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NEWSLETTER

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Plagiarism in the Digital Age

Harold C. Sox, M.D., Professor of Medicine, The Dartmouth Institute, Dartmouth Medical School; Editor Emeritus, Annals of Internal Medicine

According to the U.S. Office of Science and Technology Policy, research misconduct is fabrication, falsification, and plagiarism.[1] Plagiarism is defined as "the appropriation of another person's ideas, processes, results, or words without giving appropriate credit." It is an act of deception. It involves stealing someone else's work and lying about it afterward. The digital age has made it easier to plagiarize (copy and paste) and to detect plagiarized text.

What constitutes plagiarism? A brief list includes turning in someone else's work as your own; copying words or ideas from someone else without giving credit; failing to put a quotation in quotation marks, giving incorrect information about the source of a quotation; copying the sentence structure of a source without giving credit, even while substituting synonyms; and copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not.

Writing for publication is serious business. Plagiarism can end an

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Plagiarism: The Human Solution

Sujit D. Rathod, M.Sc., Ph.D. Candidate; Division of Epidemiology, the University of California-Berkeley

Plagiarism has received much attention in the past several years as a form of research misconduct. With full-text publications readily available online and the development of screening software, researchers are becoming increasingly aware of the extent to which research has been plagiarized.[1] With these programs, the entry of plagiarized works into the peer-reviewed literature is largely preventable. Yet a focus on technological fixes for the problem of plagiarism fails to highlight the causes of plagiarism and its prevention. To bring attention to these elements of research misconduct is an opportunity to strengthen the overall system of scientific research.

In recent years, software programs have been deployed to systematically scan the contents of single journals or entire databases. The results have been startling and have motivated editors and publishers to incorporate these programs into their manuscript submission systems.[2] As these software programs are increasingly adopted by university faculties, a new generation

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Plagiarism Among Undergraduate Students in an Online Course

Patricia Pence, Ed.D., M.S.N., Nursing Professor, Illinois Valley Community College, Oglesby, IL

Plagiarism in research papers on human growth and development submitted by online students attending a rural Midwest community college led to a descriptive study to address this important ethical issue.[1] The plagiarized material included the omission of quotation marks, use of direct wording copied and pasted from sources without a citation, and use of improperly paraphrased words without citation. Early efforts to alert students to avoid plagiarism and allow students to revise the plagiarized content in the written papers did not resolve the issue. Specific interventions, including a survey focused on informing students about plagiarism, since instances of plagiarism may have been unintentional, also are discussed.[1]

Interventions

Announcements posted in the online course and in an email to students at the beginning of the course and prior to the due date for the first research paper served as initial reminders to avoid plagiarism. Plagiarism information added to the online course also included the following:

- A web link to *http://www.plagiarism.org*, which defined plagiarism, described various forms of plagiarism and provided examples of plagiarism and how to avoid it.
- Sample questions and answers developed by the researcher highlighted the various forms of plagiarism noted in previous student papers submitted. Answers included examples of proper citations.
- Resources provided by faculty members of the English department included a writing guidelines stylebook, the American Psychological Association (APA) sources for in-text citation, how to cite references in APA style, and a sample APA reference page.

Plagiarism Rubric

We assigned a grading rubric that showed how plagiarism could adversely affect the grade for the written research papers. The rubric also encouraged students to use it as a self-assessment tool. Rubrics attempt to communicate expectations and assess the quality of an educational task. Rubrics divide the educational task into separate component parts and objectives and provide descriptions for acceptable and unacceptable performance.[2] This rubric also included the criteria for citations, consequences for any plagiarism, and a requirement that students have the draft of their written research paper reviewed by tutors from the college writing center.

Survey

We then disseminated an 18-item survey that had been designed to better assess the students' understanding and awareness of plagiarism. Forty-one of the 43 students enrolled in the course participated in the study. All participants received five bonus points toward their final grade for completing the survey.

