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Memorandum

Date: November 6, 2014

From: Inquiry Committee, San Francisco VA Medical Center

Subj: Research Misconduct Inquiry – Joint Inquiry Led by VA

To: Dr. Rajvir Dahiya

The Inquiry Committee has reviewed the allegations of research misconduct pertaining to fifteen publications co-authored by Dr. Rajvir Dahiya (hereafter, Respondent), a Senior Research Career Scientist employed by the San Francisco VAMC (SFVAMC) and a Professor of Urology at the University of California, San Francisco (UCSF). UCSF has concurrent jurisdiction over one or more of the allegations referenced above based on the fact that the Respondent is a UCSF faculty member (and was so during the period that the research in question was done) and that at least one of the grants referred to in the papers containing the allegations was administered by UCSF. UCSF jointly participated in the inquiry, which was led by SFVAMC in accordance with the procedures of VHA Handbook 1058.02 ("Research Misconduct"). As such, this memorandum represents a joint SFVAMC and UCSF report.

All the allegations involve photographic images within the figures cited. With the exception of publication 15 (see below), the images in question show electrophoretic analyses of PCR products, or proteins probed by immunoblotting (Western blotting). The allegations contend that the research reported in the figures was falsified, resulting in the research not being accurately represented. To address the validity of these charges, the committee has reviewed the figures in question, using a number of analytic approaches, as discussed below. During the course of this examination, we identified a number of additional instances of possible data falsification, resulting in several new allegations of research misconduct. We have discussed both the original and new allegations in detail with the Respondent. We have also provided him extensive access to all sequestered material, such that he would have ample opportunity to review his records and retrieve original data, for purposes of preparing his response to the allegations. Below is a summary of our analysis and recommendations for the allegations pertaining to each publication:

PAPER 1: The Respondent is alleged to have falsified research reported in Figures 2C, 3B and/or 5D in a **Cancer Research** journal article, titled "Regulation of minichromosome maintenance gene family by microRNA-1296 and genistein in prostate cancer" (vol. 70, pp. 2809-2818), published in 2010.

Grant funding: NIH grants RO1CA 111470 and T32DK007790, Veterans Affairs Research Enhancement Award Program, and Merit Review.

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, these allegations fall with the scope of VHA Handbook 1058.02.

Allegation 1: "Please compare bands left 3 lanes GAPDH panel figure 5D with the bands in the upper GAPDH panel (directly below the MCM3 panel) figure 3B. The treatments are different."

The Committee reviewed high resolution images of Figures 5D and 3B, and identified similarities in the shapes and electrophoretic mobilities of the Western blot GAPDH bands shown in each figure,

indicating possible data falsification. The three lanes in the upper panel (PC3 cells) of Figure 3B (labeled GAPDH) and the three left lanes (also labeled GAPDH) of the bottom panel in Figure 5D appear to be from the same blot (or a portion thereof). The high degree of similarity was more apparent when the relevant part of Figure 3B was stretched horizontally, compressed vertically and overlaid on top of the left lanes of the bottom (GAPDH) panel in Figure 5D. The ORI Forensic Review used Gradient Map software to overlay and color-compare blots. Gradient Map was also used to create false color blots that revealed commonalities within the internal characteristics of the protein bands and the shape of protein bands in the GAPDH blots in Figs. 3B & 5D, with the two images appearing to originate from the same blot and to have been used in separate figures. Thus, the same image appears to have been used to depict two different blots, with different treatments, in two different figures.

In response to this allegation, the Respondent analyzed the images by densitometry, noting differences in band intensity as evidence for the uniqueness of each band. However, he did not provide any original data or material from these experiments, such as uncropped images of the gels. The Inquiry Committee believes that the densitometric analysis is not persuasive, since it was not performed using the original experimental data, but instead was done using the final published images. In addition, it does not address the similarities in band shape or electrophoretic mobility. Based on a review of the readily available evidence and the unresolved issues discussed above, the committee recommends that this allegation undergo further investigation.

Allegation 2: Figures 2C and 5D: Lanes 1, 2 and 3 of the GAPDH panel in Figure 2C appear to be identical to the last 3 lanes of the GAPDH panel in Figure 5D.

The Committee reviewed Figures 2C and 5D, and identified similarities in the shapes of the Western blot GAPDH bands shown in each figure, indicating possible data falsification. The three left lanes in the lowest panel of Figure 2C (labeled GAPDH) and the three right lanes of the bottom panel (also labeled GAPDH) in Figure 5D appear to be from the same blot (or a portion thereof). The high degree of similarity was most apparent when the relevant part of Figure 2C was overlaid on top of the right 3 lanes of the bottom (GAPDH) panel in Figure 5D. In the ORI Forensic Review, images were enlarged and re-sized in Adobe Photoshop and Gradient Map used to overlay and compare color blots. False color blots using Gradient Map revealed commonalities in the shape and the internal characteristics of the protein bands, as well as the characteristics of their surrounding backgrounds. In lanes 1-3 for the GAPDH blot in Fig. 2C and lanes 4-6 for the GAPDH blot in Fig. 5D the two images appear to originate from the same blot and to have been duplicated in separate figures. Thus, it appears that the same image is used to depict two different blots, with different treatments, in two different figures.

In response to this allegation, the Respondent analyzed the images by densitometry, noting differences in band intensity as evidence for the uniqueness of each band. However, he did not provide any original data or material from these experiments, such as uncropped images of the gels. The Inquiry Committee believes that the densitometric analysis is not persuasive, since it was not performed using the original experimental data, but instead was done using the final published images. In addition, it does not address the similarities in band shape or electrophoretic mobility. Based on a review of the readily available evidence and the unresolved issues discussed above, the committee recommends that this allegation be referred for further investigation.

PAPER 2: The Respondent is alleged to have falsified research reported in Figures 2, 4, and 5 in **Oncogene**. 2007 Dec 6;26(55):7647-55. Epub 2007 Jun 11 “Knockdown of astrocyte-elevated gene-1 inhibits prostate cancer progression through upregulation of FOXO3a activity”.

Grant funding: This study was supported by grants RO1CA101844, RO1AG021418, RO1CA108612, RO1CA111470 and T32DK07790 from the NIH, VA REAP award, Merit Review grants and Yamada Science Foundation.

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, these allegations fall with the scope of VHA Handbook 1058.02.

