

Allegation and Admission Report: Venkata Sudheer Kumar Ramadugu, PhD

November 5, 2018

Ranjini Ambalavanar, BVSc, PhD
Division of Investigative Oversight
Office of Research Integrity
U.S. Department of Health and Human Services
1101 Wootton Parkway, Suite 750
Rockville, MD 20852

Dear Dr. Ambalavanar,

On June 18, 2018, the U-M Research Integrity Office received an email from Robert Kennedy, PhD, Professor and Chair of the U-M Chemistry Department, indicating that Ayyalusamy Ramamoorthy, PhD, Robert W. Parry Collegiate Professor of Chemistry and Biophysics (*Complainant*), had a "research compliance" issue involving a postdoctoral researcher in his lab that he would like to discuss.

Assistant Research Integrity Officer, Jess Peirson, PhD, spoke with Professor Ramamoorthy on the phone on the morning of June 19, 2018. The Complainant indicated that a colleague had contacted him in early June 2018 with concerns about data in a recent publication. The Complainant told the Assistant RIO that his review of the situation supported his colleague's concerns and that he suspected that data/figures from experiments performed by Venkata Sudheer Kumar Ramadugu, PhD, a postdoctoral researcher in his lab (*Respondent*), had been falsified and/or fabricated. The implicated publication was:

Ramadugu, VSK, Di Mauro, GM, Ravula, T, Ramamoorthy, A. 2017. Polymer nanodiscs and macro-nanodiscs of a varying lipid composition. *Chemical Communications* 53(78): 10824-10826.

A review of Ramadugu et al. (2017) indicated the following two NIH R01 grants to the University of Michigan with A. Ramamoorthy as Contact PI / Project Leader as funding sources: *Investigation of Membrane-bound Cytochromes-p450-b5 Interactions* (Project Number: 5R01GM084018-08) and *Membrane Interaction and Disruption by the Alzheimer's Amyloid-Beta Peptide* (Project Number: 5R01AG048934-03).

Based on the initial conversation with the Complainant, we proceeded with an assessment, during which we interviewed the Complainant, the Respondent, and the two other co-authors on the above-indicated publication. Prior to interviewing the Respondent, we sequestered digital records (UM email and cloud-based storage systems) from all authors on the publication. We also sequestered one computer from the Complainant's lab; the Respondent's departmental laptop computer, his thumb drive, and his laboratory notebooks; and the laboratory notebooks from the two other co-authors, all of which may have contained relevant information or files. Forensic images of the drives were made by the Information Assurance office at UM.

Interviews of the Complainant and the two co-authors on Ramadugu et al. (2017) led to the following initial allegations involving data/figures that were derived from NMR spectroscopy performed by the Respondent:

The spectrum shown in Fig. 2 at the top left (A) is incorrect and was likely modified from a previous experiment (with the x-axis shifted). Two spectra shown in Fig. 3 (DSPC at right-most bottom) are likely falsified or fabricated, as they are identical spectra with the axis manipulated and the original data files could not be located. The spectra shown in Fig. S4 are likely manipulated, as the original data files could not be located. [Please see annotated version of Ramadugu et al. (2017).]

Dr. Peirson and I interviewed the Respondent on the morning of June 28, 2018, at which time we explained the general allegations to him. We asked the Respondent to take us through the figures and data in the implicated publication. The Respondent walked us through the publication and made the general admission that some of the data and figures in the manuscript were wrong. We then asked the Respondent if he could provide us with a written report on the validity of all of the figures/data in Ramadugu et al. (2017), including the supplementary material.

The Respondent agreed, and on June 28, 2018, he sent us his initial report / admission statement. We reviewed the statement and returned it to the Respondent for clarification on July 24, 2018. The Respondent provided clarification and returned a version of the statement to us on the morning of July 26, 2018. Following another round of clarification, the Respondent delivered his signed admission statement to Dr. Peirson on July 31, 2018.

At that time, we informed the Complainant that he could initiate personnel actions, as consistent with University policy. The Respondent was terminated on August 2, 2018.

In his July 31st statement, the Respondent attested that the admission described all of the knowing and intentional falsification of data in Ramadugu et al. (2017). He also attested that he did not manipulate data in any additional publications on which he was a co-author while at the University of Michigan. The Complainant and the two co-authors on Ramadugu et al. (2017) had also told us during their June and July 2018 interviews, respectively, that they did not believe there were problems with other data in Ramadugu et al. (2017) or the Respondent's contributions to their other publications. However, in August 2018, possible additional issues with the Respondent's publications were brought to our attention. Specifically, the Complainant sent us a link to a comment about another publication (Ravula et al. 2017, see below) on PubPeer, in which the individual who posted the comment noted that two of the spectra in Figure 4 were identical.

