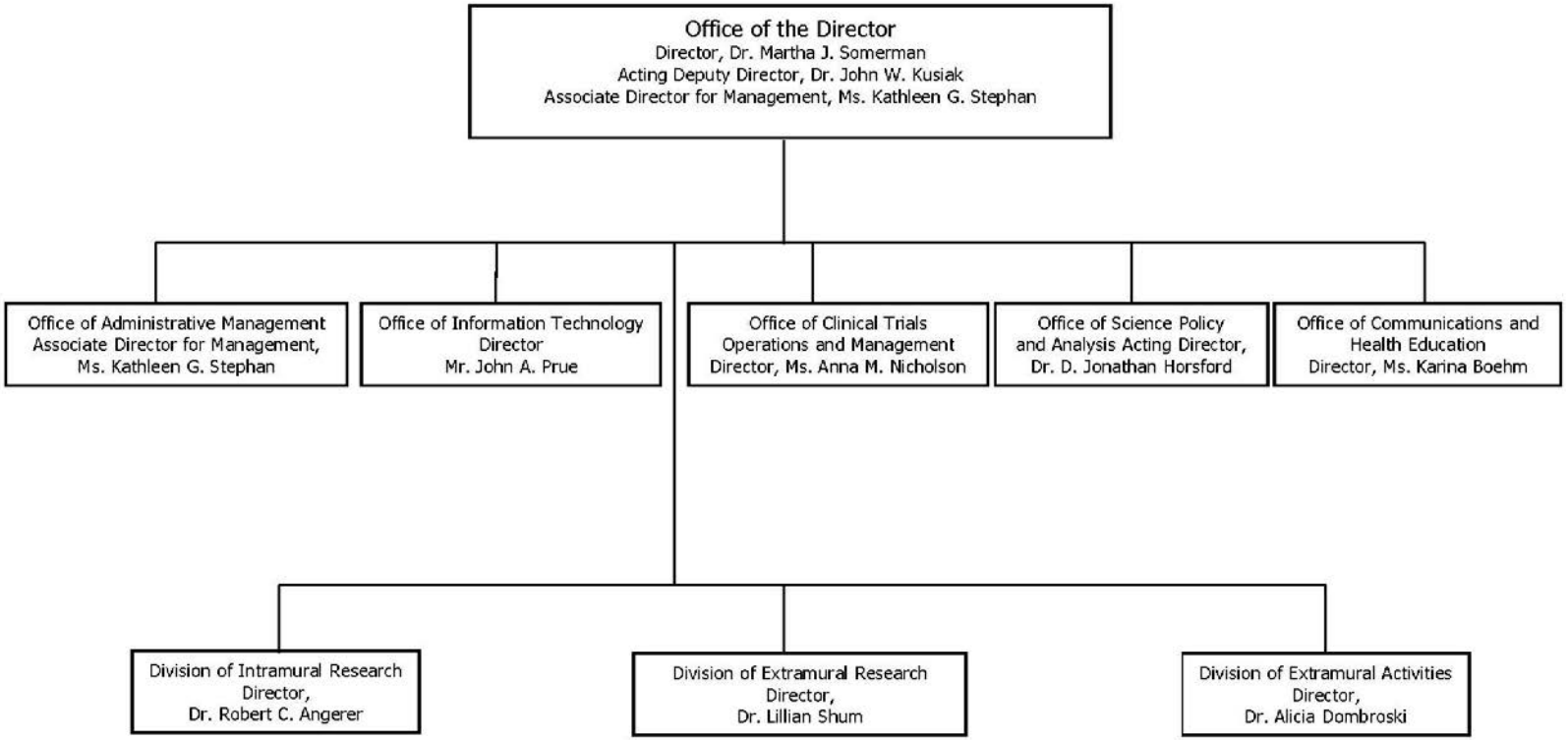
DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Institute of Dental and Craniofacial Research (NIDCR)

NOTE: The FY 2016 Enacted funding amounts cited throughout this chapter reflect the effects of OAR HIV/AIDS Transfers.

