(Billing Code: 4150-31)

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Office of the Secretary

Findings of Research Misconduct

AGENCY: Office of the Secretary, HHS.

ACTION: Notice.

SUMMARY: Findings of research misconduct have been made against Dr. Shin-Hee Kim (Respondent), who was an Assistant Professor of Veterinary Medicine, University of Maryland (UMD). Dr. Kim engaged in research misconduct in research supported by U.S. Public Health Service (PHS) funds, specifically National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health (NIH), grants R21 AI100195 and ZIA AI000938 and contract N01 AO60009. The administrative actions, including supervision for a period of three (3) years, were implemented beginning on March 27, 2020, and are detailed below.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION: Notice is hereby given that the Office of Research Integrity (ORI) has taken final action in the following case:

Dr. Shin-Hee Kim, University of Maryland: Based on an investigation conducted by UMD and additional analysis conducted by ORI in its oversight review, ORI found that Dr. Shin-Hee Kim, former Assistant Professor of Veterinary Medicine, UMD, engaged in research misconduct in research supported by PHS funds, specifically NIAID, NIH, grants R21 AI100195 and ZIA AI000938 and contract N01 AO60009.

ORI found that Respondent engaged in research misconduct by intentionally, knowingly, and/or recklessly falsifying and/or fabricating data by altering, reusing, and relabeling same source Western blot images, microscopy fields, and data of viral titers and mouse immune response from non-correlated experiments to represent the results of different viral strains in the following seven (7) published papers and two (2) grant applications submitted to NIAID, NIH:

- Mutations in the fusion protein cleavage site of avian paramyxovirus serotype 4 confer increased replication and syncytium formation in vitro but not increased replication and pathogenicity in chickens and ducks. *PLoS One* 2013;8(1):e50598 (hereafter referred to as "*PLoS One* 2013A").

- Newcastle disease virus fusion protein is the major contributor to protective immunity of genotype-matched vaccine. *PLoS One* 2013;8(8):e74022 (hereafter referred to as "*PLoS One* 2013B").

- Role of C596 in the C-terminal extension of the haemagglutinin-neuraminidase protein in replication and pathogenicity of a highly virulent Indonesian strain of Newcastle disease virus. *J Gen Virol*. 2014;95(Pt 2):331-6 (hereafter referred to as "*J Gen Virol.* 2014").

- Newcastle disease virus vector producing human norovirus-like particles induces serum, cellular, and mucosal immune responses in mice. *J Virol*. 2014;88(17):9718-27 (hereafter referred to as "*J Virol.* 2014").

- Modified Newcastle disease virus vectors expressing the H5 hemagglutinin induce enhanced protection against highly pathogenic H5N1 avian influenza virus in chickens. *Vaccine* 2014;32(35):4428-35 (hereafter referred to as "*Vaccine* 2014").

- Immunogenicity of Newcastle disease virus vectors expressing Norwalk virus capsid protein in the presence or absence of VP2 protein. *Virology* 2015;484:163-9 (hereafter referred to as "*Virology* 2015").

- LaSota fusion (F) cleavage motif-mediated fusion activity is affected by other regions of the F protein from different genotype Newcastle disease virus in a chimeric virus: implication for virulence attenuation. *J Gen Virol*. 2016;97(6):1297-1303 (hereafter referred to as "*J Gen Virol.* 2016").

- R01 AI118879-01, "Avian paramyxovirus vectored vaccines for Norovirus infection," submitted to NIAID, NIH, on October 3, 2014.

- R01 AI118879-01A1, "Avian paramyxovirus vectored vaccines for Norovirus infection," submitted to NIAID, NIH, on November 5, 2015.

Specifically, ORI finds that Respondent knowingly, intentionally, and/or recklessly falsified and/or fabricated:

- Western blot images in four (4) figures of three (3) published papers by reusing and relabeling images from non-correlated blots and using blank backgrounds as blot images with negative expression of proteins. Specifically:

  – the blot that was used for Figure 3A, first blot of the second band, in *Vaccine* 2014, representing the negative expression of HA_0 protein of the rLaSota virus in DF1 cells after 24 hour infection at Multiplicity of Infection (MOI) of 1, was fabricated by using the blank background from an uncorrelated original film

  – the six (6) blots that were used for Figure 3A, bottom band, in *Vaccine* 2014, representing the expression of Newcastle Disease Virus (NDV) haemagglutinin-neuraminidase (HN) proteins in DF1 cells after 24 hour infection with six modified rNDV virus strains at MOI of 1, also were used in Figure 1B, bottom band, in *J Gen Virol.* 2014 to represent the expression of HN proteins of six different virus strains evaluated in infected DF1 cells at MOI of 0.1 in the presence of trypsin

- the four (4) blots that were used for Figure 1B, upper band, in *J Virol.* 2014, Figure 1B in grant application R01 AI118879-01, and Figure 1A in grant application R01 AI118879-01A1, representing the expression of VP1 proteins of four modified NDV strains in DF1 cells after 24 hour infection at MOI of 1, were fabricated by using blots from an uncorrelated film: the first two blots were from the blank background and the last two blots were from samples labeled with a different viral name – BC/NV101

- the four (4) blots that were used for Figure 3A, third band, in *J Virol.* 2014, representing the VP1 protein expression of the modified rNDV virus strain in DF1 cells at four time points, were fabricated by using four blots labeled with a different viral name (BC/NV101) from the same uncorrelated film of the last hyphen bullet

- nine (9) microscopy fields presented in four (4) figures of four (4) published papers by reusing and relabeling same source images to representing different results. Specifically:

  - the microscope field that was used for Figure 1B in *J Gen Virol.* 2016, representing the cytopathic effect of rLaSota virus infection with allantoic fluid in DF1 cells, also was used in Figure 1B in *J Gen Virol.* 2016 to represent the cytopathic effect of rBC/AKO-F virus infection with allantoic fluid in DF1 cells

  - the microscope field that was used for Figure 1B in *J Gen Virol.* 2016, representing the cytopathic effect of rBC/Las-Fc-AKO-F virus infection without allantoic fluid in DF1

cells, also was used in a PowerPoint presentation on Respondent's laptop to represent the cytopathic effect of rBan 010 Las Fc virus and rBan 010 Las Fc/D403N virus

– the microscope field that was used for Figure 1B in *J Gen Virol.* 2016, representing the cytopathic effect of rLaSota virus infection without allantoic fluid in DF1 cells, also was used in a PowerPoint presentation on Respondent's laptop to represent the cytopathic effect of rAPMV-2/BC F virus

– the microscope field that was used for Figure 1B in *J Gen Virol.* 2016, representing the cytopathic effect of rBC/Las-Fc virus infection without allantoic fluid in DF1 cells, also was used in a PowerPoint presentation on Respondent's laptop to represent the cytopathic effect of mock infected sample

– the two images that were used for Figure 2B in *Virology* 2015, representing rLaSota-NV (the middle one) and rBCm-NV (the right one) expressed VLP in allantoic fluid of chicken eggs, were fabricated by splitting a microscopy field into two parts

– the image that was used for Figure 3A in *PLoS One* 2013A, representing a mock control in the experiment in which DF1 cells were infected by a group of viruses at MOI of 0.1 for 72 hours, also was used in Figure 2A of *PLoS One* 2013B to represent a mock control in a different experiment in which DF1 cells were infected by a different group of viruses at MOI of 0.01 for 72 hours

- data of viral titers and mouse immune responses to viral immunization presented in five (5) figures of one (1) published paper by altering, reusing, and relabeling data from non-correlated experiments or by fabricating data that did not exist. Specifically:

  – the data that were used for Figure 2 in *J Virol.* 2014, representing titers of four virus strains, also were used to represent titers of another group of four different virus strains in Respondent's research records

  – the data that were used for Figures 5, 6, 7, and 8 in *J Virol.* 2014, representing the results of mouse immune responses to the immunization of rLaSota-VP1, Modified rNDV-VP1, and VLP viruses, also were used to represent the results of mouse responses to the immunization of different virus strains in Respondent's research records

  – the data that were used for Figures 5, 6, 7, and 8 in *J Virol.* 2014, representing the results of mouse immune responses to PBS injection as negative controls, were fabricated as the data did not exist

Dr. Kim entered into an Agreement and agreed to the following:

(1) Respondent agreed to have her research supervised for a period of three (3) years beginning on March 27, 2020. Respondent agreed that prior to the submission of an application for PHS support for a research project on which Respondent's participation is proposed and prior to Respondent's participation in any capacity on PHS-supported research, Respondent shall ensure that a plan for supervision of Respondent's duties is submitted to ORI for approval. The supervision plan must be designed to ensure the scientific integrity of Respondent's research contribution. Respondent agreed that she shall not participate in any PHS-supported research until such a supervision plan is submitted to and approved by ORI. Respondent agreed to maintain responsibility for compliance with the agreed upon supervision plan.

(2) The requirements for Respondent's supervision plan are as follows:

i. A committee of 2-3 senior faculty members at the institution who are familiar with Respondent's field of research, but not including Respondent's supervisor or collaborators, will provide oversight and guidance for three (3) years from the effective date of the Agreement. The committee will review primary data from Respondent's laboratory on a quarterly basis and submit a report to ORI at six (6) month intervals, setting forth the committee meeting dates and Respondent's compliance with appropriate research standards and confirming the integrity of Respondent's research.

ii. The committee will conduct an advance review of any PHS grant applications (including supplements, resubmissions, etc.), manuscripts reporting PHS-funded research submitted for publication, and abstracts. The review will include a discussion with Respondent of the primary data represented in those documents and will include a certification to ORI that the data presented in the proposed application/publication is supported by the research record.

(3) Respondent agreed that for a period of three (3) years beginning on March 27, 2020, any institution employing her shall submit, in conjunction with each application of PHS funds, or report, manuscript, or abstract involving PHS-supported research in which Respondent is involved, a certification to ORI that the data provided by Respondent are based on actual experiments or are otherwise legitimately derived and that the data, procedures, and methodology are accurately reported in the application, report, manuscript, or abstract.

(4) If no supervisory plan is provided to ORI, Respondent agreed to provide certification to ORI at the conclusion of the supervision period that she has not engaged in, applied for, or had her name included on any application, proposal, or other request for PHS funds without prior notification to ORI.

(5) Respondent agreed to exclude herself voluntarily from serving in any advisory capacity to PHS including, but not limited to, service on any PHS advisory committee, board, and/or peer review committee, or as a consultant for a period of three (3) years, beginning on March 27, 2020.

(6) As a condition of the Agreement, Respondent will request that the following papers be corrected or retracted in accordance with 42 C.F.R. §93.407(a)(1):

- *PLoS One* 2013;8(1):e50598
- *PLoS One* 2013;8(8):e74022
- *J Gen Virol.* 2014;95(Pt 2):331-6
- *J Virol.* 2014;88(17):9718-27
- *Vaccine* 2014;32(35):4428-35
- *Virology* 2015;484:163-9
- *J Gen Virol.* 2016;97(6):1297-1303

Respondent will copy ORI and the Research Integrity Officer at UMD on the correspondence.

Dated: May 8, 2020.

Elisabeth A. Handley,

Director, Office of Research Integrity,

Office of the Assistant Secretary for Health.

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