Dr. Peirson and I performed additional interviews of the Complainant and the Respondent's other co-authors on August 22, 2018. During the interviews we asked the individuals to go over all figures and data contributed by the Respondent. The interviews and our own review of the materials led to the following additional allegations involving data/figures that were derived from NMR spectroscopy performed by the Respondent:

Ramadugu, VSK, Di Mauro, GM, Ravula, T, Ramamoorthy, A. 2017. Polymer nanodiscs and macro-nanodiscs of a varying lipid composition. *Chemical Communications* 53(78): 10824-10826.

- The spectra shown in Fig. 2B (top and bottom spectra) are incorrect and were likely modified from a previous experiment (with the x-axis shifted). [Please see annotated version of Ramadugu et al. (2017).]

Ravula, T, Ramadugu, SK, Di Mauro, GM, Ramamoorthy, A. 2017. Bioinspired, Size-Tunable Self-Assembly of Polymer-Lipid Bilayer Nanodiscs. *Angewandte Chemie-International Edition* 56(38): 11466-11470.

- The spectra shown in Fig. 4E and 4F (middle center and middle right) are incorrect and were likely modified from a previous experiment (with the x-axis shifted). These appear the same as in Fig. 2B in Ramadugu et al (2017). [Please see annotated version of Ravula et al. (2017).]

Ravula, T, Hardin, NZ, Ramadugu, SK, Cox, SJ, Ramamoorthy, A. 2018. Formation of pH-Resistant Monodispersed Polymer-Lipid Nanodiscs. *Angewandte Chemie International Edition* 57(5): 1342-1345.

- The spectra shown in Fig. 4b (top center) is incorrect and was likely modified from a previous experiment. [Please see annotated version of Ravula et al. (2018).]

Ramadugu, VSK, Ravula, T, Ramamoorthy, A. 2017. Polymer macrodiscs for solid-state NMR structural studies on aligned lipid bilayers. Presented at ENC 2017 - 58th Experimental Nuclear Magnetic Resonance Conference in Pacific Grove (Asilomar), California, March 25-30, 2017.

- The spectra shown in the left column (bottom two spectra on the right) are incorrect and were likely modified from a previous experiment (with the x-axis shifted). These appear to be the same as in Fig. 2B in Ramadugu et al. (2017) and Fig. 4E and 4F in Ravula et al. (2017). [Please see annotated version of Ramadugu et al. (2017) poster.]

Ravula et al. (2017) and Ravula et al. (2018) both indicate the following NIH R01 grant to the University of Michigan with A. Ramamoorthy as Contact PI / Project Leader as funding source: *Investigation of Membrane-bound Cytochromes-p450-b5 Interactions* (Project Number: 5R01GM084018-08). The poster presentation also indicates that it was supported by funds from the NIH.

Dr. Peirson and I interviewed the Respondent again on the afternoon of August 23, 2018, at which time we informed him of the new allegations. We asked the Respondent to explain the figures and data related to the new allegations. The Respondent walked us through the publications and indicated that he had knowingly and intentionally falsified these figures/data as well. We then asked the Respondent if he could provide us with an additional written admission statement concerning the new allegations, which he agreed to do. The Respondent emailed photos of his signed admission statement to us on August 27, 2018. We asked the Respondent if he could provide the original, signed admission document, but he informed us on August 29, 2018, that he had returned to India. We have maintained contact with the Respondent, and he indicated at the end of October 2018 that he had located a FedEx store near his home in India. We are currently working to have the signed statement mailed from India.

Based on my review to date, with the addition of his second admission statement, the Respondent's admissions cover the extent of his knowing and intentional research misconduct (data fabrication / falsification) as related to Ramadugu et al. (2017), Ravula et al. (2017), Ravula et al. (2018), and the poster presentation. In the second admission, the Respondent has attested that he did not manipulate any data in his other two co-authored publications published while at the University of Michigan. I asked his co-authors on the other two publications to confirm the raw data, and they have expressed confidence in the validity of those data. I have no reason at this time to suspect otherwise. In addition, Dr. Peirson and I have reviewed the progress reports sent to the NIH with respect to the aforementioned grants, and none of the data in question appear in those documents.

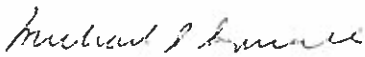
Given the extent of data manipulation in Ramadugu et al. (2017), I asked the Complainant to contact the journal and begin the process for retraction of that manuscript. The Complainant contacted the journal and initiated that process on August 3, 2018.

The Complainant and co-authors on Ravula et al. (2017) and Ravula et al. (2018) have indicated that the falsified NMR data do not affect the findings or main conclusions of the studies. They proposed to redo the affected experiments and work with the journal to publish corrections/errata for both papers. I agreed with that approach, and the Complainant initiated the process on August 23, 2018.

I recommended no further actions for the poster presentation.

Based on the Respondent's admissions, it is the University's intention to issue its finding of research misconduct once we have obtained the signed (hardcopy) of the second admission statement, without moving forward to the formal Inquiry or Investigation stages.

Best regards,



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