National Institute of Dental and Craniofacial Research



NATIONAL INSTITUTES OF HEALTH

National Institute of Dental and Craniofacial Research

For carrying out section 301 and title IV of the PHS Act with respect to dental and craniofacial diseases, [$415,582,000]*$404,560,000*.

NATIONAL INSTITUTES OF HEALTH
National Institute of Dental and Craniofacial Research

Amounts Available for Obligation[1]
(Dollars in Thousands)

Source of Funding	FY 2015 Actual	FY 2016 Enacted	FY 2017 President's Budget
Appropriation	$399,886	$415,582	$413,396
Mandatory Appropriation: (non-add)			
Type 1 Diabetes	*(0)*	*(0)*	*(0)*
Other Mandatory financing	*(0)*	*(0)*	*(8,836)*
Rescission	0	0	0
Sequestration	0	0	0
FY 2015 First Secretary's Transfer	0	0	0
FY 2015 Second Secretary's Transfer	0	0	0
Subtotal, adjusted appropriation	$399,886	$415,582	$413,396
OAR HIV/AIDS Transfers	-2,186	-2,186	0
National Children's Study Transfers	0	0	0
Subtotal, adjusted budget authority	$397,700	$413,396	$413,396
Unobligated balance, start of year	0	0	0
Unobligated balance, end of year	0	0	0
Subtotal, adjusted budget authority	$397,700	$413,396	$413,396
Unobligated balance lapsing	-28	0	0
Total obligations	$397,672	$413,396	$413,396

[1] Excludes the following amounts for reimbursable activities carried out by this account:
FY 2015 - $1,049 FY 2016 - $1,900 FY 2017 - $1,900

NATIONAL INSTITUTES OF HEALTH
FY 2017 Congressional Justification
NIDCR

Budget Mechanism - Total[1]

(Dollars in Thousands)

MECHANISM	FY 2015 Actual		FY 2016 Enacted		FY 2017 President's Budget[3]		FY 2017 +/- FY 2016	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research Projects:								
Noncompeting	392	$177,444	414	$197,585	396	$189,215	-18	-$8,370
Administrative Supplements	*(28)*	5,850	*(24)*	4,000	*(24)*	4,000		
Competing:								
Renewal	27	15,114	24	13,115	27	14,697	3	1,582
New	144	53,414	125	46,398	109	52,109	-16	5,711
Supplements								
Subtotal, Competing	171	$68,528	149	$59,513	136	$66,806	-13	$7,293
Subtotal, RPGs	563	$251,822	563	$261,098	532	$260,021	-31	-$1,077
SBIR/STTR	28	9,895	30	10,764	32	11,300	2	536
Research Project Grants	591	$261,717	593	$271,862	564	$271,321	-29	-$541
Research Centers:								
Specialized/Comprehensive	3	$6,277	3	$7,281		$4,146	-3	-$3,135
Clinical Research								
Biotechnology								
Comparative Medicine								
Research Centers in Minority Institutions								
Research Centers	3	$6,277	3	$7,281		$4,146	-3	-$3,135
Other Research:								
Research Careers	43	$5,716	47	$6,257	54	$7,135	7	$878
Cancer Education								
Cooperative Clinical Research								
Biomedical Research Support								
Minority Biomedical Research Support		333		247				-247
Other	18	1,581	18	1,843	13	1,147	-5	-696
Other Research	61	$7,630	65	$8,347	67	$8,282	2	-$65
Total Research Grants	655	$275,624	661	$287,490	631	$283,749	-30	-$3,741
Ruth L Kirchstein Training Awards:	FTTPs		FTTPs		FTTPs		FTTPs	
Individual Awards	98	$4,119	82	$3,908	84	$4,025	2	$117
Institutional Awards	159	7,593	160	8,037	158	7,920	-2	-117
Total Research Training	257	$11,712	242	$11,945	242	$11,945		
Research & Develop. Contracts	25	$20,318	26	$21,494	26	$23,425		$1,931
(SBIR/STTR) (non-add)[2]		*(84)*		*(121)*		*(130)*		*(9)*
Intramural Research	152	$64,930	152	$66,221	152	$67,500		$1,279
Res. Management & Support	80	25,117	82	26,246	82	26,777		531
Res. Management & Support (SBIR Admin) (non-add)[2]		*(53)*		*(85)*		*(95)*		*(10)*
Office of the Director - Appropriation[2]								
Office of the Director - Other								
ORIP/SEPA (non-add)[2]								
Common Fund (non-add)[2]								
Buildings and Facilities								
Appropriation								
Type 1 Diabetes								
Program Evaluation Financing								
Cancer Initiative Mandatory Financing								
Other Mandatory Financing						-8,836		-8,836
Subtotal, Labor/HHS Budget Authority		**$397,700**		**$413,396**		**$404,560**		**-$8,836**
Interior Appropriation for Superfund Res.								
Total, NIH Discretionary B.A.		**$397,700**		**$413,396**		**$404,560**		**-$8,836**
Type 1 Diabetes								
Proposed Law Funding								
Cancer Initiative Mandatory Financing								
Other Mandatory Financing						8,836		8,836
Total, NIH Budget Authority		**$397,700**		**$413,396**		**$413,396**		
Program Evaluation Financing								
Total, Program Level		**$397,700**		**$413,396**		**$413,396**		