Design

The first part of the survey asked students to respond to a five-point Likert-type scale, ranging from *strongly agree* to *strongly disagree* to three questions related to the students' awareness of plagiarism and confidence in their ability to avoid plagiarism. In the second part, students were then asked to respond to eight questions depicting scenarios of plagiarism and two questions not depicting plagiarism, by selecting whether the scenarios were *definitely plagiarism, probably plagiarism, not sure if it is plagiarism, probably not plagiarism,* or *definitely not plagiarism*. The third section asked students to indicate their gender and age and whether they had reviewed the plagiarism information and grading rubric posted in the online course.

Results and Conclusion

Survey results revealed that the majority of participants either *strongly agreed* or *agreed* to being aware of plagiarism (88 percent), being able to recognize different types of plagiarism (71 percent), and having confidence in their ability to avoid plagiarism (71 percent). At least two-thirds of study participants identified the correct answer for the

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Textual Plagiarism: How Should It Be Regarded?

Diane Pecorari, Ph.D., Linnaeus University, Sweden

Plagiarism is one of the most stigmatizing acts a researcher can commit, bringing excoriating criticism down upon the accused. It is difficult to find someone with a good word to say about plagiarism. An exception exists, however, for what has been called textual, or linguistic, plagiarism. This refers to the re-use of language from a source and presupposes that a distinction can be made between recycling language and appropriating findings. One public articulation for the idea came in a letter to the editor of *Nature* responding to accusations of plagiarism. The author implicitly accepted the charge of having copied from earlier works, but defended it as legitimate, on the grounds that language, but not content, had been appropriated. In the words of the author:

> *Borrowing sentences in the part of a paper that simply helps to better introduce the problem should not be seen as plagiarism. Even if our introductions are not entirely original, our results are—and these are the most important part of any scientific paper.*[1]

A recent survey of academics about the acts they consider to be plagiarism found that many believed that it can sometimes be acceptable to re-use language from a source.[2] The points made by individuals who take this position in our study, and elsewhere in the literature,[3] include the following:

Certain ideas are less original than others. Common knowledge or background information does not belong to any particular individual, so repeating such ideas may be appropriate.

Certain parts of texts are less original than others. For example, an article introduction describes work already done, not new findings. Borrowing from this section may therefore be appropriate.

Some language is inherently unoriginal. For example, the sentence "results were considered significant at the $P < 0.05$ level" generates 278 hits on Google Scholar. Such sentences can be considered to be in the public domain.

Some ideas can be expressed only in a limited number of ways. One of our informants, a professor at a prestigious medical school, stated, "Cows have four legs, how should I write that in a different way?"

Even if rewordings can be found, there may be no benefit in doing so. Indeed, the result may be less successful. The professor quoted above expressed surprise that less experienced writers "come up with their own strange formulations," awkward articulations of standard ideas they've read better expressed. He was "surprised that people don't… make use of functional text, so to speak."

These views are by no means universally held. Our informants found it impossible to agree whether specific examples constituted plagiarism. The scientist quoted above as defending copying did so in response to harsh criticisms of the strategy as plagiarism. The idea that some re-use of language can be appropriate horrifies some, but so does the idea that copying a formulaic chunk of language can be called plagiarism. There is, simply put, a dangerous lack of consensus about this issue. The purpose here is not to argue for or against the idea that textual plagiarism is an appropriate strategy. Rather it is to draw attention to the diversity of views, the lack of consensus about this issue.

About a year ago, I was asked to speak about plagiarism to a group of public health students. They were engaged, bright people and keen to learn the standards they were expected to meet in their writing. However, when I showed them examples of writing that have been condemned as plagiarism, they became worried. Many expressed the view that if re-using even anodyne, formulaic sentences is illegitimate, then not only is the bar set too high, but they might unknowingly stumble over it. Answering their fears and concerns was made more difficult by the awareness that the various teachers responsible for their education would provide different and inconsistent answers to questions about what is allowed.

