding of MHE and their years of service to the MHE community.**

We hope that children living with MHE can be inspired and understand the accomplishments of Dr. Yu Yamaguchi and the future recipients of this Award. While many people will have to spend their lives overcoming all the physical challenges of MHE, it is their mind, compassion and commitment that can and will pave the way to making their dreams come true. And with this, they will leave their own very special mark in this world and make it a better place for us all.

The MHE Research Foundation salutes the recipient of the **Humanitarian and Scientific Achievement Award**. Dr. Yu Yamaguchi has demonstrated his commitment to The MHE Research Foundation time and again and to the research community at large. A noted scientist doing extensive research on MHE, Dr. Yamaguchi has shared his expertise and knowledge whenever asked, and has volunteered to take on the huge task of co-organizing the third International MHE Conference to be held July 2009.

Dr. Yamaguchi was contacted by our foundation's National Director of Research Sarah Ziegler who spoke with him in detail about all the different symptoms that she had been seeing in people with MHE. She went on to speak with him concerning why she believed that these symptoms were connected to MHE and moreover why Orthopaedic physicians had not connected these symptoms to MHE before, due to the rare nature of this disease. How could any researcher really think about discovering treatment, if they did not know what all symptoms were and how they are connected to Multiple Hereditary Exostoses. Dr. Yamaguchi took on this challenge and over the past 5 years has been a world leader not only in the research he is conducting; but he also brings his discoveries to the scientific community at large. For more than one hundred years MHE was thought of as a bone disease, where by multiple bone tumors formed. Both researcher and physicians now think about MHE to be multifaceted disorder thanks to so much effort given by Dr. Yamaguchi. His research includes neurobiology, bone and cartilage in order to study this disease as a whole with all that this entails. As more of this research emerge both parents and physicians will be able to intervene much earlier and get the child suffering from these symptoms such as learning disabilities the educational resources they need to help overcome these disabilities. The lives of the MHE child is much brighter thanks to not only Dr. Yamaguchi's scientific efforts but also his humanitarian efforts as well.

Dr. Yamaguchi was born at Sendai, Japan, to a family of medical tradition. Both of his parents, both of his grandfathers and great-grand father were all M.Ds. He met his wife Masumi as they both attended Tohoku University School of Medicine and went on to have three children. They had a son Tsubasa, who is now a College senior, a daughter Mai, who just started college this September, and a daughter Shoko, who is now high school senior.

Yu Yamaguchi earned his M.D. from Tohoku University in Japan in 1981, followed by a Ph.D. in 1985. He came to the Burnham Institute for Medical Research for his postdoctoral training. He was appointed to the staff in 1991 where he has continued his research.

Dr. Yamaguchi created a conditional EXT1 knockout mouse model. These conditional EXT1 knockout mice are being used for genetic studies to figure out how the deficiency of EXT1/heparan sulfate causes MHE. These conditional knockout mice, which allow knocking out EXT1 at the site and time of researchers' desire, are very useful for diverse studies on the function of EXT1/heparan sulfate. Dr. Yamaguchi and his lab have been able to distribute these mice to more than 20 laboratories around the world (US, Europe, and Japan) to help studies by other MHE investigators. Using this model system, Dr. Yamaguchi has demonstrated that mutations of EXT1 influence not only bones but also the nervous system. Although frequently ignored in the clinical front, MHE patients tend to have some mental, neurological, and muscular symptoms. Such symptoms include: mild social interaction deficits, heightened sensitivities to sensory stimulation, difficulties to concentrate, and muscle weakness. Dr. Yamaguchi believes these neurological symptoms can be explained by the deficiency of heparan sulfate in nerve cells. Indeed, recent analysis of knockout mouse behavior has revealed that these mice have deficits in certain aspects of learning and the levels of fear/anxiety, as well as alterations in nerve cell wiring. In addition, Dr. Yamaguchi has recently discovered that knockout of EXT1 in embryonic structures that destined to become bones and cartilage causes severe bone abnormalities. These findings have provided us with a new insight into the reason why MHE patients frequently associate a variety of symptoms other than exostoses / osteochondroma formation, and suggest potential novel MHE treatment paradigms.