

### **U.S.-China Program for Biomedical Research Cooperation Preliminary Program Review**

The National Institutes of Health (NIH), in collaboration with the National Natural Science Foundation of China (NSFC), have developed a joint initiative to co-fund U.S. and Chinese scientists to conduct collaborative basic and translational biomedical research. Researchers at the National Cancer Institute (NCI), National Institute for Allergy and Infectious Diseases (NIAID), National Institute of Mental Health (NIMH), National Institute of Neurological Disorders and Stroke (NINDS), and the Office of AIDS Research (OAR) have been awarded grants through administrative supplements or RO1 mechanisms that support projects to conduct scientifically meritorious investigations of mutual interest to both countries.

To determine the effectiveness of the United States–China Program for Biomedical Research Cooperation program across NIH, evaluation surveys were developed to identify:

- 1) Unique findings or opportunities due to the international collaborations;
- 2) Scientific accomplishments and challenges of the awards; and
- 3) Areas for capacity building facilitated through these collaborations.

The survey information will be collected one year into awards and at the end of awards, when possible.

#### **Methodology**

For this preliminary analysis, thirty-two Administrative Supplement surveys were received, out of eighty-five for the first (FY11) and second rounds (FY12) of the program. Twenty surveys looking at R01s approximately one year into the award were received, out of a possible thirty-nine for the third round (FY13) of the program.

The overall response rate was 42% (38% for FY11-12 Administrative Supplements, 51% for FY13 R01s).

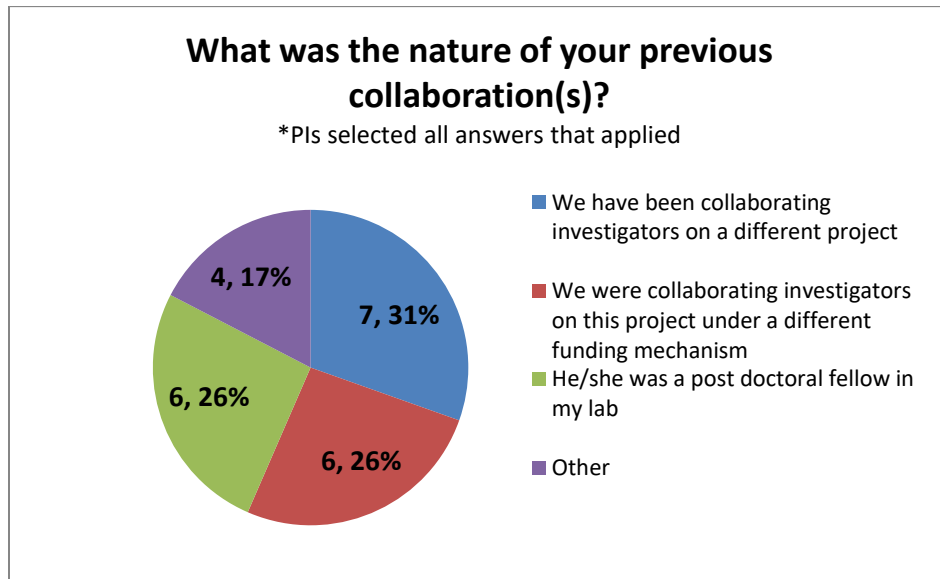
A review of QVR, a web-based tool to search and view detailed information about grant applications and awards, was conducted to identify additional information on publications not outlined in survey responses.

### **COLLABORATIONS TO FURTHER SCIENTIFIC DISCOVERY**

#### ***Administrative Supplements***

The majority of Primary Investigators (PIs) (56%, N=32) who received an administrative supplement in FY11-FY12 had collaborated with their co-PIs prior to application for the supplement. For those PIs who had collaborated prior to the award, those surveyed indicated that they had been collaborating investigators on a different project, collaborating investigators on this project under a different funding mechanism, or that their co-PIs were a post-doctoral fellow in their lab.