Allegation 1: In, Figure 2b: three bands (EF1α panels: left and right lanes LNCaP panel, and left lane DU145 panel) said to represent different experimental conditions are derived from the same source data.

To address this issue, images were overlain and registered using ImageJ and Powerpoint animation, allowing comparison based on shape and relative intensities of bands and surrounding artifacts. The committee concluded there were numerous points of high similarity between the images, supporting the allegation of falsification. The allegation is recommended for further investigation.

Allegation 2: In fig. 2b, the bands citied in allegation 1 were utilized to create a 4th band (EF1αpanel: right lane PC-3 panel) through horizontal mirror imaging.

The band image was mirrored and overlain as above for comparison. The committee concluded that there was high similarity (defined as numerous congruent points of morphology and/or patterns of intensity of bands and surrounding artifacts) between the images, supporting the allegation of falsification. The allegation is recommended for further investigation.

Allegation 3: In fig. 2b, three bands (EF1α panels: middle lane LNCaP panel, middle lane PC-3 panel, and right lane DU145 panel) representing different experimental conditions and different from those of allegation 1, are derived from the same source data.

Images were overlain and registered, allowing comparison based on shape and relative intensities of bands and surrounding artifacts by rapid switching between images. The committee concluded there were numerous points of high similarity between the images, supporting the allegation of falsification. The allegation is recommended for further investigation.

Allegation 4: In fig. 2b, one of the bands cited in allegation 3 (middle lane PC-3 panel) was horizontally stretched to create another band (left lane PC-3 same panel) representing a different experimental condition.

The band in question was manipulated as indicated and overlain using ImageJ. The committee concluded there were numerous points of high similarity between the images, supporting the allegation of falsification. The allegation is recommended for further investigation

Allegation 5: In fig. 2b, a band of allegation 3 (right lane DU145 panel) was utilized to create another band (middle lane DU145) through horizontal mirror imaging.

The band image was mirrored and overlain as above for comparison. False color mapping in ImageJ was utilized to accentuate features for comparison. The committee concluded there were numerous points of high similarity between the images, supporting the allegation of falsification. The allegation is recommended for further investigation.

Allegation 6: In Figure 4a, 2 bands (Anti-AKT panel: lanes 3 and 6) representing different experimental conditions are derived from the same source data.

The above bands were overlain and compared. Though there were several points of similarity in the morphology of the bands, there were also distinct differences. The committee concluded that the overall evidence was insufficient to support the allegation, and does not recommend further investigation.

Allegation 7: In Fig. 4a, five bands (anti-EF1α panel: lanes 1,3,4,5 and 6) representing different experimental conditions are derived from the same source data.

The above bands were overlain and compared. Though the bands were grossly highly similar, after detailed examination of overlain images the committee concluded there was insufficient similarity to support the allegation. This allegation is not recommended for further investigation.

Allegation 8: In Figure 4, a band of Fig 4a (anti-phospho-AKT panel: lane 3) and one of Fig. 4c (left anti-phospho-FOXO3a panel: lane 3) representing different conditions are derived from the same source data.

Bands were overlain and compared. Though the bands were grossly highly similar, after detailed examination the committee concluded there was insufficient evidence to support the allegation. This allegation is not recommended for further investigation.

Allegation 9: Another band of Fig 4a (anti-phospho-AKT panel: lane 5) and one of Fig 4c (left anti-phospho-FOXO3a panel: lane 5) representing different conditions are derived from the same source data.

These bands were grossly dissimilar on visual inspection. The committee concluded there was insufficient evidence to support the allegation. This allegation is not recommended for further investigation.

Allegation 10: In Figure 4a, b, c CE and c NE, the committee found that an entire panel of 6 bands (EF1 panels: lanes 1-6), which were presented as data from at least two experiments, appeared to be replicated and applied in four locations, suggesting they were inappropriately derived from the same source data.

The Respondent noted that large panels are frequently run on the same samples and the controls were duplicated and applied appropriately. The committee found this unconvincing, as at least two of the samples were represented as deriving from different experimental conditions. This allegation is recommended for further investigation.

Allegation 11: In Figure 5e, five bands (Anti-EF1α panel: lanes 1,3,4,5 and 6) representing different experimental conditions are derived from the same source data.

Bands were overlain and compared. Although the bands were grossly similar, the committee concluded after detailed examination there was insufficient evidence to support the allegation. This allegation is not recommended for further investigation.

PAPER 3: The Respondent is alleged to have falsified research reported in Figures 3a, 3b, and 4a in a **Clinical Cancer Research** journal article, titled "The human *T-cell factor-4* gene splicing isoforms, Wnt signal pathway, and apoptosis in renal cell carcinoma" (vol. 9, pp. 2121-2132), published in 2003.

Grant funding: Supported by NIH Grants RO1DK55040, RO1DK511-1, RO1DK47517, and RO1AG16870 and Veterans Affairs Merit review and Veterans Affairs Research Enhancement Award Program grants.

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the

reference in the article to the Respondent's affiliation with SFVAMC. Therefore, these allegations fall with the scope of VHA Handbook 1058.02

The specific allegations were as follows:

Allegation 1: "Figure 3a. Lower panel. Renal cancer, Nested PCR1 panel. Band in lane 2 (marked as I lane) has vertical, straight right edge. Please compare bands in lanes 3 and 4 (marked as lanes II and III), paying attention to the patterns of light and dark inside the bands."

The Committee reviewed these images in high resolution and by false colorization in Photoshop. The morphology of the band in lane 2 is not clearly anomalous, and the perceived straight edge is likely due to pixelation. It is also possible that that lane 2 was cropped from a separate gel, and thus this panel is a composite image. However, this does not constitute data fabrication or falsification per se. As for the bands in lanes 3 and 4, their shapes were sufficiently distinctive to indicate that they were not of common experimental origin. For these reasons, the Inquiry Committee has concluded that there is no clear evidence for data fabrication or falsification, and thus, the allegation does not merit further investigation.

Allegation 2: "Figure 3b. Upper panel. Normal Kidney, Nested PPCR1 panel. Band lane D has vertical, straight right edge. Lower panel. Nested PCR2 panel. Main band lane D has vertical, straight right edge."

The committee examined the morphology of these bands, using the highest resolution images available, and believes that the informant is describing pixelation of the images in question. Of note, other bands within this figure have similar levels of pixelation. Thus, there is no clear evidence that these bands have been falsified, but instead, their appearances are consistent with their representing data of different origin. The Inquiry Committee has concluded that this allegation does not merit further investigation.