[1] All Subtotal and Total numbers may not add due to rounding.
[2] All numbers in italics and brackets are non-add.
[3] Includes mandatory financing.

Major Changes in the Fiscal Year 2017 President's Budget Request

Major changes by budget mechanism and/or budget detail are briefly described below. Note that there may be overlap between budget mechanism and activity detail and these highlights will not sum to the total change for the FY 2017 President's Budget for NIDCR. The FY 2017 President's Budget for NIDCR is equal to the FY 2016 Enacted level, for a total of $413.4 million.

Research Project Grants (-$1.077 million; total $260.021 million):
NIDCR will support a total of 532 Research Project Grant (RPG) awards in FY 2017. Noncompeting RPGs will decrease by 18 awards and $8.370 million. As a result, competing RPGs will increase by $7.293 million but decrease by approximately 13 grants. The decrease in grant count is due to the higher expected grant costs for several initiatives that NIDCR will be supporting in FY 2017.

Research Centers (-$3.135 million; total $4.146 million):
The Centers for Research to Reduce Disparities in Oral Health program has ended and it is now being supported in the RPGs line. NIDCR will continue to support the Specialized Programs of Research Excellence.

NATIONAL INSTITUTES OF HEALTH
National Institute of Dental and Craniofacial Research

Summary of Changes

(Dollars in Thousands)

FY 2016 Enacted	$413,396
FY 2017 President's Budget	$413,396
Net change	$0

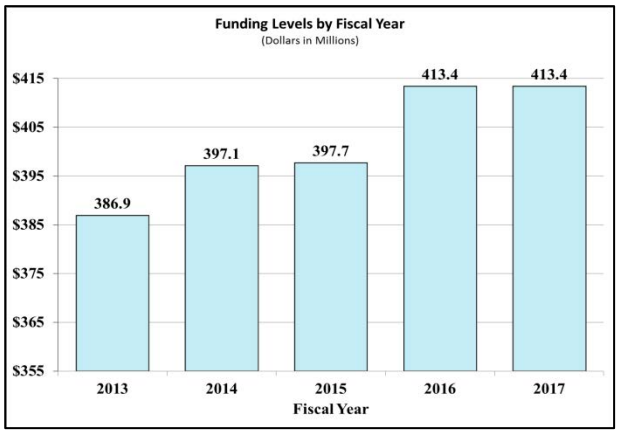
CHANGES	FY 2017 President's Budget[1] FTEs	FY 2017 President's Budget[1] Budget Authority	Change from FY 2016 FTEs	Change from FY 2016 Budget Authority
A. Built-in:				
1. Intramural Research:				
a. Annualization of January 2016 pay increase & benefits		$25,086		$64
b. January FY 2017 pay increase & benefits		25,086		192
c. Two less days of pay		25,086		-201
d. Differences attributable to change in FTE		25,086		0
e. Payment for centrally furnished services		11,369		277
f. Increased cost of laboratory supplies, materials, other expenses, and non-recurring costs		31,044		922
Subtotal				$1,255
2. Research Management and Support:				
a. Annualization of January 2016 pay increase & benefits		$13,038		$33
b. January FY 2017 pay increase & benefits		13,038		100
c. Two less days of pay		13,038		-105
d. Differences attributable to change in FTE		13,038		0
e. Payment for centrally furnished services		2,432		59
f. Increased cost of laboratory supplies, materials, other expenses, and non-recurring costs		11,308		450
Subtotal				$538
Subtotal, Built-in				$1,793

