

# Exploring Foods of the Pacific: Cultural Food Identity in the US Affiliated Pacific Region

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## Abstract

*Indigenous peoples of the Pacific have seen major shifts in dietary patterns due to foreign colonization, which introduced an array of new foods. Today, foods considered traditional and acculturated are consumed in various extents. However, the definitions and identity of traditional versus acculturated foods has become unclear as many introduced foods have been incorporated into Pacific cultures. The purpose of this study was to capture culturally relevant definitions of traditional, acculturated, and locally grown foods among 10 jurisdictions of the US-Affiliated Pacific (USAP) region with a focus on fruits and vegetables. Questionnaires were used to capture definitions of these terms, and to identify a list of foods (n=121) as traditional, acculturated, and/or locally grown in addition to classify them into food groups (ie, fruit, vegetable, starch, and/or grain). For the most part, definitions of traditional, acculturated, and locally grown were agreed upon by participating USAP jurisdictions, with some supplementary caveats presented by different jurisdictions. More foods were identified as acculturated (n=75) than traditional (n=37). Fruits (n=55) were the most frequent designation and about a third were vegetables (n=44). The majority of the jurisdictions reported growing at least half of the food items. This is the first study to identify and classify foods of the Pacific from the perspective of those indigenous to the USAP region. Understanding these similarities and differences in how food is classified and identified, through the lens of those from the Pacific, is crucial for nutrition education, and understanding what foods are locally grown is important for future sustainability.*

## Keywords

Nutrition, Diet, Food, Pacific Islands, Indigenous Peoples

## Abbreviations

CHL = Children's Healthy Living Program for Remote Underserved Minority Populations of the Pacific Region

CNMI = Commonwealth of the Northern Mariana Islands

RMI = Republic of the Marshall Islands

USAP = US-Affiliated Pacific

## Background

Humans have experienced major shifts in dietary patterns since the emergence of Paleolithic man. Popkin<sup>1</sup> describes these changes as the nutrition transition, which he defines as a concept focusing on large shifts in dietary patterns, especially of

their overall structure, that are reflected in nutritional outcomes such as changes in average stature and body composition. The nutrition transition described by Popkin is made up of 5 distinct patterns: (1) collecting food, (2) famine, (3) receding famine, (4) degenerative disease, and (5) behavioral change.<sup>1</sup> These shifts in dietary patterns have been influenced by changes in food sources, modes of processing and distribution of food, physical activity, and socioeconomic status.<sup>1</sup>

Over the past several centuries, the pace of dietary change has accelerated to varying degrees around the world.<sup>2</sup> One of the most recent rapid changes of dietary patterns can be seen among indigenous peoples in the Pacific.<sup>3,4</sup> Indigenous groups have seen major shifts in dietary patterns in more recent years relative to non-indigenous groups due to foreign colonization that occurred just within the past few centuries.<sup>5</sup> The nutrition transition can explain much of the dietary shifts seen among Pacific Islanders. Prior to Western contact, indigenous people of the Pacific led lifestyles similar to Paleolithic hunter-gatherers collecting food (pattern 1 described by Popkin<sup>1</sup>) and experiencing periods of famine (pattern 2 described by Popkin<sup>1</sup>).<sup>5</sup> Since the introduction of Western culture, Pacific Islanders have seen a major shift in diet patterns in which an abundance of food is conveniently available resulting in reduced famine (pattern 3 described by Popkin<sup>1</sup>). However, many of these foods are imported or processed which has led to the emergence of obesity and diet related non-communicable diseases in the Pacific (pattern 4 described by Popkin<sup>1</sup>).

Colonization in the Pacific, a concept not included in the Popkin model, introduced an array of new foods, including various new sources of meats, fruits, and vegetables.<sup>5</sup> Although these acculturated foods have become highly prevalent in the Pacific region, traditional foods are still consumed today to various extents.<sup>5-7</sup> Traditional diets and practices have been shown to protect health,<sup>8-10</sup> and the traditional food system and cultural practices of Pacific peoples can create opportunities for exposure and intake of healthful foods, most notably fruits and vegetables.<sup>8,11,12</sup> However, in the past few decades, the definitions and identity of traditional versus acculturated foods has

become unclear as many introduced foods have been incorporated into Pacific cultures. Understanding food identity in terms of traditional or acculturated<sup>8,13</sup> and classification in terms of food groups are important to better understand current dietary patterns and support a transition towards healthful behavioral change, Popkin's final pattern of the nutrition transition.<sup>1</sup>