**Figure 1.** The Nature of Prior Collaboration before Receiving an Administrative Supplement.



Administrative supplement awardees indicated that they identified their collaborating investigator through the following ways: they knew their collaborator’s research and contacted them directly; he/she was contacted by his/her collaborator; or a colleague introduced them.

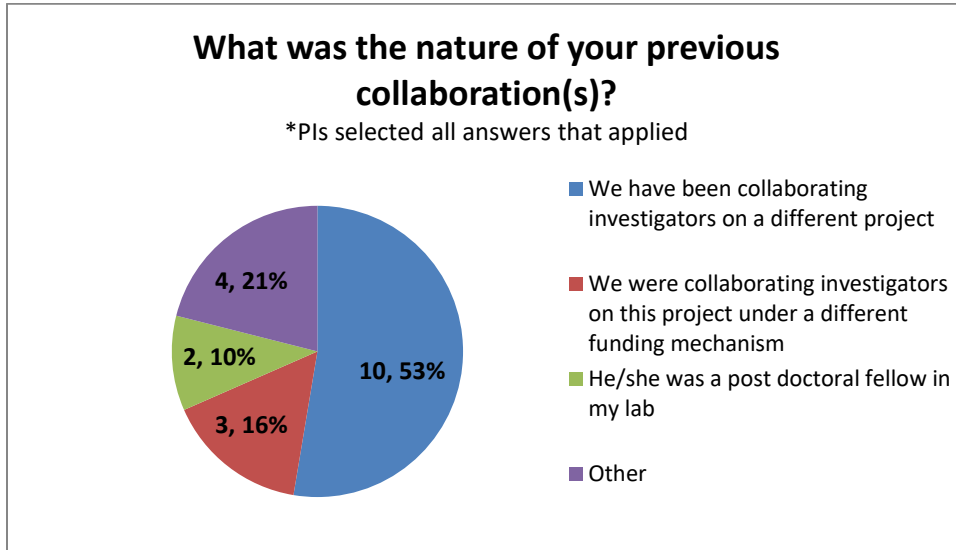
**Figure 2.** How Administrative Supplement Awardees Identified Collaborators.



**R01 Grants**

The majority of PIs (65%, N=20), who received an R01 in FY13, had collaborated with their co-PIs previously. Approximately half of the participating PIs indicated that they had been collaborating on a different project prior to receiving the R01.

**Figure 3.** The Nature of Prior Collaboration before Receiving the R01.



R01 grantees indicated that they identified their collaborating investigator through introductions made by colleagues; he/she was contacted by his/her collaborator. U.S. R01 PIs were less likely to know of their co-collaborators work beforehand, and contact them directly, compared to administrative supplement awardees. PIs also self-selected the “Other” option, indicating examples such as identifying their Chinese collaborators through co-mentoring graduate students together.

**Figure 4.** How R01 Grantees Identified Collaborators.



## **SCIENTIFIC ACCOMPLISHMENTS**

### ***Administrative Supplements***

PIs reported 53 publications associated with the work of the U.S. and/or Chinese laboratory/teams. Five publications were published in PLoS ONE Journal, and 2 appeared in Nature, PLoS Pathogens, and the Journal of Biological Chemistry. See Appendix for a full list of journals. PIs indicated that 4 additional manuscripts have been submitted, and 7 manuscripts are being prepared for submission. 8 of the 26 PIs indicated that they have not yet published, but 4 of the 8 were preparing articles at the time of the survey.

The U.S.-China investigator teams have made 30 presentations and secured 1 patent (US 8,933,075, 2013 Compounds Useful as Antiviral Agents, Compositions, and Methods of Use).