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Coping with Plagiarism in the Croatian Medical Journal

Ksenija Baždarić, Croatian Medical Journal's *Research Integrity Editor, Department of Medical Informatics, Rijeka University School of Medicine, Rijeka, Croatia*

The *Croatian Medical Journal* (*CMJ*) has had cases of plagiarism in the past that have resulted in retractions. To prevent the publication of articles that have been plagiarized, *CMJ* began to scan all submitted manuscripts using plagiarism detection software in 2009. From 2009-2010, *CMJ* also commissioned a study to collect data on the prevalence of plagiarism according to standard investigating procedures.[1] Two years of investigation yielded interesting results. Eleven percent of all submitted manuscripts contained plagiarized parts, mostly true plagiarism (8 percent) (i.e., text derived from another author).[2]

The results of this study have ensured a better understanding of plagiarism (both the features and definition) and a revision of the protocol for detecting plagiarism in *CMJ*.[3] The standard protocol for plagiarism detection was simplified after the project was completed in 2011. Currently, in 2012, all submitted manuscripts are initially checked with *CrossCheck*.[4] Manuscripts that are suspected of plagiarism, with more than a 10 percent similarity with one source, are compared against the original texts using the *WCopyfind* program. Mutually similar originals are then excluded. All manuscripts that have 10 percent or greater text similarities are analyzed by sections and also are manually verified by *CMJ's* Research Integrity Editor[5] according to *CMJ*'s Guidelines for Authors and the Committee on Publication Ethics (COPE's) flowcharts.[6] After manual verification, the Research Integrity Editor writes a brief plagiarism report. The plagiarism report consists of manuscript data, full-text similarity rate, analysis by sections (including text similarity, citing of the original sources, and the comments from the editor), and the conclusion and recommendation for peer review. This report is sent to the author regardless of the actual peer review recommendation.

The types of plagiarism are categorized according to the text similarity rate as minor (11 percent-24 percent), moderate (25 percent-49 percent), and major (> 50 percent) plagiarism.[2] In the case of minor or moderate plagiarism, the editors at *CMJ* send the report without a request for an explanation of the transgression. If the manuscript is deemed suitable for peer review, the authors are asked to rewrite the similar parts of the text and cite the original articles. In the case of major plagiarism, grave concern is expressed, and the corresponding author is required to explain the unauthorized appropriation of the previously published articles.

CMJ has found that in the majority of the manuscripts suspected of plagiarism in 2012, authors plagiarized the Materials and Methods section. This is considered technical plagiarism.[2] *CMJ* also recently discovered an instance of major plagiarism, in which the authors had plagiarized 85 percent of a text from a previously published article. All sections, including the data of the manuscript, were appropriated without authorization and presented as their own. *CMJ* notified the authors with the expectation of at least receiving an apology. No response has been received. This issue also raises additional concern considering that the authors could submit or even publish this manuscript in another scientific journal that has not yet standardized the use of plagiarism detection software and manual verification.

Allegations of plagiarism can be serious and damaging to a career. It is always "better to prevent than to cure." The prevention of plagiarism in a scientific journal should include the use of plagiarism detection software with manual verification and continuing education for editors and authors about plagiarism.[1-3, 5-7]

Plagiarism detection software is also quite easy to use and is widely available. However, it is up to the journal's editorial board to determine the plagiarism threshold and the extent of screening. The plagiarism threshold is a cut-off value of text similarity (in percent or number of words) that makes a manuscript suspected of plagiarism. A recent COPE discussion paper is useful in helping to explain the types and features of plagiarism.[7] However, their definition of plagiarism (threshold of 100 words) could be too rigid,

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Preventing and Correcting Plagiarism in the Serbian Biomedical Literature: Contribution of Serbian Scientists

Ljiljana Vučković-Dekić, M.D., Ph.D. (Ombudsman), Institute for Oncology & Radiology of Serbia, Belgrade, Serbia

Breaches in high ethical standards in science are not reserved for Western nations. The basic principles of the Responsible Conduct of Research (RCR) are valid for all countries and all scientific disciplines, and spreading of the awareness of Good Scientific Practice (GSP) should be an obligation of all scientists.[1]

However, until 1998, the scientific community in Serbia was almost completely uninformed regarding publication fraud, including plagiarism. There were no published cases, no lectures for undergraduate or graduate students, no articles, and no books that dealt with this important issue.