Allegation 3: "Figure 4a. Please compare bands in lanes B and C."

The committee has examined the available high resolution image of this figure, and believes that the two bands have distinct morphologies, and thus are not examples of data falsification. The Inquiry Committee has concluded that this allegation does not merit further investigation.

PAPER 4: The Respondent is alleged to have falsified research reported in **Clin Cancer Res** 2004 Mar 15;10(6):2015-9, "Polymorphisms of the CYP1B1 gene as risk factors for human renal cell cancer".

Grant funding: NIH Grants RO1AG016870 and RO1AG21418, an award from the Veterans Affairs Research Enhancement Award Program, and Grant-in-Aid 13220016 from the Ministry of Education, Science, Sports, Culture, and Technology, Japan (S. Yonezawa).

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, these allegations fall with the scope of VHA Handbook 1058.02.

Allegation 1: A segment of Fig. 1b, containing two bands (CODON 48 common allele panel: bands in lanes marked 4 and 5), and spot and streak artifacts are derived from the same source data reported in another publication (Fig 1B, codon 449 common allele panel: bands in lanes marked 13 and 14; Cancer Res. 2003 Jul 15;63(14):3913-8. "CYP1B1 gene polymorphisms have higher risk for endometrial cancer, and positive correlations with estrogen receptor alpha and estrogen receptor beta expressions"). The latter figure is described as representing data from different experimental conditions.

Comparison of these figures was difficult, due to differences in resolution of the images. The images were resized and overlain, and contrast-enhanced and color-remapped versions were examined. Numerous points and patterns of similarity of location and shape of streak and spot artifacts, as well as band morphologies were noted. This was concluded to support the allegation of falsification, which is recommended for further investigation.

Allegation 2: In Fig. 1b, two bands (CODON 48 rare allele panel: bands marked as 5 and 6) are derived from the same source data as 2 bands representing different experimental conditions from Fig 1B (Codon 449 rare allele panel: bands in lanes marked as 14 and 154) of Cancer Res. 2003 Jul 15;63(14):3913-8.

Images were resized and overlain, and contrast-enhanced versions were examined. Several points and patterns of similarity of location and shape of artifacts, as well as band morphologies were noted. This was concluded to support the allegation of falsification, which is recommended for further investigation.

Allegation 3: In Fig. 1b another segment of the image containing 2 bands (Intron 1 rare allele panel), and spot and streak artifacts is derived from the same source data as a segment representing different experimental conditions from Fig 1B (Codon 453 rare allele panel) of Cancer Res. 2003 Jul 15;63(14):3913-8.

Images were resized and overlain, and contrast-enhanced. Numerous points and patterns of similarity of location and shape of streak and spot artifacts, as well as band morphologies were noted. This was concluded to support the allegation of falsification, which is recommended for further investigation.

Allegation 4: In Fig. 1b, another segment of the image containing 2 bands (Codon 453 rare allele panel), and spot artifacts is derived from the same source data as a segment representing different experimental conditions from Fig 1B (Intron 1 rare allele panel) of Cancer Res. 2003 Jul 15;63(14):3913-8.

Images were resized and overlain, and contrast-enhanced. Numerous points and patterns of similarity of location and shape spot artifacts, as well as band morphologies were noted. The committee concluded that this supported the allegation of falsification, and recommended further investigation.

Allegation 5: In another segment of Fig. 1b, the image containing 2 bands (Codon 449 rare allele panel) is derived from the same source data as a segment representing different experimental conditions from Fig 1B (Codon 48 rare allele panel) of Cancer Res. 2003 Jul 15;63(14):3913-8.

Images were resized and overlain. Though the bands and areas of artifact were grossly similar, after detailed examination the committee concluded there was insufficient points of similarity support the allegation. This allegation is not recommended for further investigation.

These same allegations were sent to the Journal editor, and the Respondent provided us with his correspondence with editor. However, this correspondence does not contain any direct discussion or refutation of the allegations. Moreover, the Respondent has not been able to locate the original images that were the basis for these figures, but stated to the committee that he has made efforts to contact the first author (Dr. Sasaki).

PAPER 5: The Respondent is alleged to have falsified research reported in Figure 1 in a **Molecular Cancer Therapeutics** journal article, titled "Antitumor effect of dsRNA-induced $p21^{WAF1/CIP1}$ gene activation in human bladder cancer cells" (vol. 7, pp. 698-703), published in 2008.

Grant funding: University of California-San Francisco REAC grant (L-C. Li); Veterans Affairs Merit Review, Veterans Affairs Research Enhancement Award Program, and NIH grants RO1CA101844, RO1CA108612, and T32DK007790 (R. Dahiya).

The research referenced in this allegation was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, this allegation falls with the scope of VHA Handbook 1058.02

Allegation 1: "Figure 1**.** Left p21 panel. Please compare bands Mock and dsControl lanes."

The Inquiry Committee reviewed the single allegation for this publication and thought it was ambiguous. There was not enough information to determine whether the allegation refers to Figure 1A or 1C. Moreover, the committee did not discern any evidence of data falsification within this figure. The Mock and dsControl lanes in the left hand upper (p21) panel of Figure 1 have superficial similarity, but close inspection of its high resolution image revealed clear differences in the morphologies of the bands, indicating that they were of different experimental origin. For this reason, the Inquiry Committee concludes that there is insufficient evidence for data fabrication or falsification, and thus, that the allegation does not merit further investigation.

PAPER 6: The Respondent is alleged to have falsified research reported in **Proc Natl Acad Sci U S A**. 2008 Feb 5;105(5):1608-13. doi: 10.1073/pnas.0707594105. MicroRNA-373 induces expression of genes with complementary promoter sequence.

Grant funding: This work was supported by the Veterans Affairs Research Enhancement Award Program (REAP), a Veterans Affairs Merit Review grant, and National Institutes of Health Grants RO1CA101844, RO1CA111470, and T32DK007790 (to R.D.).

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, these allegations fall with the scope of VHA Handbook 1058.02.

Allegation 1: In Fig. 2D, there is a vertical background change between 2 lanes (E-cadherin panel: between lanes 2 and 3), implying an image splicing event

Images were magnified and color-remapped to bring out detail. The area referred to in the allegation did not clearly appear to be manipulated. The committee concluded there was insufficient evidence to support the allegation. This allegation is not recommended for further investigation.