Survey respondents described scientific findings or opportunities created specifically by the NIH-NSFC collaboration:

- This award allowed investigators to perform novel research and build research capacity by strengthening collaboration between university partners, helping develop Chinese laboratory abilities, building local research capacity, and training students via exchange of students/fellows and faculties between participating institutions.
- Many reported that their research led to publications, and that the ability to access/study unique populations (study unique populations, comparing populations across geography and genetic difference, access to endemic sites in biomedical research) was made possible by this collaboration.
- Themes regarding the ability to exchange data, ideas, and research were also cited as a unique opportunity from the award.
- More minor themes from the open-ended responses included being able to focus on specific disease areas and that this opportunity has set up researchers for additional collaborations.

### ***R01 Grants***

PIs who received R01s in FY13 were not surveyed about the status of potential publications, patents, or presentations at the time of this report. Instead, these questions will be posed at the end of the award (2017-2018).

However, data from QVR, supplied by NIMH, indicates that NIMH grantees have already published 6 articles in the following journals: Biological Psychiatry Journal, Journal of Neurogenetics, Progress in Molecular Biology and Translational Science, Schizophrenia Research, Dialogues in Clinical Neuroscience, Neurogastroenterology & Motility, Neuroscience Bulletin, and Molecular Psychiatry.

Survey respondents described scientific findings or opportunities created specifically by the NIH-NSFC collaboration:

- This award allowed U.S.-China laboratories/teams to build research capacity, expand the knowledge and abilities of both laboratories, train fellows and perform novel research in disease specific areas and validate findings.

- A recurring theme was that this opportunity helped investigators to build strong collaborations, and furthered their ability to access unique populations, ability to move research from bench to bedside.
- Respondents indicated that this award allowed them to conduct cross-cultural analyses and has helped to establish a foundation for future collaborative research studies.
- One PI reported that the grant allowed collaborators to come together, since their research was a natural pairing, and allowed them to sustain research and venture into new areas (HIV latency), as well.

## **Challenges**

### ***Administrative Supplements***

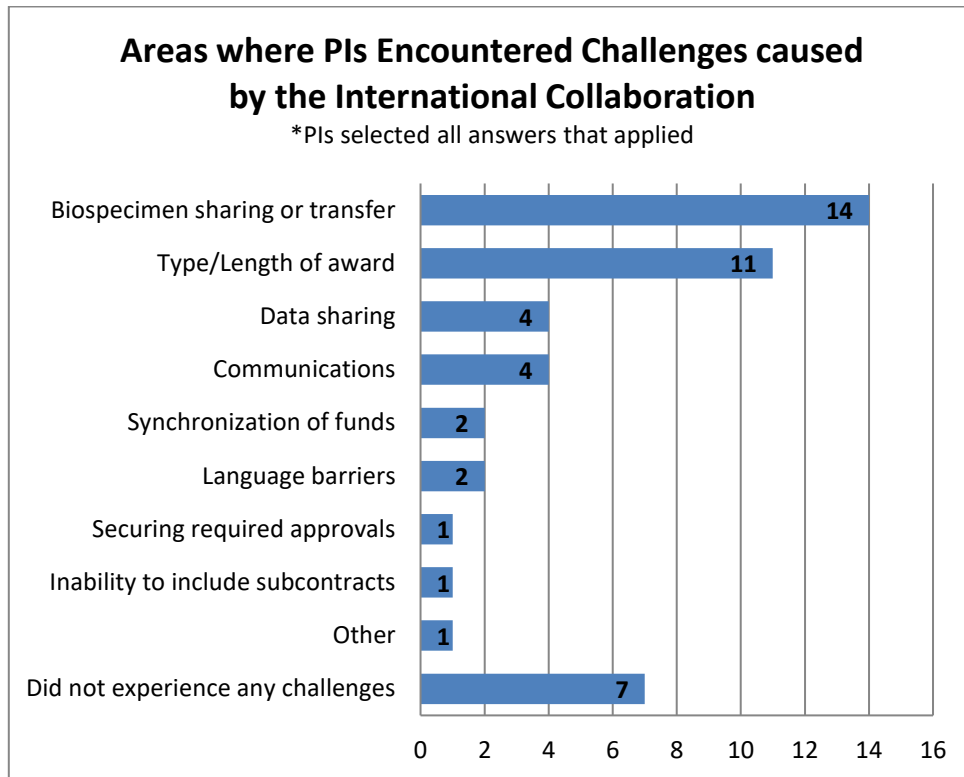
Surveyed awardees indicated that biospecimen transfer issues were one of the most prominent issues caused by the international collaboration. This response was seen in both the open-ended questions about challenges and the multiple-choice question. Figure 5 below indicates responses from the multiple-choice question.