Since 2000, I have served as Ombudsman to the official bodies of the Medical Faculties of the Universities of Belgrade and Kragujevac, and the University of Belgrade Dental School. In this capacity, I have brought together a number of interested colleagues, including editors of Serbian biomedical scientific journals and other scientists who were increasingly concerned about plagiarism and other types of scientific fraud. Together, we undertook several steps to enhance RCR. Our activities, apart from organizing legal and ethical regulation, also focused on science ethics education as the best preventive measure against all forms of scientific fraud.

To further enhance RCR efforts, we completed a comprehensive review of the literature on GSP in Serbia.[2] We also developed educational curricula and published numerous educational articles in all Serbian medical journals, and in other international medical journals, including the *Croatian Medical Journal* and the *Journal of the Balkan Union of Oncology*. At the same time, we taught science ethics in numerous courses and seminars and at scientific meetings in all Medical Faculties in Serbia. Education courses in science ethics and communication in biomedicine were also introduced into the framework of continuing medical education (CME) at the Medical Faculty, University of Novi Sad. This program has been in existence since 1999. We also developed GSP programs that were incorporated into the framework of the Ph.D. studies program at the University of Belgrade Medical School, University of Kragujevac Medical School, and University of Belgrade Dental School. These courses are now mandatory for all attendees, and almost 1,000 students have completed these curricula.[3,4,5]

To better assess the efficacy of our program, we conducted assessments of the impact of our lectures on knowledge and attitudes about scientific fraud in course attendees. Study results showed that our students exerted strong opposition to all types of fraud, even before the lectures. They were, however, more reluctant to punish plagiarists than other violators of publication ethics.[6] After lectures, significantly more attendees thought that the wrongdoers deserved severe punishment for all types of scientific fraud, including plagiarism.[7]

Other detailed lectures about various forms of plagiarism, including self-plagiarism, were delivered to attendees at three CME courses in science ethics. Our study showed that these short lectures significantly changed attendees' earlier, somewhat permissive attitude toward plagiarism. Please note that these attitudes were associated with outright plagiarism, as opposed to discreet plagiarism. Discreet plagiarism includes inappropriate paraphrasing and problematic citation practices. This form of plagiarism is recognized as a misdemeanor and is not considered to be a crime by our students.[8]

The consequences of the growing awareness of the harmful effects of plagiarism on the whole Serbian scientific community have been multiple. Awareness has been raised because of anecdotal cases of outright plagiarism and self-plagiarism, and duplicate publications have also been discovered.[9,10] The official bodies of the Medical Faculties of the Universities of Belgrade and Kragujevac, and the University of Belgrade Dental School, have assisted in the resolution of all these cases. In addition, we have educated the editors of

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Digital Age *(from page 1)*

otherwise spotless and accomplished career. If you want to use someone else's work (or even selections from your own previously published work), do not delegate responsibility for asking permission. Check your proofs. Senior authors, carefully check the work of your coauthors for plagiarized material. Reviewers, especially those who work in the same field, also have an important role in detecting plagiarism.

The scientific record should be sacrosanct. Fixing errors and removing fakery are an *obligation* of the scientific community. Retracting an article that led to the discovery of scientific fraud is not enough. When a scientist has published fraudulent work, every article can become suspect until proven otherwise.[2] This can mean thousands of hours of work reviewing articles and interviewing coauthors.