The purpose of this study was to capture culturally relevant definitions of traditional, acculturated, and locally grown foods among 10 jurisdictions of the US-Affiliated Pacific (USAP) region with a focus on foods considered as fruits and vegetables. In addition, food group classification (fruit, vegetable, starch, and/or grain) was addressed via the perspective of people from each jurisdiction. These concepts are important to better understand identity and classification in terms of food groups and dietary patterns. To the authors' knowledge, no other studies have comprehensively identified the designation of traditional and acculturated fruits and vegetables in this Pacific region, nor their food group classifications.

## Methods

The Children's Healthy Living Program for Remote Underserved Minority Populations of the Pacific Region (CHL) is a partnership among universities, local organizations, and stakeholders across the USAP region, comprised of American Samoa, Alaska, the Commonwealth of the Northern Mariana Islands (CNMI), the Federated States of Micronesia (including island states of Chuuk, Kosrae, Pohnpei, and Yap), Guam, Hawai'i, the Republic of the Marshall Islands (RMI), and the Republic of Palau.<sup>14</sup> The Exploring Foods of the Pacific study was initiated among CHL staff and partners to capture culturally relevant definitions of traditional, acculturated and locally grown foods in the USAP. This analysis focused on the 10 island jurisdictions (American Samoa, CNMI, Chuuk, Kosrae, Pohnpei, Yap, Guam, Hawai'i, RMI, and Palau). Due to the emphasis on tropical foods of the Pacific, Alaska was not included.

Two questionnaires were constructed for this study: (1) a Food Identity Questionnaire captured culturally relevant definitions of traditional, acculturated, and locally grown foods and (2) a Food Classification Form identified foods in the USAP as traditional, acculturated, and locally grown and also classified the foods into food groups (ie, fruit, vegetable, starch, and/or grain). The Food Identity Questionnaire provided definitions based on the literature documenting Pacific foods<sup>6,15</sup> and consultation with nutritionists affiliated with the CHL program. This questionnaire was designed to retrieve respective jurisdiction's definition(s) of traditional, acculturated, or locally grown. CHL staff, indigenous to each USAP island jurisdiction (n=10), were tasked with completing the questionnaires. Participating staff from each jurisdiction were asked to assess the provided definition, and then to edit and record in their own words the concepts of traditional, acculturated, and locally grown foods based on their individual perspectives (see **Table 1**).

The foods listed on the Food Classification Form were ascertained from the Pacific Tracker 3 (PacTrac3) dietary database<sup>16,17</sup> (University of Hawai'i Cancer Center, Honolulu, HI) and focused on fruits and vegetables, which aligned with one of CHL's goals to increase consumption of fruits and vegetables. CHL staff were tasked to complete the Food Classification Form, which consisted of 121 food items commonly classified as fruits and vegetables. On the form, the translated name of each food item, specific to each jurisdiction, was included when known. CHL staff were asked to correct or add an appropriate translation, if needed. Then, the CHL staff marked whether the listed food item was considered to be (1) a fruit, vegetable, starch, and/or grain, and (2) traditional, acculturated, and/or locally grown (some fruits and vegetables throughout the Pacific are also considered starch and/or grain; thus, the inclusion of these choices). Food items not pertaining to a jurisdiction could be marked "not applicable". Lastly, jurisdiction staff were instructed to include additional fruits and vegetables not listed and then categorize them as described above.

Once the information was collected from all jurisdictions, food items were summarized into the food classification or identity category that received the most counts among all the jurisdictions (see **Table 2**, [[https://hawaiijournalhealth.org/docs/DelaCruz\\_table2.pdf](https://hawaiijournalhealth.org/docs/DelaCruz_table2.pdf)] and **Table 3**, [[https://hawaiijournalhealth.org/docs/DelaCruz\\_table3.pdf](https://hawaiijournalhealth.org/docs/DelaCruz_table3.pdf)] column "Summary"). If the counts were even among 2 or more categories and at least 1 jurisdiction classified the food as both categories, then the food was summarized as both categories ("and"). If the counts were even among 2 or more categories, but each jurisdiction classified the food as only 1 of those categories, then the food was summarized as either category ("or"). If the food item was not categorized by any jurisdiction, then the food was summarized as not applicable ("n/a").