Open ended responses were analyzed for prominent themes. In their open-ended responses, PIs indicated that biospecimen transfer and shipping prompted varying levels of difficulty, depending on the individual collaboration. Some experienced delays, and others were not allowed to transfer any samples.

Approximately one third of the respondents also indicated that the award period for the administrative supplements was too short in length to promote substantial collaborations.

U.S. PIs also faced logistical communication issues such as difficulty scheduling, poor Skype or telephone connection, or cultural differences. Some US PIs also experienced delays with the release of funding. Other individuals reported difficulties in receiving timely responses from their Chinese collaborators, receiving general approvals, and difficulties sharing clinical and epidemiological data across the collaborating teams.

**Figure 5.** How Administrative Supplement Grantees Identified Collaborators.



### ***R01 Grants***

Similar to the open-ended responses from PIs receiving administrative supplements, R01 grantees' surveys indicated that data sharing/transfer, transferring biospecimens, and delayed approvals (IRB, etc.) are the major challenges they face due to the nature of their international collaboration.

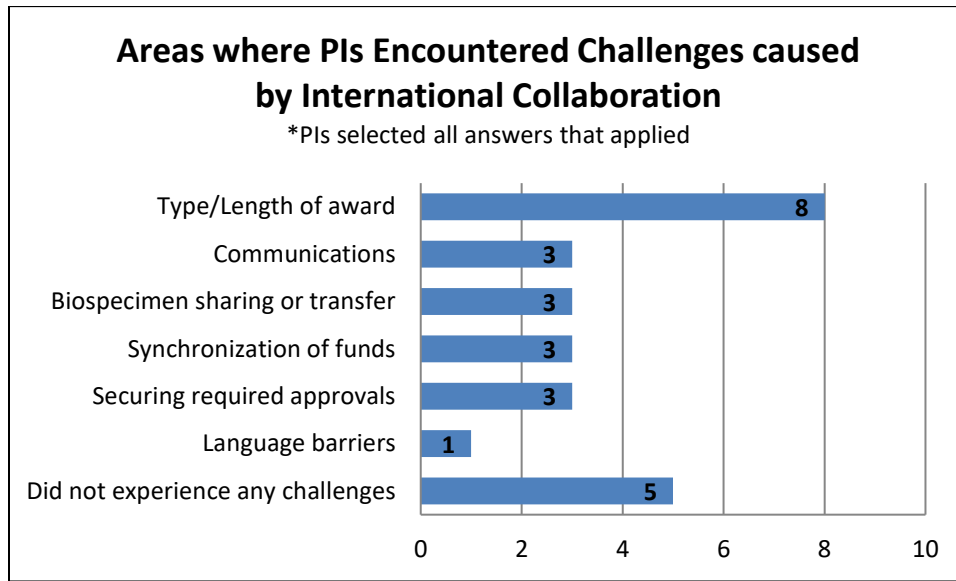
Other main themes that emerged from the open-ended responses were the perceptions that the award period was too short in length and was not enough funding to produce strong collaborative work.

Another recurring challenge was that U.S. PI's Chinese collaborators faced delays in funding disbursements and substantial reductions in funding. Survey respondents indicated that these delays and reductions required them to change or adapt their projects accordingly.

Similar to PIs who received administrative supplements, R01 grantees reported issues with communication issues such as scheduling, poor Skype/telephone connection, and cultural differences. Two PIs also mentioned that the distance was a challenge.