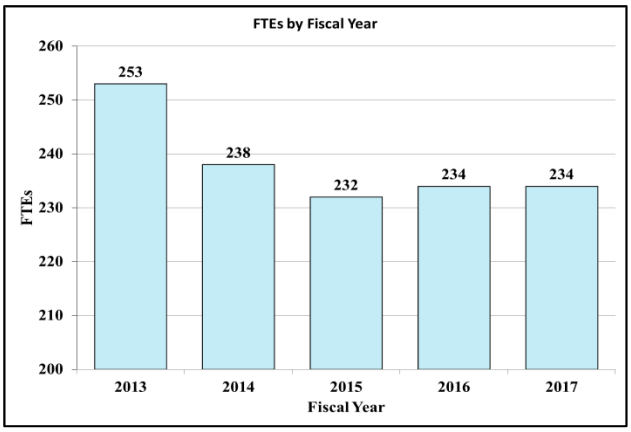
CHANGES	FY 2017 President's Budget[1] No.	FY 2017 President's Budget[1] Amount	Change from FY 2016 No.	Change from FY 2016 Amount
B. Program:				
1. Research Project Grants:				
a. Noncompeting	396	$193,215	-18	-$8,370
b. Competing	136	66,806	-13	7,293
c. SBIR/STTR	32	11,300	2	536
Subtotal, RPGs	564	$271,321	-29	-$541
2. Research Centers	0	$4,146	-3	-$3,135
3. Other Research	67	8,282	2	-65
4. Research Training	242	11,945	0	0
5. Research and development contracts	26	23,425	0	1,931
Subtotal, Extramural		$319,119		-$1,810
	FTEs		FTEs	
6. Intramural Research	152	$67,500	0	$24
7. Research Management and Support	82	26,777	0	-7
8. Construction		0		0
9. Buildings and Facilities		0		0
Subtotal, Program	234	$413,396	0	-$1,793
Total changes				$0

[1] Includes mandatory financing.

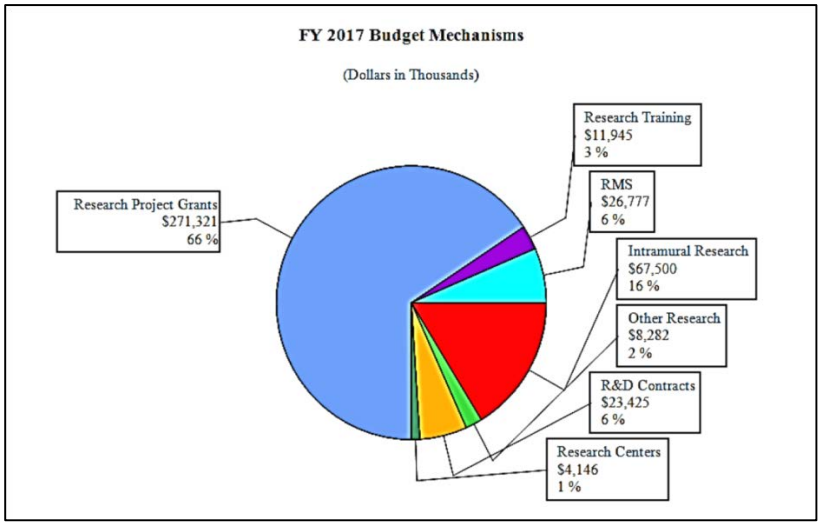
Fiscal Year 2017 Budget Graphs

History of Budget Authority and FTEs:

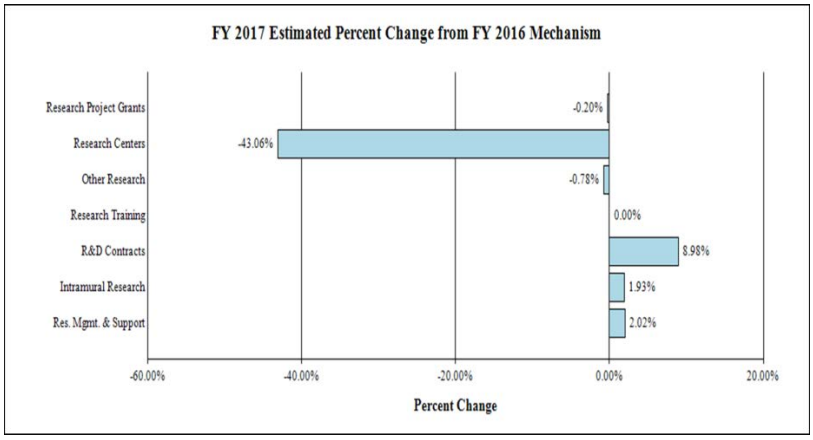




Distribution by Mechanism:



Change by Selected Mechanism:



NATIONAL INSTITUTES OF HEALTH
National Institute of Dental and Craniofacial Research

Budget Authority by Activity[1]
(Dollars in Thousands)

	FY 2015 Actual		FY 2016 Enacted		FY 2017 President's Budget[2]		FY 2017 +/- FY2016	
Extramural Research	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**
Detail								
Oral and Craniofacial Biology		$190,361		$198,575		$197,455		-$1,120
Clinical Research		50,477		52,655		52,358		-297
Behavioral and Social Sciences		17,779		18,547		18,442		-105
Genetics and Genomics		49,036		51,152		50,864		-288
Subtotal, Extramural		**$307,653**		**$320,929**		**$319,119**		**-$1,810**
Intramural Research	**152**	**$64,930**	**152**	**$66,221**	**152**	**$67,500**	**0**	**$1,279**
Research Management & Support	**80**	**$25,117**	**82**	**$26,246**	**82**	**$26,777**	**0**	**$531**
TOTAL	**232**	**$397,700**	**234**	**$413,396**	**234**	**$413,396**	**0**	**$0**

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund.
[2] Includes mandatory financing.

NATIONAL INSTITUTES OF HEALTH
National Institute of Dental and Craniofacial Research

Authorizing Legislation

	PHS Act/ Other Citation	U.S. Code Citation	2016 Amount Authorized	FY 2016 Enacted	2017 Amount Authorized	FY 2017 President's Budget[1]
Research and Investigation	Section 301	42§241	Indefinite	$413,396,000	Indefinite	$404,560,000
National Institute of Dental and Craniofacial Research	Section 401(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				$413,396,000		$404,560,000

[1]Excludes mandatory financing.

NATIONAL INSTITUTES OF HEALTH
National Institute of Dental and Craniofacial Research

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2007	$386,095,000	$386,095,000	$389,699,000	$389,703,000
Rescission				$0
2008	$389,722,000	$395,753,000	$398,602,000	$396,632,000
Rescission				$6,929,000
Supplemental				$2,075,000
2009	$390,535,000	$403,958,000	$401,405,000	$402,652,000
Rescission				$0
2010	$408,037,000	$417,032,000	$409,241,000	$413,236,000
Rescission				$0
2011	$423,511,000		$422,845,000	$413,236,000
Rescission				$3,628,459
2012	$420,369,000	$420,369,000	$404,997,000	$411,488,000
Rescission				$777,712
2013	$408,212,000		$409,449,000	$410,710,288
Rescission				$821,421
Sequestration				($20,614,832)
2014	$411,515,000		$409,947,000	$398,650,000
Rescission				$0
2015	$397,131,000			$399,886,000
Rescission				$0
2016	$406,746,000	$404,847,000	$415,169,000	$415,582,000
Rescission				$0
2017[1]	$413,396,000			

[1] Includes mandatory financing.

Justification of Budget Request

National Institute of Dental and Craniofacial Research

Authorizing Legislation: Section 301 and title IV of the Public Health Service Act, as amended.