Prevention is far preferable to the pain of retracting suspect articles and the work of checking articles by authors who have published fraudulent science. Inculcating scientists with a sense of high moral purpose is the intent of mandatory training programs required for grantees of the National Institutes of Health and the National Science Foundation. This approach begins with the leader of a research group. Education is most effective when individuals with deep knowledge of a topic show that they value the behaviors they are trying to teach. A research mentor also can engage in this type of teaching by carefully checking the work by a trainee in the laboratory, by questioning coauthors specifically about using text or ideas without attribution, and by explaining why these activities are important to the ethical conduct of science. Education and mentoring are the foundation of efforts to reduce fraudulent science. A report from the Institute of Medicine delves into this topic in much more detail than is possible in this article.[3,4]

Journals can complement these efforts by trying to detect fraud by refusing to publish an article and by insisting upon an investigation at the local level. The peer review process is also a key element of these efforts, but so is the screening of manuscripts using computer software that compares the text of a manuscript with the published literature and marks duplicate phrases, sentences, and paragraphs. This process can have many false-positive results, so it is also important for someone to read the duplicated text and form a judgment about whether it constitutes plagiarism. A journal staff member can read the text marked by the computer program and discuss possibly plagiarized text with other staff, including senior editors who are also experienced authors and researchers. Journals are beginning to adopt these practices. Also, if the journal editors screen articles only if they plan to publish them, the cost may be bearable since small journals with small budgets typically publish fewer articles. Publishers should also be willing to support the costs of screening because it will reduce the risk of an embarrassing disclosure of plagiarism in one of their journals.

In theory, the combination of electronic screening and follow-up by human review should be quite effective. As a screening test, electronic screening is probably quite sensitive for detecting duplicated text, but much of the duplicated wording is at most a short phrase and clearly not fraudulent by intent. An experienced staff person reading the text can provide additional insight when duplicated text exceeds the threshold for suspecting fraud, especially when overseen by a second person, who is usually a senior editor.

Plagiarism in the digital age is easier to commit but much easier to detect. On balance, we're making progress.

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Human Solution *(from page 1)*

of research scientists will become accustomed to this new paradigm in the peer-review process. Yet it is not known whether the existence of these programs has a deterrent effect on those seeking to submit knowingly plagiarized works to journals. Although there is reason to be optimistic that future publications of original research will, in fact, be original, the software solution treats the symptoms rather than the causes of plagiarism.

The causes of plagiarism can be addressed at a number of intervention points. Fischer and Zigmond provide a thorough catalogue of these reasons, directed at mentors for the benefit of their trainees.[3] An explanation of the rationale for why plagiarism is considered a form of research misconduct is a particularly critical element of the process of developing trainees, and one which should be introduced much earlier in the formal education system. It is also worth noting that emphasis on the negative consequences of being found guilty of plagiarism is not an adequate rationale. Plagiarism is misconduct; therefore, penalties exist.

For trainees, discussions of the rationale for plagiarism from a positive orientation may prove compelling and enduring. Namely, the concepts of intellectual property and attribution must be introduced when students start to collect and summarize information as part of their educational activities. Students can easily envision themselves as beneficiaries of inventions and discoveries disseminated by past scientists. From this point forward, they can better appreciate how those innovators merit attribution, at a minimum, for their contributions. As the students advance and start to engage in research activities, they will be more likely to ethically engage in the scientific system in which they, in turn, can be rewarded—via funded grants, promotions, and tenure—for their own original contributions.

Under this framework, students learn that original research published in the peer-reviewed literature is intellectual property. Fortunately, the cost of this property is only that of attribution, upon which they can build their own contribution to the field, while also providing additional recognition to those researchers who have been attributed. Implicitly recognized in this framework is that plagiarism diminishes the rewards of original contributions and is, in a sense, theft of the recognition due to the original contributor. In contrast to falsification and fabrication, with plagiarism, the actual person is the victim.