Figure 6 illustrates R01 U.S. PIs' responses to the multiple-choice question about challenges they are currently facing in their international collaboration.

**Figure 6.** How R01 Grantees Identified Collaborators.



**CAPACITY BUILDING**

***Administrative Supplements***

Tables 1 and 2 demonstrate the number of people from the U.S. and Chinese Laboratory/Teams, who were trained in particular skills specifically for their project.

**Table 1.** Number of US Laboratory/Team Trained under Administrative Supplement Awards.

<b>US Laboratory/Team Capacity Building</b>	
Number trained in quantitative data collection and analysis	45
Number trained in trained in qualitative data collection and analysis (e.g. focus group discussions, guided interviews, etc.)	41
Number people trained in bioethics or IRB rules and regulations	20
Number trained in (either through mentoring or training courses) in grant writing	28
Number trained in(either through mentoring or training courses) in scientific manuscript writing	32
Number trained in medical procedures	5
Number trained in lab or bench science techniques	43

**Table 2.** Number of Chinese Laboratory/Team Trained under Administrative Supplement Awards.

<b>International Laboratory/Team Capacity Building</b>	
Number trained in quantitative data collection and analysis	51
Number trained in qualitative data collection and analysis (e.g. focus group discussion, guided interviews, etc.)	32
Number trained in bioethics or IRB rules and regulations	26
Number trained (either through mentoring or training courses) in grant writing	20
Number trained (either through mentoring or training courses) in scientific manuscript writing	35
Number trained in medical procedures	11
Number trained in administrative and financial grant management	16
Number trained in lab or bench science techniques	45

**R01 Grants**

Tables 3 and 4 demonstrate the number of people from the U.S. and Chinese Laboratory/Teams, who were trained in particular areas specifically for their project.

**Table 3.** Number of US Laboratory/Team Trained under R01 Awards.

<b>US Laboratory/Team Capacity Building</b>	
Number trained in quantitative data collection and analysis	39
Number trained in qualitative data collection and analysis (e.g. focus group discussions, guided interviews, etc.)	22
Number trained in bioethics or IRB rules and regulations	38
Number trained (either through mentoring or training courses) in grant writing	24
Number trained (either through mentoring or training courses) in scientific manuscript writing	27
Number trained in medical procedures	6
Number trained in lab or bench science techniques	47

**Table 4.** Number of Chinese Laboratory/Team Trained under Administrative Supplement Awards.

<b>International Lab/Team Capacity Building</b>	
Number trained in quantitative data collection and analysis	39
Number trained in qualitative data collection and analysis (e.g. focus group discussion, guided interviews, etc.)	44
Number trained in bioethics or IRB rules and regulations	25
Number trained (either through mentoring or training courses) in grant writing	31
Number trained (either through mentoring or training courses) in scientific manuscript	46
Number trained in medical procedures	39
Number trained in administrative and financial grant management	12
Number trained in lab or bench science techniques	45



Most of the PIs reported not knowing what additional training areas members of the international laboratory/team had received. Two individuals reported that that their international counterparts received training in project and experiment design, and on specific lab/bench science techniques