Budget Authority (BA):

	FY 2015 Final	FY 2016 Enacted	FY 2017 President's Budget	FY 2017 +/- FY 2016
BA	$397,700,000	$413,396,000	$413,396,000	0
FTE	232	234	234	0

Program funds are allocated as follows: Competitive Grants/Cooperative Agreements; Contracts; Direct Federal/Intramural and Other.

Director's Overview

The National Institute of Dental and Craniofacial Research (NIDCR) is committed to improving dental, oral, and craniofacial health through research, training, and the dissemination of oral health information. NIDCR-supported research is building a foundation of knowledge and creating tools to enable the realization of the potential of precision medicine – providing patients with improved evidence-based prevention strategies, diagnoses, and more effective targeted therapies. These investments will accelerate scientific breakthroughs and enhance our own oral health and that of our children.

Foundational Discoveries: Bringing the Elusive Oral Microbiome to Light
NIDCR leads the effort to increase the understanding of both beneficial and harmful microbes living in our mouths. Through the NIDCR-funded Human Oral Microbiome Database, the scientific community has a resource that provides comprehensive information on over 700 different microbial species. NIDCR also supports researchers who are devising innovative strategies to cultivate oral bacteria that have never been able to be grown and studied in the laboratory. A prime example is the TM7 family of bacteria, which is associated with periodontal disease, inflammatory bowel disease, and other inflammatory diseases in people. A recent scientific advance was the growth of a TM7 species using a novel strategy that mimics the microbe's natural environment in saliva, thus allowing scientists to begin to unravel the inner workings of this pathogen. Together, the database and innovative lab methods are helping to shed light on new species and are advancing the understanding of the role of the microbiome in the oral cavity and throughout the body.

Translational Research: Developing Cures to Fight Oral Inflammation

Nearly half of adults in the United States suffer from periodontal disease, which can cause serious damage to tissues and bone that support the teeth and may result in tooth loss.[1] Although periodontal disease is initiated by bacteria in our mouths, the damage is largely due to an inflammatory response by the immune system, for which there are few safe and effective treatments. NIDCR-funded scientists have discovered that a potent, naturally occurring anti-inflammatory protein, known as developmental endothelial locus-1 (Del-1), plays a role in inhibiting periodontal disease. In mice, Del-1 reduces the inflammatory response by blocking the recruitment of specialized immune cells called neutrophils. Researchers showed that when directly applied to the gingivae of mice with periodontal disease, Del-1 treatment was able to inhibit not only inflammation, but also periodontal-associated bone loss. Decreased Del-1 is linked to other inflammatory diseases such as multiple sclerosis (MS), an autoimmune disease resulting in destruction of the insulating cover around nerve fibers. In a mouse model of MS, treatment with Del-1 reduces damaging inflammation and the clinical signs of MS. The amount of Del-1 in the body also naturally decreases with aging, suggesting reduced levels of this protein may permit the harmful inflammation found in some age-related diseases such as Alzheimer's disease, thus proposing a promising new therapeutic target for these diseases.

Precision Medicine: Applying Big Data to Reduce Oral Health Disparities

NIDCR investments are improving the oral health of the Nation, yet many Americans continue to experience a disproportionate and unacceptable burden of oral disease. To reduce or eliminate oral health disparities, NIDCR recently formed a research consortium and data coordinating center with the award of 10 grants totaling more than $7 million in first-year funding. Multidisciplinary investigator teams will study the impact of holistic, population health, and other approaches to take decisive action against oral health disparities in children at multiple levels of influence, including families, neighborhoods, and health care systems. Ongoing work by other health disparities researchers leverages big data to understand individual biological variability, a key to tailoring preventive and treatment strategies. For example, an NIDCR-supported study is combining personal genomic information with oral microbiome data to diagnose and treat dental decay in vulnerable children. An NIDCR grantee has also received a Gabriella Miller Kids First Research Act award from the Common Fund to use genome sequencing in a large cohort of families to identify the genetic basis for facial clefting in children. Moving forward, data driven and precision medicine approaches will help realize the goal of the right treatment, at the right time, with a focus on those most in need.