Institutional review board (IRB) approval was obtained from the University of Hawai'i at Mānoa (Honolulu), University of Guam (Mangilao), and the Republic of Palau. All other jurisdiction institutions ceded to the University of Hawai'i at Mānoa.

## Results

### Food Identity Definitions

The provided definitions of traditional, acculturated, and locally grown were accepted by the designated staff members of each USAP jurisdiction; no jurisdiction rejected the provided definitions or made comments about the inaccuracy of these definitions. However, the majority of the jurisdiction representatives edited the language to add descriptions to the provided definitions (**Table 1**).

Based on the edits of the jurisdiction representatives, a theme of traditional foods that emerged was the importance of the timing of a food's availability within the region. Some jurisdictions

Table 1. Definitions of Traditional, Acculturated, and Locally Grown Foods with Additional Definition Descriptions by Island Jurisdiction			
	Traditional	Acculturated	Locally Grown
<b>Definition Provided</b>	<ul style="list-style-type: none"> <li>• Foods that sustained the culture a very long time ago (keep in mind modes of preparation, eg, poi versus taro chips).</li> </ul>	<ul style="list-style-type: none"> <li>• Possesses cultural meaning.</li> <li>• Foods that have been acculturated "... refers to the changes in attitudes, behaviors, beliefs and values for an individual of one culture with a new culture..." (Williams &amp; Berry, 1991).<sup>15</sup></li> <li>• Foods that are not considered traditional but have been adopted into the everyday eating habits of many individuals.</li> </ul>	<ul style="list-style-type: none"> <li>• Foods grown at specific jurisdictions.</li> </ul>
<b>Additional Definition Descriptions by Island Jurisdiction</b>			
American Samoa	<ul style="list-style-type: none"> <li>• <i>Umu</i> (Samoan oven) versus baking in the electric oven.</li> </ul>	<ul style="list-style-type: none"> <li>• eg, McDonalds/Carl's Jr/KFC</li> </ul>	<ul style="list-style-type: none"> <li>• Locally grown on Island. – in different seasons.</li> </ul>
Chuuk	none	none	none
CNMI	<ul style="list-style-type: none"> <li>• Foods that are consumed in the way our ancestors ate them.</li> <li>• Foods that have been consumed over a long-term duration of people through generations.</li> </ul>	none	
Guam	<ul style="list-style-type: none"> <li>• Foods endemic or introduced to Guam that are prepared in the same manner as our ancestors prior to World War II.</li> </ul>	none	none
Hawai'i	<ul style="list-style-type: none"> <li>• Foods that sustained indigenous or native culture/people...before Western contact.</li> </ul>	none	none
Kosrae	none	<ul style="list-style-type: none"> <li>• Foods especially introduced to the islands and been long used as part of the diet.</li> </ul>	none
Marshall Islands	<ul style="list-style-type: none"> <li>• Foods that sustained the culture a very long time ago and continue to do so today (eg, <i>ma kwanjin</i> – breadfruit cooked/baked over an open fire pit called um).</li> </ul>	none	<ul style="list-style-type: none"> <li>• Foods that were not local a long time ago but were at some point successfully introduced to the local soil and now grow in the jurisdiction (eg, cucumbers, eggplants).</li> </ul>
Palau	none	none	none
Pohnpei	<ul style="list-style-type: none"> <li>• Does not include processed foods, such as breadfruit flour to cook pancakes.</li> </ul>	<ul style="list-style-type: none"> <li>• Processed foods (giant swamp taro into flour into pastries).</li> </ul>	none
Yap	<ul style="list-style-type: none"> <li>• Foods that have a significant meaning in the culture practices and been sustained throughout each generation.</li> </ul>	none	none

added that traditional foods are those that were available prior to a certain time, such as “prior to World War II” (Guam) or “before Western contact” (Hawai‘i). Similarly, another theme of traditional foods was the endurance of food over time. Jurisdictions emphasized traditional as foods consumed or sustained over many generations (CNMI and Yap). The final theme of traditional foods included food preparation practices. For some jurisdictions, traditional foods are also still prepared in a specific, perhaps traditional, manner such as in an “*umu* (earth oven) versus baking in the electric oven” (American Samoa), “cooked/baked over an open fire pit called *um*” (Marshall Islands), preparing or consuming “in the way our ancestors ate them” (CNMI), and not processing the foods “from its original form...such as into flour...” (Pohnpei).