Allegation 2: In Figure 2D, E-cadherin panel, lanes 5 and 6) said to represent different experimental samples, were actually derived from the same source data.

Images were magnified and color-remapped to bring out detail. The committee concluded there were numerous points of high similarity between the images, supporting the allegation of falsification. The allegation is recommended for further investigation.

Allegation 3: in another panel of Fig. 2D, 2 lanes (GAPDH panel: lanes 2 and 5) representing differing experimental conditions were derived from the same source data.

In the ORI Forensic Review of this allegation images were magnified and color-remapped to bring out detail. The committee concurred that the two bands appeared to be mirror images of one another, based on numerous areas of similarity of band morphology and surrounding artifacts. The allegation is recommended for further investigation.

Allegation 4: Further analysis by the Committee led to the finding of additional data falsification, wherein a portion of the Fig. 2D GAPDH panel encompassing approximately 1.5 lanes was mirrored and added to the panel and yet another portion of this was mirrored and added.

Areas of overlap were identified by overlaying mirrored, inverted-lookup table partially transparent images, suggesting 2 mirroring and appending events consistent with falsification. The committee recommends this allegation for further investigation.

The Respondent did not address the original allegations, beyond stating that he is attempting to contact the first author.

PAPER 7: The Respondent is alleged to have falsified research reported in Figures 5A and 5B in a **Carcinogenesis** journal article, titled "Catechol-O-methyltransferase-mediated metabolism of 4-hydroxyestradiol inhibits the growth of human renal cancer cells through the apoptotic pathway" (vol. 33, pp. 420-426), published in 2012.

Grant funding: This study was supported by the Veterans Affairs Merit Review grant.

The research was reported, in part, by the Respondent, in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, these allegations fall with the scope of VHA Handbook 1058.02.

Allegation 1: Figure 5A: Please compare: bands middle lanes left and right GADD45α panels.

In the top row of Fig. 5A labeled GADD45α, the middle lane in the blot labeled Caki-1/COMT appears superficially to be similar to the image used in the middle GADD45α lane of the blot labeled ACHN/COMT. In the ORI Forensic Review, enlargement and false colorization of the Fig. 5A GADD45α blot using Gradient Map revealed distinct differences in the morphologies of the protein bands and their surrounding backgrounds for lane 2 versus lane 5 of the GADD45α blot. Thus, lanes 2 and 5 do not appear to have originated from a common source, but instead, represent original data. For this reason, the Inquiry Committee believes that there is insufficient evidence for data fabrication or falsification, and that the allegation does not merit further investigation.

Allegation 2: Figure 5A: Right GAPDH panel. Light area at end of band right lane.

In the row labeled GAPDH, the light pattern at the end of the panel labeled ACHN/COMT appears irregular. In the ORI Forensic Review, enlargement and false colorization of the Fig. 5A GAPDH - ACHN/COMT blot using Gradient Map revealed a lighter pattern of background color on the right side of lane 3. This may reflect artifacts from normal immunoblotting (primary or secondary antibody, blocking, washing, etc.) and is not evidence of obvious image manipulation or data falsification. For this reason, the Inquiry Committee concluded that the allegation does not merit further investigation.

Allegation 3: Figure 5B. Please compare bands left and middle lanes right GADD45α panel with enlarged horizontal mirror images bands left and middle bands GADD45α panel.

The allegation implies that the same image has been manipulated to represent two different blots. In particular, the GADD45α blot row lanes 1 and 2 in the Caki-1 panel are mirror images of lanes 1 and 2 in the ACHN panel. In the ORI Forensic Review, enlargement, resizing and false colorization of the GADD45α blots using Gradient Map revealed varying morphologies of the protein bands and of the surrounding backgrounds in lanes 1 & 2 of Caki-1 blot versus lanes 1 and 2 of ACHN blot. Thus, the blots appear to represent data of distinct origin and not mirror images. The Inquiry Committee believes that there is insufficient evidence for data fabrication or falsification, and thus, that the allegation does not merit further investigation.

PAPER 8: The Respondent is alleged to have falsified research reported in **Mol Cancer Ther** 2010 Jun;9(6):1680-7. doi: 10.1158/1535-7163.MCT-10-0012. "Oncogenic functions of secreted Frizzled-related protein 2 in human renal cancer."

Grant funding: NIH grants RO1CA130860 (S. Yamamura, K. Kawakami, H. Hirata, K. Ueno, and R. Dahiya) and T32DK007790 (S. Saini, S. Majid, and R. Dahiya), Veterans Affairs Research Enhancement Award Program (R. Dahiya), and Veterans Affairs Merit Review (R. Dahiya).

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, these allegations fall with the scope of VHA Handbook 1058.02.

Allegation 1: In Figure 6A, there are a vertical background changes between 2 lanes (Bcl2 panel: between middle and right lanes), implying image splicing.

The image was magnified and examination showed clear disjunctions in the background as noted in the allegation, suggesting splicing of the lanes. However, no evidence of image replication or other manipulations were noted. The committee concluded that splicing may be used to accurately represent experimental results and does not *per se* support an allegation of falsification. This allegation is not recommended for further investigation.

Allegation 2: In Fig. 6a, there are a vertical background changes between three lanes (Cyclin B2 panel: between left, middle and right lanes), implying image splicing.

The image was magnified and examination showed clear disjunctions in the background as noted in the allegation, suggesting splicing of the lanes. However, no evidence of image replication or other manipulations were noted. The committee concluded that splicing may be used to accurately represent experimental results and does not *per se* support an allegation of falsification. This allegation is not recommended for further investigation.

Allegation 3: In Fig. 6a, there are a vertical background changes between a 2 lanes (Cyclin E2 panel: between middle and right lanes), implying image splicing.

The image was magnified and examination showed clear disjunctions in the background as noted in the allegation, suggesting splicing of the lanes. However, no evidence of image replication or other manipulations were noted. The committee concluded that splicing may be used to accurately represent experimental results and does not *per se* support an allegation of falsification. This allegation is not recommended for further investigation.

Allegation 4: Two panels, one from Fig 6A (GAPDH panel) and the other from 6B (GAPDH panel) (each containing 3 bands) are said to represent different experimental conditions, but in reality are derived from the same source data.