Clinical Scientists: Strengthening the Biomedical Research Workforce

NIDCR funds a spectrum of training and career development awards to prepare individuals for careers in dental, oral, and craniofacial research. Dentist scientists are a critical bridge between the research lab and the clinic and are instrumental in the translation of research findings to the practical realities of patient needs. Through the Clinical Research Fellowship program at the renowned NIH Clinical Center, NIDCR provides mentored training in the latest clinical and translational methodologies to highly qualified dentists with an interest in research. The scope of the fellowship is broad so that fellows can gain expertise in basic research, as well as

[1] Eke PI, Dye BA, Wei L, Slade GD, et al. Update on Prevalence of Periodontitis in Adults in the United States: NHANES 2009 to 2012. J Periodontol. 2015 May; 86(5): 611-22

epidemiology and informatics, using large clinical datasets. This training will equip them to excel in the big data scientific transformation occurring in dentistry and medicine. The Clinical Research Fellowship program is also developing a partnership with the NIDCR Dental Public Health Residency program, a formal training opportunity for dentists planning careers in public health. With these efforts, NIDCR is working to create a diverse cadre of dentist scientists with cross-disciplinary expertise and experience who are prepared to answer challenging research problems and improve the oral health of future generations.

Looking Ahead: Advancing Foundational, Translational, and Clinical Research
To address critical knowledge gaps and capitalize on emerging scientific opportunities, NIDCR plans to develop funding announcements to encourage research in the following areas:

- Exploring how sugar molecules attached to proteins and lipids affect HIV infection and HIV/AIDS-related oral opportunistic diseases
- Developing oral biosensors for dynamic monitoring of oral and systemic health and diseases
- Devising novel three-dimensional models of human dental, oral, and craniofacial tissues to mimic and study human diseases
- Investigating differences between males and females in developing certain oral diseases
- Tailoring oral health treatments for individuals with systemic diseases that have oral complications
- Supporting mentoring networks for postdoctoral trainees and junior investigators that have been underrepresented in dental, oral, and craniofacial sciences.

Overall Budget Policy**:** The FY 2017 President's Budget request for NIDCR is $413.396 million, which is equal to the FY 2016 Enacted level. In FY 2017, NIH would provide an increase of two percent for stipends under the Ruth L. Kirschstein National Research Service Award training program, in a continued effort to attain the stipend levels recommended by the National Academy of Sciences. NIDCR will also fund a new initiative aimed at promoting the career progression and success of postdoctoral trainees and junior faculty from underrepresented groups in the biomedical research workforce. The goal of this initiative is to establish mentoring networks that will connect these early stage investigators with established mentors who can guide them through the critical transitions in their careers and enhance the success of the next generation of diverse dental, oral and craniofacial health researchers.

Program Descriptions and Accomplishments

Oral and Craniofacial Biology: The Oral and Craniofacial Biology program supports comprehensive basic, clinical, and translational research spanning the areas of dental and skeletal tissue development; regeneration and repair; salivary gland biology; infections and immunity; oral complications from systemic diseases; head and neck cancers; and chronic orofacial pain. The goal of this program is to provide the scientific foundation for advancing the prevention, diagnosis, and treatment of dental, oral, and craniofacial diseases.

NIDCR continues to invest in research to understand stem cells and their ability to regenerate and repair a variety of damaged or diseased tissues. Scientists have identified a distinct subset of stem cells in our skeletons, which become activated by fractures and act to repair and heal the bone. These studies are uncovering how the precise molecular signals that result from the

fracture may activate stem cells to enhance regeneration and repair. NIDCR-supported scientists have also demonstrated that joints or sutures of the developing skull are a reservoir for stem cells that give rise to bones of the skull. If these stem cells are depleted during development, sutures close prematurely, resulting in the craniofacial disorder called craniosynostosis. The only current treatment for babies with craniosynostosis is to surgically remove the fused suture and reshape the bones of the skull to allow for brain expansion as the child grows. Researchers are investigating the key factors that function within stem cells, as well as those provided by the environment surrounding the cells. Understanding the interplay between internal and external factors in stem cell biology could lead to new approaches to prevent and treat craniosynostosis as well as other craniofacial disorders.

