MILBON

News Release

March 13, 2015

Microlevel Visualization of Differences in Metal Distribution in Grey Hair and Black Hair using SPring-8

~ New Research into Grey Hair ~

The Milbon Co., Ltd. (President and CEO: Ryuji Sato) Central Research Institute has worked alongside Assistant Professor Hidekazu Takano from the Graduate School of Material Science, University of Hyogo to conduct an analysis of the metals contained in the grey hair and black hair obtained from the same subjects (Japanese women). The results confirmed that there is a difference in the volume of metals between grey hair and black hair. Furthermore, use of the Hyogo Beamline (BL24XU) located at the SPring-8 Synchrotron Radiation Facility*1 allowed the differences in metal distribution in cross sections of grey hair and black hair to be visualized on the mircolevel for the first time ever.

The differences in the volumes and distribution of metal in grey hair and black hair is believed to have a large effect on the properties of the hair, including the color reaction of hair color products. It is our intention to reflect these findings in our hair color products being developed for future release. We have announced these research results externally as follows.

[External Release]

Released At: 6th Research Symposium of the Hair Scientists Association
Release Title: New Information Concerning Grey Hair and Black Hair
Released By: Yoichi Nagano
Release On: February 4, 2015

[Research Background]

A variety of the metals that are found in hair are used as catalytic agents by hair color products in order to create a bleaching or color reaction. While research into the metal found in hair has been reported numerous times in the past, there has never been a detailed report into the grey hair and black hair of Japanese women. This is what led Milbon to research the metals contained in the grey hair and black hair of Japanese women.

[Research Results]

Hair collected from a sample of around 20 Japanese women was divided into grey and black hairs, and then tested. ICP-OES*2 was used to perform a metal quantitative analysis, making it clear that Japanese women have less metal in their grey hair than in their black hair. Furthermore, use of the SPring-8 BL24XU microbeam XRF*3 allowed the differences in metal distribution in grey hair and black hair to be visualized on the mircolevel for the first time ever. We intend to conduct further research onto the relationship between these new findings and the chemical reactions of products such as hair color, seeking to link them into the development of better performing hair cosmetics in the future.

<<Reference Materials>>

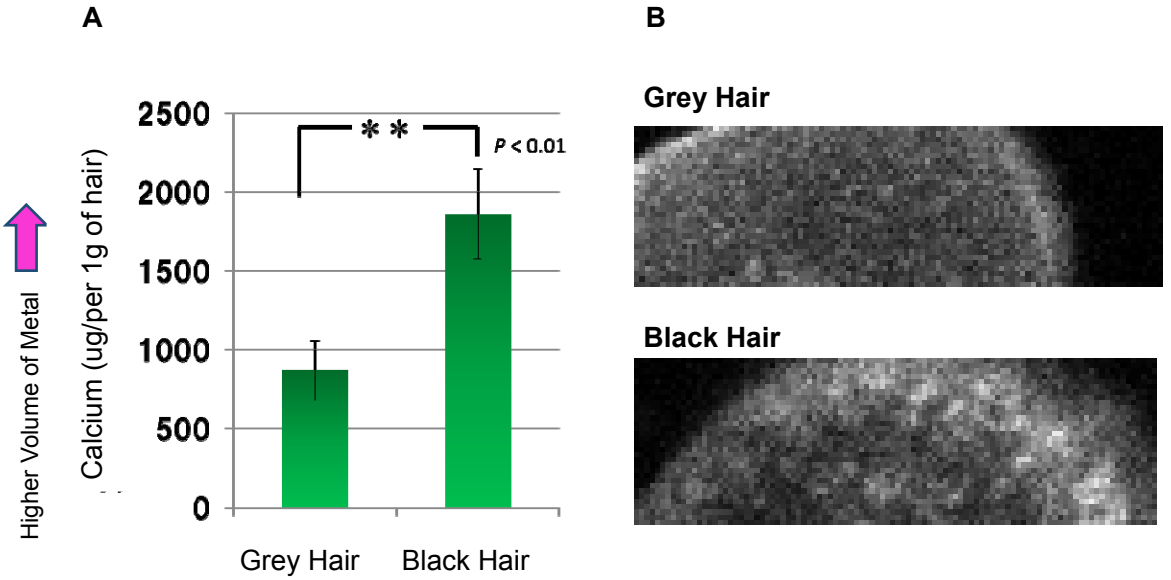

Fig.1 Quantitative results for calcium in grey hair and black hair (A) and calcium mapping of a cross section of hair (B).

Grey hair has less calcium than black hair (A). The white points of light are calcium. The more dense the white, the more calcium is present (B).