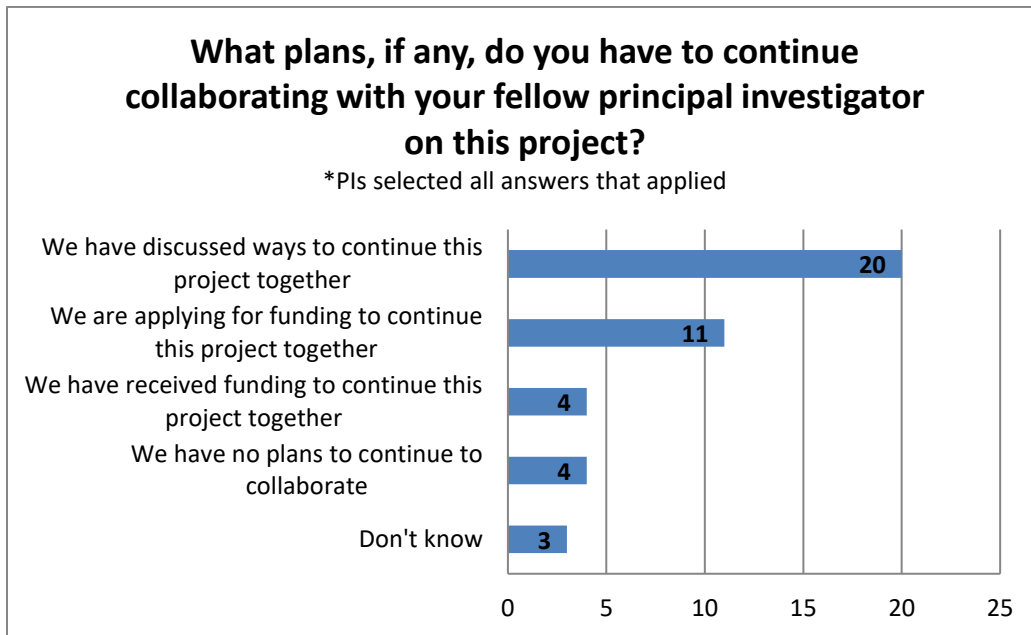
### **Continued Collaboration**

#### ***Administrative Supplements***

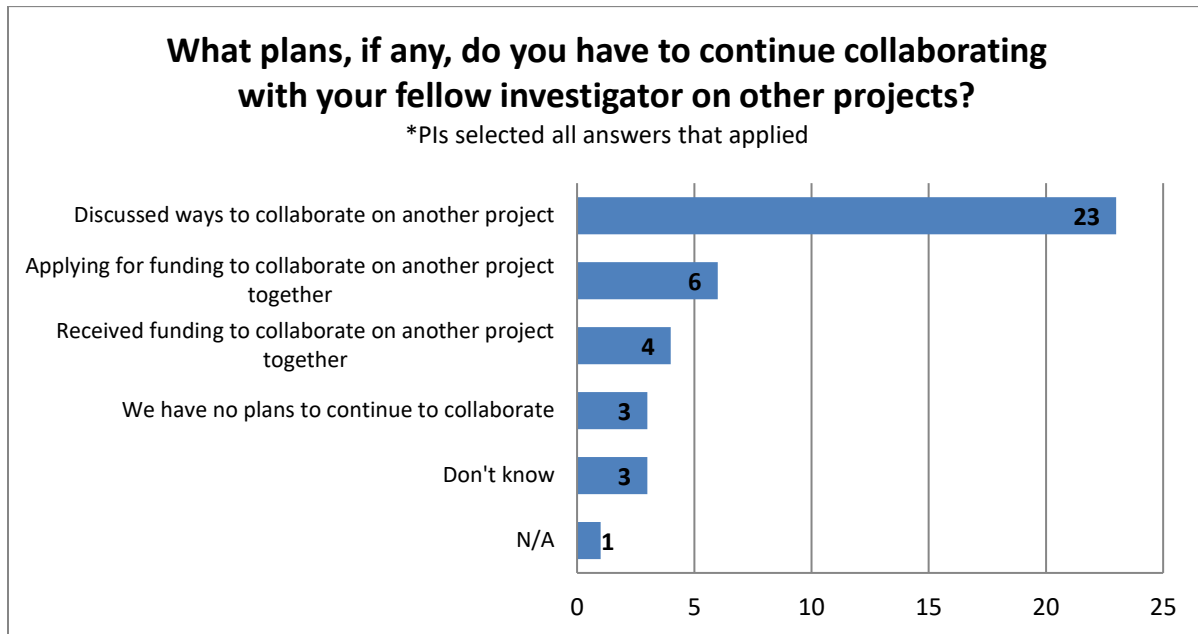
The majority of PIs who received Administrative Supplements plan to continue to collaborate on this project, and have sought additional funding to do so. (Graph 7). The majority have also discussed ways of continuing the collaboration on different projects, as well (Graph 8).