Other positive aspects of the concept of intellectual property can also have a tangible appeal in those settings that have achieved a level of notoriety with regard to plagiarism practices. Whether deserved or not, cultural considerations—perhaps the scientific culture or traditional culture—have also been implicated in the differing standards of research misconduct.[4] Fortunately, in many of these settings, there is evidence that awareness of the importance of intellectual property is growing among journal editors.[5,6] This awareness may reflect the fact that researchers in countries such as India and China have an increasing stake in the international intellectual property rights regime. That these editors look to the established guidelines for research misconduct (e.g., from the Office of Research Integrity [U.S.], the Committee on Publication Ethics [U.K.], and the International Committee of Medical Journal Editors) is proof that as research activities are manifest globally, standards are harmonizing, in spite of the aforementioned cultural considerations.

Those who would depend on software programs to eradicate plagiarized works from the literature, but ignore the causes of plagiarism, can miss an important opportunity to strengthen the overall system by which knowledge is generated and disseminated. For those researchers who will be authors on future publications, both from the U.S. and abroad, developing an appreciation of intellectual property creates multiple levels of benefit—for the authors, the journals in which they will publish, and the overall system of scientific knowledge.

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Students *(from page 2)*

eight scenarios depicting plagiarism in the second part of the survey. The participants also correctly identified scenarios: depicting probable plagiarism, changing the wording from a source, not giving proper attribution (90 percent), not adding citations (90 percent), citing in only part of a paragraph (83 percent), copying from a friend (78 percent), not including quotation marks (76 percent), copying and pasting a table without proper citation (54 percent), and not citing personal communication (49 percent). Students also noted that they were *not sure if it is plagiarism* when using personal communication without a citation (44 percent), using a table from a source (20 percent), and using ideas from an author (17 percent). For the survey items not depicting plagiarism, the majority of participants were still able to recognize the examples of a proper citation (81 percent) and when a citation is paraphrasing and not plagiarism (73 percent).

In the third part of the survey, students indicated whether they had reviewed the plagiarism information and grading rubric posted in the online course. The results suggest that 90 percent of the participants had reviewed the grading rubric, whereas only 44 percent of the participants reviewed the plagiarism information (including the writing stylebook).

The results suggest that these interventions were effective in helping students recognize examples of plagiarism. Also, review of the first written research paper submitted for this course showed that instances of plagiarism had decreased, compared with the instances of plagiarism noted in papers submitted during previous semesters. Other students, however, continued to have difficulty paraphrasing, quoting, and citing papers correctly.

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especially for non-native speakers of English. An understanding of cultural difference should also be incorporated prior to its presentation as a guideline, which *CMJ* will heartily endorse. Editors can also choose whether to scan all manuscripts, those for peer review, or only manuscripts accepted for publishing. In *CMJ*, all manuscripts are scanned, even though it can be costly and is sometimes time consuming. Manual verification by journal editors should be obligatory, no matter how obvious the appropriation of the text is.[2] Altogether, to ensure the best system of plagiarism prevention, any requirements should be uniform with COPE or the International Committee of Medical Journal Editors because most journals use the same software.

Finally, the prevention of plagiarism is useless without the education of authors and promotion of research integrity through a journal's detailed guidelines for authors, articles about research integrity topics, and correspondence. This system will bring long-term benefits and preserve the high quality of manuscripts published in *CMJ*.

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Serbian Biomedical *(from page 5)*

Serbian biomedical journals on how to prevent the publication of fraudulent manuscripts.[10] If the improvement of the ethical atmosphere in our scientific community is at least partly due to these activities, we are convinced that such results are worth any efforts.