Images were overlain and color remapped to bring out background detail allowing comparison based on shape and relative intensities of bands and surrounding artifacts. The committee concluded there were numerous points of high similarity between the images, supporting the allegation of falsification. The allegation is recommended for further investigation.

PAPER 9. The Respondent is alleged to have falsified research reported in figures 2 and 5B in a **Cancer** journal article, titled "CpG methylation at promoter site -140 inactivates TGFβ2 receptor gene in prostate cancer" (vol. 104, pp. 44-52), published in 2005.

Grant funding: This work was supported by grants R01AG21418, R01CA1018447, R01CA1018447, T32DK07790 from the National Institutes of Health (NIH), and by the VA Merit Review and Research Enhancement Award Program (REAP) grants from Veterans Affairs.

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, these allegations fall with the scope of VHA Handbook 1058.02.

The specific allegations were as follows:

Allegation 1: "Figure 2. Please compare the 2nd Beta-actin/T BetaRII panel with the 3rd 2nd Beta-actin/T BetaRII minus the background."

This allegation is lacking is in detail, so it is unclear what specific aspects of the images are in question. Using ImageJ background subtraction and the highest resolution images available, however, the committee found no morphologic evidence for falsification or fabrication of data. The image is likely to represent lane splicing, which does not evidence of falsification per se. The Inquiry Committee has concluded that this allegation does not merit further investigation.

Allegation 2: "Figure 5B. M panel. Vertical change in background between left and right lanes."

Although the backgrounds of the material in the left lane (molecular weight markers) and the right lane (M) differ slightly, this most likely represents experimental artifact and not data fabrication or falsification. The committee recommends no further investigation of this allegation.

PAPER 10: The Respondent is alleged to have falsified research reported in **Oncogene**, 2005 Oct 13;24(45):6765-72. "Promoter CpG hypomethylation and transcription factor EGR1 hyperactivate heparanase expression in bladder cancer."

Grant funding: This work was supported by grants RO1AG21418, T32DK07790, RO1CA1018447 and RO1TW006215 from NIH, and the VA REAP award and Merit Review grants.

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent, in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, this allegation falls with the scope of VHA Handbook 1058.02.

Allegation 1: In figure 6a, two panels (EGR1 and heparanase panels each containing 5 lanes) representing different experimental conditions, are derived from the same experimental source.

Images were magnified and compared as overlays. Sample bands were highly similar in shape and morphology, though differences in contrast and image dimensions made comparison difficult. However, it was also noted that the bands, reportedly representing PCR products of different sizes, appeared in the images to have highly similar molecular weights. The Respondent did not address issue of the similarity of the appearance of the gels, but stated that the observed MWs of the above transcripts reflected the limited resolving power of the gel. The committee found this an insufficient explanation, because the relevant MW standards used in this figure were sufficiently separated. The committee concluded that these observations together were consistent with these panels derivation from a common source and refers this allegation for further investigation.

PAPER 11: The Respondent is alleged to have falsified research reported in Figures 2d, 3a, 4a, 4b, 4e, and 5b in an **International Journal of Cancer** article, titled "Genistein mediated histone acetylation

and demethylation activates tumor suppressor genes in prostate cancer cells" (vol. 123, pp. 552-560), published in 2008.

Grant funding: NIH, VA REAP award, Merit Review grants; Grant numbers: RO1CA111470, T32DK007790.

The research referenced in these allegations was supported by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, these allegations fall with the scope of VHA Handbook 1058.02.

Allegation 1: Figure 2d. Patchwork of light, mottled background and smoother, darker background.

The Committee found that the allegation was unclear, and did not identify aspects of the figure that suggested data fabrication or falsification. Any unevenness in the background may reflect artifacts from normal blotting (primary or secondary antibody, blocking, washing, etc.) and is not evidence per se of image manipulation. Moreover, when viewed as a high-resolution image, and inverting the color as part of a preliminary UCSF examination, the figure was found to have some artifacts consistent with the experimental methodology, but no clear indication of data falsification. For these reasons, the Inquiry Committee believes that the allegation does not merit further investigation.

Allegation 2: Figure 3a: Bands left and right FOXO3a panels too similar.

The two FOXO3a panels that were thought to be similar by the preliminary UCSF examination. However, when the Inquiry Committee compared the panels, using Photoshop and the highest resolution images available, it found significant differences in the relative intensities and shapes of the corresponding bands. The spacing of the bands also differs, such that when the panels are superimposed, the bands are not in register. For these reasons, the Inquiry Committee believes that there is insufficient evidence for data fabrication or falsification, and thus, that the allegation does not merit further investigation.

Allegation 3: Figure 4e. Left eF1-α panel. Right two lanes have lighter background than left two lanes.

The preliminary UCSF examination and the Inquiry Committee found that there was significant variation in the background of this figure, but that this was consistent with the usual experimental artifacts seen with immunoblotting. For these reasons, the Inquiry Committee concluded that there is insufficient evidence for data fabrication or falsification, and thus, that the allegation does not merit further investigation.

Allegation 4: Figure 3a:There are multiple instances of the same image (perhaps additional exposures of the same image) being used to represent different cell lines, lanes, blots and/or bands. The amount of image manipulation varies from none at all to an image being cropped, spliced, flipped, and/or resized to represent a different band.

The Inquiry Committee reviewed this allegation of data fabrication in reference to a Fig. 3a showing the results of RNA from LNCaP and PC-3 cells analyzed by RT-PCR. According to the caption of the figure, these are DNA gels (presumably ethidium stained agarose). It appears that mirror images of the first and second lanes in the PC3 panel (CYLD treatment) were used to represent lanes 3 and 4 in that panel. Similarly it appears that mirror images of the first and second lanes in the LNCaP panel (PTEN treatment) were used to represent lanes 3 and 4 in that panel. For the row labeled GAPDH, the same image appears to have been used to represent two different cell lines (LNCaP and PC-3).

The ORI Forensic Review of this image showed that a mirror image of the first two lanes of the CYLD row, PC-3 cell panel, might have been cropped and spliced together to represent the last two lanes. (In addition, the resulting image appears similar to the image in the PTEN row, LNcaP panel.) The Inquiry Committee conducted further examination using Photoshop. This image (CYLD row, PC-3 panel) was grayscale inverted, flipped horizontally and overlaid on the original image. The two images were entirely superimposable, indicating that that data from two experimental conditions with PC-3 cells had been used to represent data from two additional conditions.