Two PIs indicated they do not plan to continue the collaboration; their responses cite changes due to shifting research focus areas as the reason they plan to discontinue the collaboration.

**Figure 7.** Plans to Continue Collaborating on the Project currently funded by Administrative Supplements.



**Figure 8.** Administrative Supplement PIs' Plans to Continue Collaborating with Co-PI on Other Projects.

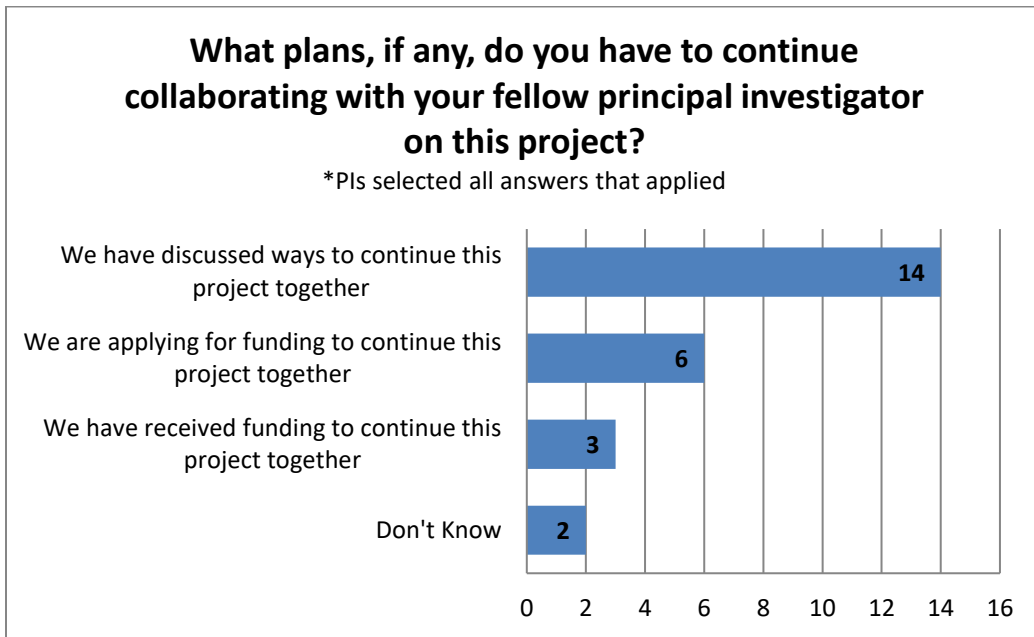


***R01 Grants***

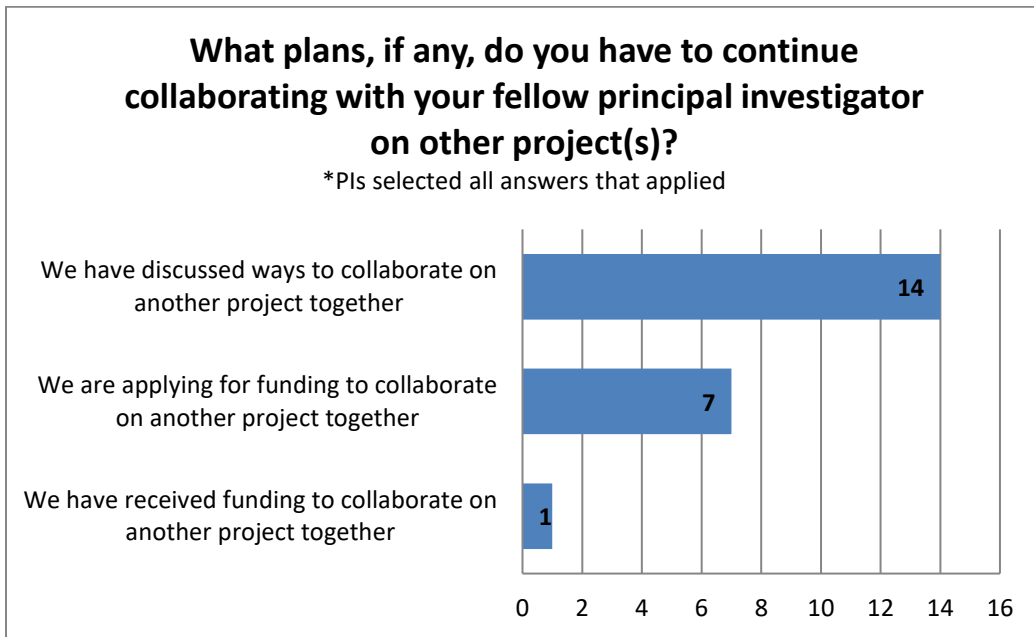
The majority of PIs who received an R01 award plan to continue to collaboration on this project (Figure 9). They have also discussed ways of continuing to the collaboration on different projects (Figure 10).