Additional descriptions for the definition of acculturated were identified by 3 jurisdictions. One description emphasized that acculturated foods were those introduced to the island (Kos-

rae). Another included American fast food chains (American Samoa). Finally, another described acculturated foods as those processed from their original form (Pohnpei).

The definition of locally grown was edited by 2 jurisdictions. These added descriptions of locally grown highlighted seasonal growth (American Samoa) and successful introduction and growth of non-local foods (RMI).

### Food Classification

Jurisdictions agreed on most of the classifications of foods being a fruit, vegetable, starch, and/or grain (**Table 2**, [[https://hawaiijournalhealth.org/docs/DelaCruz\\_table2.pdf](https://hawaiijournalhealth.org/docs/DelaCruz_table2.pdf)]). Based on the methods used to summarize the food group classifications of the 121 food items, food items were most frequently counted as fruits (n=55), about a third were counted as vegetables (n=44), a few were considered a starch (n=12), and only 1 (rice) was

counted as a grain. A few foods had an even classification distribution among the jurisdictions where 2 (pepper corn and red bean) were counted as either a fruit or vegetable and 1 (sweet potato) was counted as both a vegetable and a starch. Foods not classified by any jurisdiction (n=6) were mountain palm, native cinnamon, native fig, oil palm, sakau as a beverage, and water dropwort.

Although the majority of the foods were categorized as a single food group, there were several food items that had close to an even distribution of classification between 2 of the food groups. These foods included banana, betel nut, breadfruit, coconut cream, coconut sprout, jackfruit, pumpkin, rice, sugar cane, and turmeric. Interestingly, 1 or more jurisdictions classified these food items as more than 1 food group. For example, banana was classified as both a fruit and a vegetable by 4 of the 10 jurisdictions (Guam, Hawai‘i, Palau, and Pohnpei). Similarly, breadfruit was classified as both a fruit and a vegetable by the same 4 jurisdictions and also as a starch by Pohnpei. Palau, Pohnpei, and RMI classified jackfruit as both a fruit and starch. Pumpkin was classified both as a fruit and vegetable by Guam and Pohnpei. Sweet Potato was classified as both a vegetable and starch by Hawai‘i, Palau, and Yap. Similarly, turmeric was classified as both a vegetable and starch by Hawai‘i and Yap.

There were several fruits and vegetables that one or all jurisdictions chose not to classify. Less than half of the jurisdictions classified canistel, false durian, garlic pear, garlic vine, giant passion fruit, kumquat, nightshade, palm, or red bean.

Three jurisdictions added foods to the list. Pohnpei added banana sprout, coconut sap or tuba (fermented sap), and coconut embryo to the list. Hawai‘i added prickly pear. American Samoa added green banana.

### Food Identity

More food items were designated as acculturated (n=75) than traditional (n=37) (**Table 3**, [[https://hawaiijournalhealth.org/docs/DelaCruz\\_table3.pdf](https://hawaiijournalhealth.org/docs/DelaCruz_table3.pdf)]). Five food items had an even amount of labeling and were summarized as either traditional or acculturated (amaranth, jackfruit, kavika, oil palm, and water spinach). Four food items (garlic vine, kumquat, sweetleaf bush, and water dropwort) were not identified by any jurisdiction.

Despite having been identified as either traditional or acculturated, 15 food items had a near-equal categorization among the jurisdictions. These included arrowroot, bitter melon, cassava, citrus fruit, kangkong, kava, lemon, lemon grass, lime, mango, passion fruit, pumpkin, tangerine, tapioca, and turmeric. Some jurisdictions identified several of these foods as both traditional and acculturated. Notably, Pohnpei identified 23 food items as being both traditional and acculturated (arrowroot, banana, bird’s nest fern, breadfruit, coconut cream, coconut meat, coconut milk, coconut sprout, coconut water, giant swamp taro,

hibiscus, Indian mulberry, kava, pandanus, papaya, plantain, sakau (drink), soft taro, sugar cane, yam, banana sprout, coconut tuba or sap, and coconut embryo).