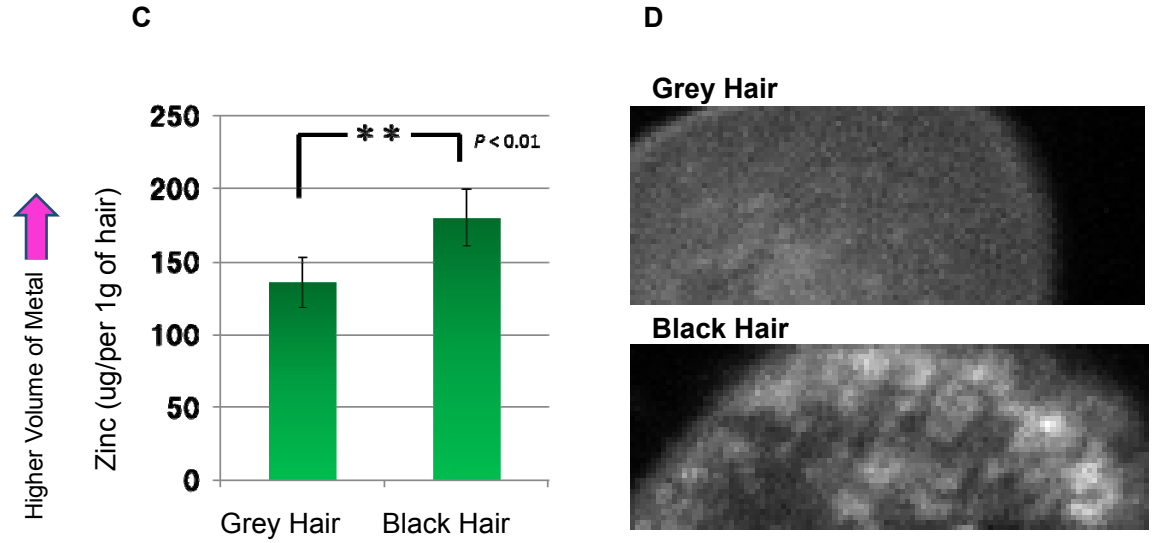

Fig.2 Quantitative results for zinc in grey hair and black hair (C) and zinc mapping of a cross section of hair (D).

Grey hair has less zinc than black hair (C). The white points of light are zinc. The more dense the white, the more zinc is present (D).

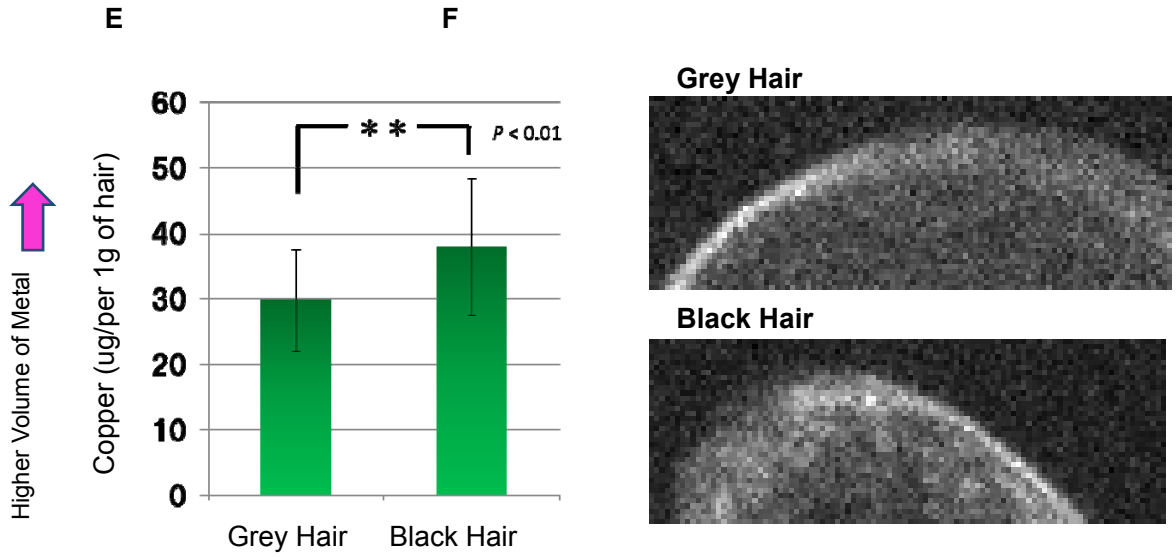

Fig.3 Quantitative results for copper in grey hair and black hair (E) and copper mapping of a cross section of hair (F).

Grey hair has less copper than black hair (E).

The white points of light are copper. The more dense the white, the more copper is present (F).

<<Terminology>>

*1 SPring-8 Synchrotron Radiation Facility

A Riken managed facility capable of producing the highest levels of synchrotron radiation in the world, located in the Harima Science Park City, Hyogo Prefecture. There are only two other facilities in the same class anywhere in the world, one in America and one in Europe. The name SPring-8 is taken from the full name of the facility, the Super Photon ring-8 GeV. Synchrotron radiation is the name given to the powerful electromagnetic waves generated when electrons are accelerated to almost the speed of light and then their direction of travel is altered using magnets. At SPring-8, this synchrotron radiation is used in a wide range of research, including nanotechnology, bio-technology and industrial use.

*2 ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry)

A device that performs a quantitative analysis of metal elements. It is capable of performing a simultaneous analysis of multiple metal elements found in a sample solution. Used across a wide range of fields, from cosmetics to food, medicine and semi-conductors.

*3 Microbeam XRF

A device that uses X-ray fluorescence from an X-ray emitter to allow for the visualization of trace metals and an analysis of their state. This type of device is used for a variety of purposes, including the analysis of natural materials and foreign bodies and the evaluation of materials.

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