The ORI Forensic Review of this figure showed that a mirror image of the first two lanes of the PTEN row, LNCaP cell panel, had been cropped and spliced together to represent the last two lanes. In reviewing this allegation the Inquiry Committee noted that the image for the PTEN treatment (LNCaP cells) appears similar to the image in the CYLD row, PC-3 panel. The Committee conducted further examination of Fig. 3a using Photoshop. The image for the CYLD row, PC-3 panel was grayscale inverted and overlaid on the original image for the PTEN treatment (LNCaP cells). The images were superimposable, indicating that data from two experimental conditions with different cell lines had been used to represent data from two additional conditions.

The ORI Forensic Review of this image indicated that the four lanes in GAPDH row LNCaP cell image was used in the GAPDH row PC-3 cell panel. The Committee also reviewed these images using Photoshop. By overlaying the relevant image panels it was concluded that different exposures of the same GAPDH blot were likely used to represent two different cell lines.

In response to this allegation, the Respondent provided the Committee with an Excel spreadsheet, containing an analysis of the images by densitometry. The Respondent noted differences in band intensity as evidence for the uniqueness of each band. However, he did not provide any original data or material from these experiments, such as uncropped images of the gels. The Inquiry Committee believes that the densitometric analysis is not at all persuasive, since it was not performed using the original experimental data, but instead was done using the final published images. Based on a review of the readily available evidence and the unresolved issues discussed above, the committee recommends that this allegation be referred for an investigation.

Allegation 5: Fig. 4a and 4b: The SIRT1 bands in 4b are duplicates of the SIRT (PC-3) bands in 4a.

The Inquiry Committee reviewed this allegation of data falsification in reference to a Fig. 4a and 4b, which show analysis by semi-quantitative RT-PCR of RNA from LNCaP and PC-3 cell lines. A preliminary UCSF examination indicated that the same image (perhaps additional exposures of the same image) was used to represent multiple blots in Figures 4a and 4b. Using Image J, the Committee inverted the image for SIRT1 PC-3 panel Fig. 4a and overlaid it on both the SIRT1 image LNCaP panel Fig. 4b and on the SIRT1 image PC-3 panel Fig 4b. This provided good evidence for the three images having originated from the same blot and thus did not represent different experimental origins.

The Respondent has not addressed this new allegation in his written response. In his interview with the Committee he stated, when asked by the Chairperson to comment on this allegation, that he had given data to the journal editor and that he would provide the Inquiry Committee with this information. To date, we have not received this information. Based on a review of the readily available evidence and the unresolved issues discussed above, the committee recommends that this allegation be referred for further investigation.

Allegation 6: Figure 4e. EF1α lanes 3 and 4 are duplicated in as lanes 5 & 6.

The Inquiry Committee reviewed this allegation of data falsification in reference to a Fig. 4e, which shows the SIRT1 and EF1-alpha protein levels in the absence and presence of genistein from LNCaP and PC-3 cells analyzed by Western blotting. Lanes 3 and 4 of the EF1α blot, left panel (PC-3 cell line)

appear clearly to be different intensities of the images for lanes 1 and 2 of the EF1α blot, right panel (LNCaP cell line). The two pairs (Lanes 3 and 4 of left panel; Lanes 1 and 2 of right panel) are labeled as different cell lines. As part of the preliminary UCSF examination it was concluded that bands 3 and 4 in the EF1-alpha row left panel (PC-3 cell line) and the lanes 1 and 2 of the eIF1α blot, right panel (LNCaP cell line) appear to be different exposures of the same image, or manipulated versions of the same image. The ORI Forensic Review of this image also indicated that lanes 3 and 4 in the EF1-alpha row left panel (PC-3 cell line) were the same as lanes 1 and 2 of the eIF1α blot right panel (LNCaP cell line). Moreover, the variance in the background between lanes 2 and 3 in the EF1-alpha row left panel (PC-3 cell line) was thought to be possible evidence of image manipulation. Further forensic review by the Committee by enlargement and false colorization of the images using Gradient Map revealed striking commonalities, such as the shape of the protein bands and characteristics of the surrounding backgrounds in the two pairs of bands in question. Thus lanes 3 and 4 eIF1α blot, left panel (PC-3 cell line) appear to have been duplicated as lanes 1 and 2 of the eIF1α blot, right panel (LNCaP cell line). The same image appears to have been used to represent experiments from two different cell lines (PC-3 and LNCaP). The Respondent has not addressed this new allegation in his written response or in his interview with the Committee. Based on a review of the readily available evidence and the unresolved issues discussed above, the committee recommends that this allegation undergo further investigation.

Allegation 7: Figure 5b. In the PTEN promoter panel (INP column), lanes 1, 2 and 3 appear to be identical to lanes 1, 2, and 3 in the CYLD promoter panel (INP column).

The preliminary UCSF investigation and the ORI Forensic Review both indicated that the PTEN promoter panel (INP column) appears similar to the CYLD promoter panel (INP column). Further forensic review by the Inquiry Committee, using enlargement and false colorization of the PTEN and CYLD images Gradient Map software, revealed multiple striking similarities in the shapes and the internal characteristics of the DNA bands, as well as in their backgrounds. The Committee concluded that the PTEN and CYLD promoter panels in the INP column are likely to have been derived from a common experimental origin and recommends that this allegation be referred for further investigation.

PAPER 12: The Respondent is alleged to have falsified research reported in Figure 1A in a ***Clinical Cancer Research*** journal article, titled "Combination analysis of hypermethylated Wnt-antagonist family genes as a novel epigenetic biomarker panel for bladder cancer detection" (vol. 12, pp. 2109-2116), published in 2006.

Grant funding: NIH grants RO1CA101844, RO1AG21418, T32DK07790; Department of Defense, VA Merit Review, VA Research Enhancement Award Program, and VA Merit Review Entry Program grants.

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, this allegation falls with the scope of VHA Handbook 1058.02

Allegation 1: "*Please compare lanes 7 to 10 sFRP-5 MSP panel with lanes 7 to 10 sFRP-4 MSP panel."*

The committee examined the highest quality images available for this figure, and did not detect any distinctive morphologic features of the bands or experimental artifacts that would indicate the images were derived from the same experimental origin. Thus, the committee has concluded that there is no evidence to support the above allegation, and recommends no further investigation.