Only one PI indicated that s/he had not yet spoken with his/her co-PI about collaborating on different projects in the future, and had not yet decided whether or not they would continue to work together on this project or others.

**Figure 9.** Plans to Continue Collaborating on the Project currently funded by R01 Award.



**Figure 10.** R01 PIs' Plans to Continue Collaborating with Co-PI on Other Projects.



## **Additional Feedback**

### ***Administrative Supplements***

PIs felt that international bilateral programs such as this were beneficial, and some investigators continued to collaborate following the end of the award. Recommendations from PIs centered around the desire for multiyear collaboration support, and the need to find solutions for the biospecimen sharing issues.

### ***R01 Grants***

PIs gave positive feedback, indicating that they thought this type of award is a good way to encourage international collaboration. Multiple PIs suggested that additional funding would be beneficial, as would extending the collaboration for additional years (lengthening the award). A longer award period/collaboration would allow for time to understand international team's capabilities (capacity), and would accommodate for IRB delays.

One recommendation suggested that the program be expanded, and offered annually without restriction of applying for only one award. Another suggested streamlining the proposal, similar to that suggested by an Administrative Supplement respondent.

Other suggestions included: explaining grant policies to Chinese collaborators (future opportunities), and finding a way to better the supply chain/biospecimen shipping requirements/policies, in an effort to combat issues that arise. Other feedback from PIs was about the logistical communication issues that came up and the need for solutions to combat those communication issues/distance.

**Appendix:** Publications associated with NIH-NSFC Administrative Supplements.

<b>Administrative Supplements Publications</b>	
<b>Journal Title</b>	<b>Number of Articles per Journal</b>
Acta Tropica	1
ACS Chemical Biology	2
Advanced Drug Delivery Reviews	1
AIDS Research and Human Retroviruses	1
American Journal of Neuroradiology	1
Angewandte Chemie International Edition	1
Antiviral Research	1
Biomedicine Pharmacotherapy	1
British Journal of Cancer	1
Carcinogenesis	1
Clinical Microbiology and Infection	1
Cytotherapy	1
PhD Dissertation	1
European Radiology	1
Food Chemistry	1
Handbook of Therapeutic Antibodies	1
Human Brain Mapping	1
International Journal of Cancer	1
International Journal of Infectious Disease	1
Journal of Biological Chemistry	2
Journal of Experimental Medicine	1
Journal of Immunology	1
Journal of Leukocyte Biology	1
Journal of Theoretical Biology	1
Journal of Virology	2
Magnetic Resonance in Medicine	1
Molecular Cell	1
Nature	2
Neuroimage	1
Organic & Biomolecular Chemistry	1
PLoS Genetics	1
PLoS One	5
PLoS Pathogens	2
Proceedings of the National Academy of Sciences, 2013	1
Science	1
The EMBO Journal	1
Zhonghua Zhong Liu Za Zhi	1