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Case Summaries

Peter J. Francis, M.D., Ph.D.
Oregon Health Sciences University

Based on the report of an investigation conducted by Oregon Health Sciences University (OHSU) and additional analysis conducted by ORI in its oversight review, ORI found that Dr. Peter J. Francis, Associate Professor, Casey Eye Institute, OHSU, engaged in research misconduct in research reported in two grant applications, R01 EY021214-01 and resubmitted as R01 EY021214-01A1, that he submitted to the National Eye Institute (NEI), National Institutes of Health (NIH).

Textual *(from page 3)*

Inexperienced writers and those with English as a second language have the most to gain from a copying strategy. Therefore, they are perhaps most disadvantaged by disagreement about whether that strategy is legitimate, but nobody is well served by the disagreement. It is imperative that this question be debated in the wider research community as a first step toward achieving a stable consensus.

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2. Pecorari D, Shaw P. Types of student intertextuality and faculty attitudes. *J Second Lang Writ*. 2012;21(2):149-164.
3. Flowerdew J, Li Y. Language re-use among Chinese apprentice scientists writing for publication. *Appl Ling*. 2007;28(3);440-465.

Specifically, ORI found that the Respondent fabricated results of a pilot experiment in which he claimed to have injected retinal pigment epithelial (RPE) cells obtained from Rhesus monkey embryonic stem cells (ECS) into a strain of rats (RCS) that develops retinal degeneration.

Respondent claimed that after the injection of ECS-derived RPE cells 21 days postnatal, the rats were tested at day 60 postnatal for optomotor acuity, and that the retinal histology of eyes receiving ECS-derived RPE cells, compared to mock-injected controls, showed enhanced photoreceptor preservation and no adverse effects. Respondent admitted that this experiment had not been conducted either by the time the original grant application had been submitted or by the time the later R01 EY021214-01A1 application was submitted.

Dr. Francis has entered into a Voluntary Settlement Agreement (Agreement) and has voluntarily agreed for a period of two (2) years, beginning on March 29, 2012:

(1) to have his research supervised; Respondent agrees to ensure that prior to the submission of an application for U.S. Public Health Service (PHS) support for a research project on which the Respondent's participation is proposed and prior to Respondent's participation in any capacity on PHS-supported research, the institution employing him must submit a plan for supervision of Respondent's duties to ORI for approval; the plan for supervision must be designed to ensure the scientific integrity of Respondent's research contribution; Respondent agrees that he shall not participate in any PHS-supported research after sixty (60) days from the effective date of this Agreement until such a supervision plan is submitted to and approved by ORI; Respondent agrees to maintain responsibility for compliance with the agreed upon supervision plan;

(2) that this supervisory plan provided by any institution employing him shall provide assurance that each application for PHS funds, or report, manuscript, or abstract involving PHS supported research in which Respondent was involved was based on actual experiments or was otherwise legitimately derived, that the data, procedures, and methodology were accurately reported in the application, report, manuscript, or abstract, and that the text in such submissions was his own or properly cited the source of copied language and ideas; and

(3) to exclude himself 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.

Jian Ma, Ph.D.
Brigham and Women's Hospital and Harvard Medical School

Based on evidence and findings of an inquiry conducted jointly

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by Brigham and Women's Hospital (BWH) and Harvard Medical School (HMS) and additional evidence gathered by the Office of Research Integrity (ORI) during its oversight review, ORI found that Dr. Jian Ma, former Research Fellow, BWU, engaged in research misconduct in research supported by National Cancer Institute (NCI), National Institutes of Health (NIH), grant 5 P01 CA120964.