PAPER 13: The Respondent is alleged to have falsified research reported in Figures 2 and 3 in a **Clinical Cancer Research** journal article, titled "Cytochrome P450 1B1 is overexpressed and regulated by hypomethylation in prostate cancer" (vol. 11, pp. 5793-5801), published in 2005.

Grant funding: NIH grants RO1CA101844, RO1AG21418, and T32DK07790 and Veteran Affairs Merit Review and Research Enhancement Research Program awards.

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, this allegation falls with the scope of VHA Handbook 1058.02

Allegation 1: The informant alleges that in Figure 2, the bands in top 3 panels have "watermarks" around them," and that in Figure 3 is "Low resolution. All looks too regular."

The committee thought this allegation was somewhat vague, and did not clearly identify what features were most suggestive of data falsification. However, we examined these figures in high resolution, and did not detect any distinctive morphologic of the features of the bands or background that would suggest image falsification. The "watermarks" in Figure 2 appear to be pixelation. We recommend that no further investigation be done for these allegations.

PAPER 14: The Respondent is alleged to have falsified research reported in Figures 1B, 5A, and 6 in a ***Clinical Cancer Research*** journal article, titled "Epigenetic modifications of RASSF1A gene through chromatin remodeling in prostate cancer" (vol. 13, pp. 2541-2548), published in 2007.

Grant funding: NIH grants RO1CA101844, RO1CA111470, RO1CA108612, RO1AG21418, and T32DK07790, VA Merit Review and Research and Engineering Apprenticeship Program grants.

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, these allegations fall with the scope of VHA Handbook 1058.02.

The specific allegations are as follows:

Allegation 1: "Figure 1B. Prostate cancer panel. USP row of bands. Band lane 15 has sharp left edge. Band lane 16 has sharp right edge with an angular piece sticking out".

The committee has examined a high resolution version of this image and believes that, while the band does have an artifact, this does not per se indicate that the image has been falsified or fabricated, and recommends that no further investigation of this allegation.

Allegation 2: "Figure 5A. Please compare the RWPE-1 AcH3 GAPDH and LNCaP AcH3 GAPDH panels. Please compare the RWPE-1 Input RASSF1A and LNCaP Input RASSF1A panels. Please compare the LNCaP Input GAPDH panel with a horizontal mirror image of the RWPE-1 Input GAPDH panel. Please compare the RWPE-1 AcH4 RASSF1A panel with RWPE-1 H3K4me2 RASSF1A panel."

The committee examined these figures in high resolution, and did not detect any distinctive morphologic of the features of the bands or background that would suggest image falsification. The committee recommends no further investigation of this allegation.

Allegation 3: "Fig. 5: 4th AcH3 RASSF1A and 4th H3K4me2 RASSF1A panels too similar."

The committee examined these figures in high resolution, and did not detect sufficient distinctive morphologic features of the bands or background to indicate image falsification. The committee recommends no further investigation of this allegation.

Allegation 4: Fig. 6: 2nd AcH3 GAPDH and 2nd AcH4 GAPDH panels too similar.

The committee reviewed the available high resolution images of this figure, and concluded that there was morphologic variation in the above images, indicating they represent distinct data origins. The committee recommends no further investigation of this allegation.

Allegation 5: The committee had concerns about Fig. 5: 1st AcH3 GAPDH (cited as obtained from RWPE-1 cells) with Fig. 6 1st AcH3 GAPDH (LNCaP cells). The bands in these lanes appear similar or identical, suggesting that they do not represent separate experiments and original data.

To address this new allegation, the Respondent has provided the committee with images of two separate gels corresponding to the bands in question indicating that the images in the figure represent distinct original data. Based on this evidence, we believe that the images in question do not represent data falsification, and thus do not merit further inquiry.

PAPER 15: The Respondent is alleged to have falsified research reported in Figure 3A in *Journal of Biological Chemistry* pre-print publication article, titled "Long non-coding RNA HOTAIR is targeted and regulated by miR-141 in human cancer cells," that was electronically published on March 10, 2014.

Grant funding: NIH RO1CA130860, a Veterans Affairs Program Project and Veterans Affairs Merit Review grants.

The research referenced in these allegations was supported, in part, by the VA. Further, the research was reported, in part, by the Respondent in his capacity as a VA employee as evidenced by the reference in the article to the Respondent's affiliation with SFVAMC. Therefore, this allegation falls with the scope of VHA Handbook 1058.02.

Allegation 1: In Figure 3A, the image in the panel labeled "HOTAIR siRNA-2" of the pre-print is identical to the image labelled "ACHN HOTAIR siRNA-1." In the final version of the paper, the latter image has been replaced. The committee has reviewed both the online preprint version and the final printed form, and indeed, the images appear identical in the former. The Respondent acknowledges this difference and states that the error originated with the journal. However, this seems implausible, since the figure is complex, containing multiple images, and thus was most likely assembled by the Respondent or other members of the research group. The committee has requested that the Respondent provide copies of his correspondence with the JBC corroborating his statement, or otherwise clarifying the circumstances by which the above duplication was detected. However, this information has as yet not been provided. The committee therefore recommends that this allegation undergo further investigation.

In summary, the Inquiry Committee believes that for eight publications (#1, 2, 4, 6, 8, 10, 11, and 15 listed above) there are allegations with sufficient substance to warrant a research misconduct investigation. For the remaining seven publications and associated allegations, we recommend no further action, either because the original allegations were unconvincing, or because the Respondent has provided adequate additional information. We specifically recommend the following allegations undergo further investigation:

1. In **Cancer Research**, "Regulation of minichromosome maintenance gene family by microRNA-1296 and genistein in prostate cancer" (vol. 70, pp. 2809-2818), 2010; the left 3 lanes of GAPDH panel figure 5D and the upper GAPDH panel (directly below the MCM3

panel) in figure 3B, said to represent different experimental conditions, are derived from the same source data.