**Table 4** [[https://hawaiijournalhealth.org/docs/DelaCruz\\_table4.pdf](https://hawaiijournalhealth.org/docs/DelaCruz_table4.pdf)] presents the local names of each fruit and vegetable by jurisdiction.

Most jurisdictions reported at least half of the food items as locally grown. In contrast, RMI identified the least amount of locally grown foods of all the jurisdictions, growing only 37 of the 121 foods listed. American Samoa had the next least amount of locally grown foods reported (n=43).

### Discussion

The majority of the USAP jurisdictions reported growing at least half of the 121 food items and most of these foods were classified as fruits and vegetables, which is expected since this study focused on fruits and vegetables. The provided definitions of traditional and acculturated were agreed on with some supplementary caveats provided by various jurisdictions. These jurisdiction perspectives on traditional and acculturated reflect the identities of the foods. Most foods were identified as acculturated.

Despite diverse identities, some jurisdictions identified various food items as both traditional and acculturated. Jurisdictions may have been drawing upon their perspectives on the definitions of acculturated, which includes how food is prepared and if the food is processed from its raw state. Many of the foods found to be identified as both traditional and acculturated can indeed be prepared in less traditional ways and be further processed. For example, giant swamp taro can be eaten in a traditional manner and cooked using traditional practices such as in an *umu*, and can also be further milled into flour to bake taro bread or be sliced and fried to make chips.<sup>18</sup> Thus, one food item may indeed be both traditional and acculturated.

Another reason food items may be considered traditional and acculturated is that a single fruit or vegetable can have multiple varieties.<sup>19</sup> For example, avocados that grow locally in the islands may be considered traditional whereas avocados that are imported from other countries may be considered acculturated. Similar to modern day, crops were historically carried during navigational voyages between the island jurisdictions.<sup>6</sup> Therefore, the distinction between traditional and acculturated may have become unclear over time when these crops were grown and thrived locally for many years.

Jurisdictions also classified certain foods into multiple food groups. Many jurisdictions classified certain food items as both a fruit and a vegetable or both a vegetable and a starch. One reason for this may be due to how different parts of the food’s plant may be viewed. For example, different parts of a pumpkin

vine such as the pumpkin fruit as well as the pumpkin leaves can be consumed and may be viewed as different food groups. The pumpkin may be considered a fruit while the leaves considered a vegetable. A reason for the lack of distinction between vegetable and starch may be due to the overlapping characteristics of these food groups and indeed nutrition scientists have classified certain vegetables as “starchy vegetables”.<sup>20</sup> Unique to this process emphasizing the local terms appeared to reduce terminology used by Federal Nutrition Programs, which are influential. However, the CHL staff across the jurisdictions remained focused on local perspectives. Despite these double classifications adding a layer of complexity, this approach highlights the unique perspectives of each jurisdiction and their views on each food. Furthermore, food classifications vary among different countries and culture, and Western ways of grouping foods may not always fit classifications for Pacific foods. The long-standing organization, the Secretariat of the Pacific Community, has classified Pacific foods using a different grouping system: classifying foods as energy foods (starchy staples), protective foods (fresh locally grown foods), or body-building foods (protein rich foods) and providing nutrition recommendations based on these unique food groups.<sup>6,21</sup>

These perceptions of food classifications and identities also stem from prior knowledge that was passed down through cultural understanding or education and vary by jurisdiction. The results of this study demonstrate that food identity and classification is still somewhat variable among the jurisdictions. As similar as the jurisdictions are when compared to other regions of the world, they vary in language, topography, cultural tradition, history, and political status.<sup>22</sup> These differences likely influence how food is identified and classified. The variation found in food identity among Guam and CNMI is particularly interesting as these 2 jurisdictions are of the same archipelago, the Mariana Islands, with the same indigenous people, language, and culture.<sup>23</sup> The slight differences found between these 2 jurisdictions show how even recent changes in history and governance influence ideology and language regarding food. For example, custard apple was identified as traditional in Guam, but acculturated in the CNMI (**Table 3**, [[https://hawaiijournalhealth.org/docs/DelaCruz\\_table3.pdf](https://hawaiijournalhealth.org/docs/DelaCruz_table3.pdf)]).

