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 Anil K. Jaiswal, Ph.D. (Respondent), former professor, Department of Pharmacology, University of Maryland at Baltimore, School of Medicine (UMB). Dr. Jaiswal engaged in research misconduct in research supported by U.S. Public Health Service (PHS) funds, specifically National Cancer Institute (NCI), National Institutes of Health (NIH), grants R01 CA062483 and R01 CA081057; National Institute of Environmental Health Sciences (NIEHS), NIH, grants R01 ES007943, R01 ES012265, and R01 ES021483; and National Institute of General Medical Sciences (NIGMS), NIH, grant R01 GM047466. The administrative actions, including debarment for a period of three (3) years, were implemented beginning on July 21, 2020, and are detailed below.

FOR FURTHER INFORMATION CONTACT:

Elisabeth A. Handley
Director
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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:

Anil K. Jaiswal, Ph.D., University of Maryland at Baltimore, School of Medicine: Based on an investigation conducted by UMB and additional analysis conducted by ORI in its oversight review, ORI found that Dr. Anil K. Jaiswal, former professor, Department of Pharmacology, UMB, engaged in research misconduct in research supported by PHS funds, specifically NCI, NIH, grants R01 CA062483 and R01 CA081057; NIEHS, NIH, grants R01 ES007943, R01 ES012265, and R01 ES021483; and NIGMS, NIH, grant R01 GM047466.

ORI found that Respondent intentionally, knowingly, or recklessly: (a) used random blank background sections of film or empty boxes to falsely represent or fabricate western blot analyses; (b) used manipulated images to generate and report falsified data in figures; and (c) used mislabeled images to falsely report data in figures. Respondent's research misconduct occurred in the following four (4) funded PHS grant applications, four (4) unfunded PHS grant applications, and six (6) PHS-supported published papers:

- NCI, NIH grant application R01 CA081057-11, Mechanisms of Bioreductive Drugs Activation (unfunded)
- NIEHS, NIH grant application R01 ES007943-10, Prevention of Quinone Toxicity and Mutagenicity (funded)
- NIEHS, NIH grant application R01 ES007943-15, Prevention of Quinone Toxicity and Mutagenicity (unfunded)
- NIEHS, NIH grant application R01 ES007943-15A1, Prevention of Quinone Toxicity and Mutagenicity (funded)
- NIEHS, NIH grant application R01 ES012265-07, Role and Regulation of INrf2 (funded)

- NIEHS, NIH grant application R01 ES021483-01, Quinone Oxidoreductases and Mammary Toxicity/Carcinogenicity (unfunded)
- NIGMS, NIH grant application R01 GM047466-20, Regulation of NAD(P)H:Quinone Oxydoreductases (unfunded)
- NIGMS, NIH grant application R01 GM047466-20A1, Regulation of NAD(P)H:Quinone Oxydoreductases (funded)
- Overlapping signal sequences control nuclear localization and endoplasmic reticulum retention of GRP58. *Biochem Biophys Res Commun.* 2008 Dec 12;377(2):407-12 (hereafter referred to as "*BBRC* 2008"). Retraction in: *Biochem Biophys Res Commun.* 2018 Jun 27; 501(3):826.
- Disruption of the NAD(P)H:quinone oxidoreductase 1 (NQO1) gene in mice causes myelogenous hyperplasia. *Cancer Res* 2002 Jun 1;62(11):3030-6 (hereafter referred to as "*Cancer Res* 2002"). Retraction in: *Cancer Res* 2018 Nov 15;78(22):6526.

- Deficiency of NRH:quinone oxidoreductase 2 increases susceptibility to 7,12-dimethylbenz(a)anthracene and benzo(a)pyrene-induced skin carcinogenesis. *Cancer Res* 2004 Sep 1;64(17):5925-8 (hereafter referred to as "*Cancer Res* 2004").
- Nuclear import and export signals in control of Nrf2. *J Biol Chem.* 2005 Aug 12;280(32):29158-68; Epub 2005 May 17 (hereafter referred to as "*JBC* 2005"). Retraction in: *J Biol Chem.* 2017 Feb 3;292(5):2052.
- Quinone oxidoreductases in protection against myelogenous hyperplasia and benzene toxicity. *Chem Biol Interact.* 2005 May 30;153-154:147-57 (hereafter referred to as *Chem Biol Interact*. 2005").

- Low and high dose UVB regulation of transcription factor NF-E2-related factor 2. *Cancer Res* 2006 Sep 1;66(17):8421-9 (hereafter referred to as "*Cancer Res* 2006"). Retraction in: *Cancer Res* 2018 Nov 1;78(21):6346.

Specifically, ORI found by a preponderance of the evidence that Respondent engaged in research misconduct by intentionally, knowingly, or recklessly:

- using a random blank background section of a film for PHS grant application R01 CA081057-11, Figure 8D (top panel), to falsely report that human kidney carcinoma 293 expressing vector (293-V) did not express the Flag-Nrf2 protein, regardless of treatment condition (control, tetracycline, tetracycline + tert-butyl hydroquinone)
- using a random blank background section of a film for PHS grant application R01 CA081057-11, Figure 9B (right-side, top panel), to falsely report that human kidney carcinoma 293 expressing vector (293-V) did not express the Flag-Nrf2 protein, regardless of treatment condition (control, etoposide, tetracycline + etoposide, tetracycline + tert-butyl hydroquinone + etoposide)
- using empty boxes drawn in PowerPoint in PHS grant application R01 GM047466-20A1, Figure 5 (left-side, third and fourth LDH panels), to falsify or fabricate the absence of LDH protein expression in human fibroblast and mouse skin keratinocytes when exposed to 0 to 20 J/m^2 UVB
- using empty boxes drawn in PowerPoint in *Cancer Res* 2006, Figures 2A (middle panel on left; and lower panel on right) and 2D (lower panel), to falsely show that there was an absence of Lamin B and LDH protein expression
- using a manipulated image in which the background was digitally added to falsely show the expression of p53, in wild type and $NQO2^{-/-}$ mice skin exposed to acetone, 800 nmol of benzo(a)pyrene ("BP800") or 1600 nmol of benzo(a)pyrene ("BP1600") dissolved in acetone in PHS grant application R01 ES007943-10, Figure 10 (right side, top panel); in PHS grant

application R01 ES007943-15, Figure 4C (top panel); and in *Cancer Res* 2004, Figure 2 (top panel)