2. In **Cancer Research**, (vol. 70, pp. 2809-2818), 2010, Figures 2C and 5D: Lanes 1, 2 and 3 of the GAPDH panel in Figure 2C appear to be identical to the last 3 lanes of the GAPDH panel in Figure 5D. The treatments, however, are labeled differently in each figure.
3. In **Oncogene**, 2007 Dec 6;26(55):7647-55. Epub 2007 Jun 11, "Knockdown of astrocyte-elevated gene-1 inhibits prostate cancer progression through upregulation of FOXO3a activity;" Figure 2b: three bands (EF1α panels: left and right lanes LNCaP panel, and left lane DU145 panel) said to represent different experimental conditions are derived from the same source data.
4. In **Oncogene**, 2007 Dec 6;26(55):7647-55, Epub 2007 Jun 11, in Figure 2b: three bands (EF1α panels: left and right lanes LNCaP panel, and left lane DU145 panel) were utilized to create a 4th band (EF1αpanel: right lane PC-3 panel) through horizontal mirror imaging.
5. In **Oncogene**, 2007 Dec 6;26(55):7647-55, Epub 2007 Jun 1, fig. 2b, three bands (EF1α panels: middle lane LNCaP panel, middle lane PC-3 panel, and right lane DU145 panel) representing different experimental conditions are derived from the same source data.
6. In **Oncogene**, 2007 Dec 6;26(55):7647-55, Epub 2007 Jun 1, Fig. 2b, the middle lane band, lane PC-3 panel was horizontally stretched to create another band (left lane PC-3 same panel) to represent a different experimental condition.
7. In **Oncogene**, 2007 Dec 6;26(55):7647-55, Epub 2007 Jun 1, Fig. 2b, a band (right lane DU145 panel) was utilized to create another band (middle lane DU145) through horizontal mirror imaging.
8. In **Oncogene**, 2007 Dec 6;26(55):7647-55, Epub 2007 Jun 1, Figure 4a, b, c CE and c NE, the entire panel of 6 bands (EF1 panel: lanes 1-6), which were presented as data from at least two experiments, appears to be replicated and applied in four locations, suggesting they were inappropriately derived from the same source data.
9. In **Clin Cancer Res,** 2004 Mar 15;10(6):2015-9, "Polymorphisms of the CYP1B1 gene as risk factors for human renal cell cancer," a segment of Fig. 1b, containing two bands (CODON 48 common allele panel: bands in lanes marked 4 and 5), and spot and streak artifacts are derived from the same source data reported in another publication (Fig 1B, codon 449 common allele panel: bands in lanes marked 13 and 14; Cancer Res. 2003 Jul 15;63(14):3913-8.
10. In **Clin Cancer Res**, 2004 Mar 15;10(6):2015-9, Fig. 1b, two bands (CODON 48 rare allele panel: bands marked as 5 and 6) are derived from the same source data as 2 bands representing different experimental conditions from Fig 1B (Codon 449 rare allele panel: bands in lanes marked as 14 and 154) of Cancer Res. 2003 Jul 15;63(14):3913-8.
11. In **Clin Cancer Res**, 2004 Mar 15;10(6):2015-9, Fig. 1b a segment of the image containing two bands (Intron 1 rare allele panel), and spot and streak artifacts is derived from the same source data as a segment representing different experimental conditions from Fig 1B (Codon 453 rare allele panel) of Cancer Res. 2003 Jul 15;63(14):3913-8.
12. In **Clin Cancer Res**, 2004 Mar 15;10(6):2015-9, In Fig. 1b, another segment of the image containing 2 bands (Codon 453 rare allele panel), and spot artifacts is derived from the same source data as a segment representing different experimental conditions from Fig 1B (Intron 1 rare allele panel) of Cancer Res. 2003 Jul 15;63(14):3913-8.
13. In **Proc Natl Acad Sci U S A,** 2008 Feb 5;105(5):1608-13. doi: 10.1073/pnas.0707594105. "MicroRNA-373 induces expression of genes with complementary promoter sequence," Figure 2D, E-cadherin panel, lanes 5 and 6) said to represent different experimental samples, were actually derived from the same source. data.

14. In **Proc Natl Acad Sci U S A,** 2008 Feb 5;105(5):1608-13, Fig. 2D, 2 lanes (GAPDH panel: lanes 2 and 5) representing differing experimental conditions were derived from the same source data.
15. In **Proc Natl Acad Sci U S A,** 2008 Feb 5;105(5):1608-13, Fig. 2D a portion of the Fig. 2D, the GAPDH panel encompassing approximately 1.5 lanes was mirrored and added to the panel and yet another portion of this was mirrored and added.
16. In **Mol Cancer Ther,** 2010 Jun;9(6):1680-7. doi: 10.1158/1535-7163.MCT-10-0012. "Oncogenic functions of secreted Frizzled-related protein 2 in human renal cancer," two panels, one from Fig 6A (GAPDH panel) and the other from 6B (GAPDH panel) (each containing 3 bands) are said to represent different experimental conditions, but in reality are derived from the same source data.
17. In **Oncogene**, 2005 Oct 13;24(45):6765-72 "Promoter CpG hypomethylation and transcription factor EGR1 hyperactivate heparanase expression in bladder cancer," Figure 6a, two panels (EGR1 and Heparanase panels each containing 5 lanes) representing different experimental conditions, are derived from the same experimental source.
18. In **International Journal of Cancer**, 2008, (vol. 123, pp. 552-560), "Genistein mediated histone acetylation and demethylation activates tumor suppressor genes in prostate cancer cells," Fig. 3a, Figure 3a:There are multiple instances of the same image being used to represent different cell lines, lanes, blots or bands, with some images being cropped, spliced, flipped, or resized to represent a different band.
19. In **International Journal of Cancer**, 2008, (vol. 123, pp. 552-560), Fig. 4a and 4b: The SIRT1 bands in 4b are duplicates of the SIRT (PC-3) bands in 4a.
20. In **International Journal of Cancer**, 2008, (vol. 123, pp. 552-560), Figure 4e: EF1α lanes 3 and 4 are duplicated in as lanes 5 & 6.
21. In **International Journal of Cancer**, 2008, (vol. 123, pp. 552-560),Figure 5b. In the PTEN promoter panel (INP column), lanes 1, 2 and 3 appear to be identical to lanes 1, 2, and 3 in the CYLD promoter panel (INP column).
22. In **Journal of Biological Chemistry** pre-print publication article, "Long non-coding RNA HOTAIR is targeted and regulated by miR-141 in human cancer cells," electronically published on March 10, 2014, Figure 3A, the image in the panel labeled "HOTAIR siRNA-2" of the pre-print is identical to the image labelled "ACHN HOTAIR siRNA-1.

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