Jurisdiction indigenous languages could have also influenced how foods and the various terms used in this study were understood. Because the terms were defined in English, this may have affected how jurisdictions thought about cultural identity of foods from their indigenous language since some words do not always directly translate. Thus, the understanding of cultural identity may not be fully captured.

Understanding how populations classify and identify foods is important as this can influence how dietary guidelines and nutrition education may be perceived. Although the foods included in this study already have scientific classifications, they may not align with the results presented in this study. Cultural

perspectives of foods differ from botanical perspectives. This discrepancy may be a reason people believe they are consuming the recommended amounts of fruits and vegetables when they may not be, and this could be due to differing perceptions of what is a fruit or a vegetable. Furthermore, certain foods in the Pacific have become so integrated into the culture that it may potentially be considered traditional even though the food had been introduced from colonization and other foreign intervention. Some introduced foods may not be as healthy as locally grown traditional foods, although people may think they are. People’s health may be at stake when the definition of foods is viewed only through one cultural lens, such as the Western lens which food has usually been viewed.<sup>21,24</sup> These concepts are important for nutrition researchers and educators to consider so that information, such as the dietary guidelines, can be best presented and communicated to diverse populations, including those in the USAP, using familiar and available foods that have cultural significance.

Understanding which foods are locally grown in these islands is also crucial for future sustainability.<sup>25</sup> The majority of jurisdictions reported growing many of the listed foods. Interestingly, however, RMI reported growing only about a third of the foods listed. Unlike most of the other island jurisdictions, the islands of RMI are coral atolls.<sup>26</sup> Thus, they have limited land area with less sources of fresh water and different climate and soil, which has further been exacerbated by sea levels rising due to climate change.<sup>27,28</sup> As a result, several crops are not able to thrive as well on these islands. These observations are important because they can also inform agriculture capability and needs of atolls found in the outer islands of the other island jurisdictions.<sup>29</sup>

Lower availability of locally grown and traditional foods can further be explained by the Pacific’s colonial past and westernization. USAP jurisdictions lost control of their lands during colonial occupation resulting in the loss of traditional culture practices and diet.<sup>5</sup> For example, in Hawai’i, the Hawaiian Kingdom was annexed and land was seized by colonialists for plantations and now for development.<sup>30</sup> Similarly, transition to modern lifestyle and economic development also influences local governments in other USAP jurisdictions and how resources may be used, despite some islands having recently obtained independence or autonomy over their lands. Thus, emphasizing the value of local land ownership and support for sustainability are important in increasing availability of locally grown and traditional foods.<sup>31</sup>

There are several limitations of this study. First, only certain food groups (fruits, vegetables, starches, and grains) were classified and identified as traditional or acculturated, and locally sourced. This was a result of the identified priorities of the CHL intervention to improve consumption of fruits and vegetables.<sup>32</sup> Proteins, grains, and dairy may be identified in a future study as dietary records collected in CHL assessed dietary intake of all foods and beverages consumed.<sup>6</sup> A second limitation is that

a set list of food items was provided, which may have limited responses. Although jurisdictions were asked to add to the list, this could have still limited identification and classification to only these provided food items, or the expression of those food items. Third, the summaries of classification and identity were based only on counts from respondents. Also, a select group of people from the participating jurisdictions were asked to provide definitions and to identify and classify the food items. Although these select participants are nutrition experts in their respective jurisdictions, there may be variation in perspectives among local community members on how to classify and identify foods. For this project, there was no emphasis made regarding the Federal Nutrition Programs, thus we cannot rule out that perhaps some of the results could be due to influence from the Federal Nutrition Programs.

## Conclusion

To the authors' knowledge, this is the first study to identify and classify foods of the Pacific from the perspective of those from the region. The study identified some differences in definitions, classification, and identity of foods among the jurisdictions. However, there was consensus with regard to the importance of these foods. Understanding these similarities and differences in how food is classified and identified is crucial for nutrition education, and learning what foods are locally grown is important for future sustainability.

## Conflict of Interest

None of the authors identify a conflict of interest.

## Funding

This work was supported by the Agriculture and Food Research Initiative grant 2011-68001-30335 from the US Department of Agriculture National Institute of Food and Agricultural Science Enhancement Coordinated Agricultural Program and the National Institutes of Health National Cancer Institute through grants P30 CA071789, 3P30CA071789-14S1 (internship for EW), and U54 CA143727 (fellowship for RDC).

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