

April 22<sup>th</sup>, 2019

## Certificate of Poster Award

Mr. Khaliduzzaman Alin has presented a poster titled  
“Chick embryo motility triggers eggshell to release  
calcium for its development” at the International Egg  
Symposium in Kyoto 2018, October 16<sup>th</sup>, 2018. On behalf  
of the organizing committee, we certificate that he was  
awarded the Gold Egg Prize as the poster prize.

### Note

Date : October 16<sup>th</sup>, 2018

Place : Mielparque Kyoto in Kyoto City

Poster Number : 16

Award : 7<sup>th</sup> place in 25 posters (Golden Egg Award)

Title : Chick embryo motility triggers eggshell to release calcium for its  
development

presenter : Mr. Khaliduzzaman Alin

Appendix : Poster abstract and photo at award ceremony

Chair : Dr. Hajime Hatta email: [hatta@kyoto-wu.ac.jp](mailto:hatta@kyoto-wu.ac.jp)  
(Professor, Kyoto Women's University, Japan)



Co-chair : Dr. Jianping Wu email: [jwu3@ualberta.ca](mailto:jwu3@ualberta.ca)  
(Professor, University of Alberta, Canada)



## Chick embryo motility triggers eggshell to release calcium for its development

Khaliduzzaman<sup>1\*</sup>, Shinichi Fujitani<sup>2</sup>, Ayuko Kashimori<sup>2</sup>, Afzal Rahman<sup>1</sup>, Md Syduzzaman<sup>1</sup>, Tetsuhito Suzuki<sup>1</sup>, Yuichi Ogawa<sup>1</sup>, Naoshi Kondo<sup>1</sup>  
<sup>1</sup>Kyoto University, Japan, <sup>2</sup>NABEL Co. Ltd, Japan

\*Email: khaliduzzamanfetsau2014@gmail.com; Phone: +81-90-8236-1561

Mineral metabolism of the eggshell, in particular as the primary source of calcium for the embryo development, is of great interest to avian scientists, as it plays an important role in early bone formation and development. Thus, knowledge of the regulation of calcium release from the eggshell is a key to every future hatchery management. Although transport of calcium by the chorioallantoic membrane has been investigated, virtually nothing is known about the physical means by which calcium is released from the shell or the control of the process. It has been hypothesized that embryonic motility during incubation is the main physical means for inducing release and utilization of shell calcium. If this is true, mineral metabolism will be different between male and female embryos due to their different motility strengths. We also hypothesize shell thickness after hatching will also be gender dependent. To confirm this hypothesis, we non-invasively quantify embryo motility during incubation and subsequently measure shell thickness after hatching, as well as finally shank length and shank diameter for both genders. Results show males have higher body mobility strength, lower shell thickness and higher shank length and shank diameter, which suggests male embryos absorb and utilize more calcium from the eggshell than female embryos.

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### 鶏胚の運動が卵殻に胚の発達のためのカルシウムを放出させる契機となる

卵殻のミネラルの代謝は、とりわけ胚の発達のためのカルシウムの主要な源泉として、鳥類学者の大きな関心事であると同時に初期の骨の形成と発達に重要な役割を演じている。したがって卵殻からカルシウムが放出される仕組みの理解は、あらゆる将来の孵卵管理の鍵になる。尿膜によるカルシウムの輸送が研究されてきたけれども、卵殻からカルシウムが放出される物理的な手段やその過程の制御については事実上何も知られていない。これまでも孵卵中の胚の運動が卵殻カルシウムの放出と活用に対する主要な物理的手段であるとの仮説が立てられてきた。もしこれが真実ならば、ミネラルの代謝はオス胚とメス胚の間でその胚の運動の強度の差の故に、差異があるであろう。我々は更に孵化後の殻の厚さが性別に依存しているであろうと仮定した。この仮説を確認するために孵卵中の胚の運動量を非侵襲的に観察し、孵化後に卵殻厚や雛のスネの長さや直径を両方の性別に対して測定した。結果として、オス胚はメス胚に比較して胚の運動強度がより強く、孵化後の卵殻厚がより薄く、脛の長さがより長く、スネの直径がより太いことが分かった。これはオス胚が卵殻からメス胚より多くのカルシウムを吸収して利用していることを示唆している。





# Golden Egg Prize on poster presentation

7th to 9th place in 25 posters

At the International Egg Symposium in Kyoto (October 16-17, 2018)