- using an image that had been cropped, vertically stretched, and horizontally flipped to falsely show that wild-type mouse keratinocytes that express NQO1 were used in PHS grant application R01 ES007943-15, Figure 9A (seventh panel on left), and PHS grant application R01 ES007943-15A1, Figure 6A (seventh panel on the left)
- using an image that masked bands in *BBRC* 2008, Figures 1D (top panel on left) and 1E (bottom panel on left), to falsely report figures, which showed:
  - that in HCT116 cells transfected with NLS deficient GRP58DNLS-V5, the nuclear localization of GRP58 is completely abrogated when in fact the contrast was changed to conceal the expression
  - the effect of putative NLS sequence on nuclear localization of GRP58 in HCT116 cells transfected with pcDNA-V5 plasmids for GRP58-WT or GRP58-NLS K-A mutant when in fact blots showing the control condition, Lamin B, were concealed by changing the contrast
- using an image that had been horizontally flipped and stretched, with contrast enhanced to falsify Cyp1A1 data in *BBRC* 2008, Figure 4A (bottom panel on left), to falsely report a figure that showed HCT116 cells transfected with pcDNA-GRP58-WT-V5 or pcDNA-GRP58-ΔER-V5 showed increased expression in the endoplasmic reticulum when the original data showed increased expression in the cytosolic fraction

- using a vertically flipped image in *BBRC* 2008, Figure 4B (top panel), to falsely report a figure that showed HCT116 cells transfected with GRP58 NLS/ER DD (combined deletion

of NLS and ER regions) is not expressed in the endoplasmic reticulum or the nuclear fraction but only in the cytosolic fraction

- using a manipulated image in which the contrast and brightness had been enhanced in *JBC* 2005, Figure 4B, to falsely report a figure that showed reduced protein expression of LDH and Lamin B

- using the image in Figure 9 (top right) in PHS grant application R01 ES012265-07 to falsely represent reverse immunoprecipitation of Hepa-1 cell extract with anti-INrf2 and anti-PGAM5L antibodies and reusing the same image, after being flipped horizontally, in Figure 12 (top right) of the same application to falsely represent the same experiment as with anti-Flag and pICln antibodies

- falsifying reported results in Figure 9 (upper panel) in PHS grant application R01 ES021483-01 as representing *in vitro* translation of two proteins (BRCA1 and NQO1), showing that NQO1 stabilizes BRCA1 against 20S proteasomal degradation, by falsely using bands labeled NQO1 from a cell lysate experiment on the original film, flipping them horizontally, enhancing the contrast to obscure one band (BRCA1+20S), and falsely relabeling the resulting panel as BRCA1

- using bands labeled as β-actin from a cell lysate experiment on the original film, cutting out two of the bands, falsely labeling them as having been incubated with 20S + NQO1 or 20S + NQO1 + NADH, and falsely relabeling the resulting panel as NQO1 in PHS grant application R01 ES021483-01, Figure 9 (lower panel)

- using a sample with a molecular weight of 80-85kD to falsely represent P-Akt-Thr308, which should have a molecular weight of 60kD, in PHS grant applications R01 GM047466-20 and R01 GM047466-20A1, Figure 4 (first panel)
- using samples appearing in two different films, one labeled as PP2A (with a molecular weight of 75kD) and the other labeled as Akt S473 to falsely represent PP2A (with a molecular weight of 35kD) in PHS grant applications R01 GM047466-20 and R01 GM047466-20A1, Figure 4 (sixth panel)
- using protein bands from a film dated 8/25/2000 showing the expression of NQO1 in wild-type mouse liver and bone marrow to falsely represent a figure labeled instead as the expression of NQO1 in the bone marrow of wild type and NQO1 heterozygous mice in *Cancer Res* 2002, Figure 1A, and *Chem Biol Interact*. 2005, Figure 2B
- using a single blot of protein bands to falsely represent western blots exhibiting the expression of three different proteins (p53, p73, and tubulin) in *Cancer Res* 2002, Figure 7A

Dr. Jaiswal entered into a Voluntary Exclusion Agreement (Agreement) and agreed to the following:

(1) Respondent agreed to exclude himself voluntarily for a period of three (3) years beginning on July 21, 2020, from any contracting or subcontracting with any agency of the United States Government and from eligibility for or involvement in nonprocurement programs of the United States Government referred to as "covered transactions" pursuant to HHS's Implementation (2 C.F.R. Part 376) of OMB Guidelines to Agencies on Governmentwide Debarment and Suspension, 2 C.F.R. Part 180 (collectively the "Debarment Regulations");

(2) Respondent agreed to exclude himself 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 July 21, 2020; and

(3) 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) and 93.411(b):

- *Cancer Res* 2004 Sep 1;64(17):5925-8
- *Chem Biol Interact.* 2005 May 30;153-154:147-57

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

Dated: August 14, 2020.

Elisabeth A. Handley,

Director, Office of Research Integrity,

Office of the Assistant Secretary for Health.

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