ORI found that the Respondent knowingly and intentionally fabricated and falsified data in portions of figures in an unpublished manuscript titled "TSC1 loss synergizes with KRAS activation in lung cancer development and confers rapamycin sensitivity" by M.-C. Liang, J. Ma, L. Chen, P. Kozlowski, W. Qin, D. Li, T. Shimamura, M.L. Sos, R. Thomas, D. Neil Hayes, M. Meyerson, D.J. Kwiatkowski, and K.-K. Wong, submitted to the *Journal of Clinical Investigation* (*JCI*) on August 5, 2008, and in revised form on October 21, 2008 (hereafter referred to as the "*JCI* manuscript"). Specifically, Respondent committed research misconduct by knowingly and intentionally:

- falsifying and/or fabricating those portions of the immunoblots in *JCI* manuscript Figure 1C, to show that in $Tscl^{L/L}$ and $Tsc^{L/+}$ mouse lung cancer cells compared with KRAS induced lung cancer cells, there were reduced Tsc1 and Tsc2 protein levels, reduced phospho-AKT-S473 levels, and increased phospho-S6-S249/244 levels, consistent with the hypothesis that introduction of the $Tsc1^{L}$ gene resulted in mTORC1 activation
- falsifying and/or fabricating those portions of the immunoblots in Figure 3A of the *JCI* manuscript to show data consistent with the hypothesized TNS null signaling lung tumor cells: functional loss of Tsc1/Tsc2, high phospho-S6-S249/244 levels, and low phospho-AKT-S473, with recovery of phospho-AKT-S473 after Rapamycin treatment
- falsifying and/or fabricating those portions of the immunoblots in Figure 3B of the *JCI* manuscript by (i) adding a band in the Tsc2 lane for control cells for the IP blot, and (ii) weakening the Tsc2 band for one of the tumor lysates
- falsifying and/or fabricating immunoblots in Figures 5A and 5B of the *JCI* manuscript so that the data appeared to indicate that TSC reconstitution in TSC null (TNS) cell lines led to reduction of pS6-S240/244 levels during serum deprivation (in the absence of growth factors), as well as increased pAKT(S473) levels in response to serum stimulation.

The *JCI* manuscript was accepted by *JCI* on December 8, 2008, but it was withdrawn by one of the authors on January 6, 2009.

ORI found that Respondent's knowing and intentional falsification and fabrication of data constitutes research misconduct within the meaning of 42 C.F.R. § 93.103.

The following administrative actions have been implemented for a period of three (3) years, beginning on May 12, 2012:

(1) any institution that submits an application for U.S. Public Health Service (PHS) support for a research project on which Respondent's participation is proposed or that uses him in any capacity on PHS-supported research must concurrently submit a plan for supervision of his duties to the funding agency for approval; the supervisory plan must be designed to ensure the scientific integrity of his research contribution; Respondent must ensure that a copy of the supervisory plan is also submitted to ORI by the institution; Respondent will not participate in any PHS-supported research until such a supervisory plan is submitted to ORI;

(2) Respondent will ensure that any institution employing him submits, in conjunction with application for PHS funds or any

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A single lie destroys a whole reputation of integrity.

Baltasar Gracián y Morales, SJ

Spanish Jesuit Priest

(1601-1658)

Case Summaries *(continued)*

report, manuscript, or abstract of PHS-funded research in which he is involved, a certification that the data provided by him are accurately reported in the application or report; Respondent must ensure that the institution send the certification to ORI; this certification shall be submitted no later than one month before funding and concurrently with any report, manuscript, or abstract; and

(3) Respondent is prohibited 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.

ORI thanks the following people for contributing articles to the newsletter:

Ksenija Baždarić ***Sujit D. Rathod***

Diane Pecorari ***Harold C. Sox***

Patricia Pence ***Ljiljana Vučković-Dekić***

Office of Research Integrity
1101 Wootton Parkway, Suite 750
Rockville, Maryland 20852

Office of the Director... (240) 453-8200
Fax ..... (240) 276-9574

Division of Education
and Integrity..... (240) 453-8400
Fax ..... (240) 276-9574

Assurances Program .... (240) 453-8400
Fax ..... (301) 594-0042

Division of Investigative
Oversight..... (240) 453-8800
Fax ..... (301) 594-0043

Research Integrity
Branch/OGC ..... (301) 443-3466
Fax ..... (301) 594-0041

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