Research on stem cells is also being translated into novel therapeutics through partnerships with industry. An NIDCR small business innovation research (SBIR) award supported the development of a custom-engineered bone product called Epibone™ to repair bones after fracture or bone reconstructive surgery. Bone-forming cells from a patient's own fat tissue are isolated and then grown into custom bone grafts that are the exact shape and size needed for each individual. After successfully completing a Phase I SBIR award, which established the technical merit, feasibility, and commercial potential of Epibone, this project has now entered Phase II, bringing it one step closer to making unique precision bone grafts available for patients.

One of the major roadblocks in treating many diseases is delivering the therapeutic drug to the right location. The targeted delivery of drugs would allow treatments to be more effective, and lower the chance of potential side effects. NIDCR-funded scientists are capitalizing on recent advances in bioengineering, nanotechnology, and material science to develop novel and precise local drug delivery approaches. In a proof-of-principle study, a therapeutic drug was directed to specific sites of inflammation using a safe biomaterial in a mouse model of colitis, a chronic inflammatory bowel disease. Moving forward, these types of drugs could be precisely delivered in oral inflammatory diseases like periodontitis. NIDCR is also supporting research to eliminate specific bacterial species in the mouth while sparing other microbes, which are important to keep our mouths healthy. Scientists are focusing on eradicating *Streptococcus mutans* (*S. mutans*), one of the key bacterial species that causes dental decay. They are developing a molecule called Selectively Targeted Antimicrobial Peptide (STAMP), which can specifically kill the harmful *S. mutans* bacteria without harming the other beneficial bacterial species. This innovative STAMP methodology has the potential to inform a new generation of antimicrobial therapies while also reducing the use of antibiotics to kill bacteria in the oral cavity.

When dental decay does occur, the standard treatment is to remove the damaged tooth tissue and fill the cavity with a restoration. NIDCR is investing in research to create longer-lasting restoration materials that could substantially improve oral health and significantly lower costs. In 2013, NIDCR awarded $2.8 million to fund six projects to design and develop new materials that could double the current average service life of dental restorations. Now in their third year, these projects have produced novel types of compounds with superior mechanical properties that resist degradation. Moving forward, these new materials will be incorporated into dental composites to test their long term durability under conditions that mimic the chemical and microbial challenges that exist in the oral cavity.

NIDCR takes a leadership role in trans-NIH initiatives related to dental, oral, and craniofacial research. For example, NIDCR has helped to lead the development and management of the NIH Common Fund Glycoscience Program, which was launched in 2015. This $10 million program will support research to study glycans, the complex sugars that can be attached to proteins and lipids to modify their function. Glycans play critical roles in nearly every aspect of biology. Knowledge and information gained will advance virtually all fields of biomedical science and inform promising new therapeutic tools. NIDCR is also introducing a new initiative to encourage the use of glycoprofiling technologies to understand the role of glycans in HIV infection and the persistence of HIV/AIDS-related oral pathogens in patients who are undergoing antiretroviral therapy.

NIDCR supports research to understand the underlying biological mechanisms of HIV infection and the development of oral complications and cancers associated with AIDS. One such oral complication is Kaposi's sarcoma, a cancer that is caused by infection with human herpesvirus 8 (HHV8). NIDCR researchers found that the HHV8 virus blocks the natural ability of immune cells to detect the virus and fight off the viral infection. This finding shows that the virus is able to change the host's response to infection and provides new insights to inform treatment strategies for AIDS-associated complications and malignancies.

Program Portrait: Basic Research to Understand Oral Wound Healing in People with Diabetes

FY 2016 Level: $4.8 million
FY 2017 Level: $4.8 million
Change**:** $0.0 million

Approximately 29 million Americans currently suffer from diabetes at a staggering economic impact of over $245 billion annually in healthcare costs and lost productivity.[2,3] People with diabetes can have a number of complications such as stroke and heart disease, as well as problems with wound healing. Diabetics are much more likely to have periodontal disease, an inflammatory disease of the soft tissue and bone that support the teeth, further complicating oral wound healing. When wounds do not heal they can lead to infections and sores that can make talking and eating very painful, as well as causing disfiguring tissue destruction.

Although the process of how wounds heal in healthy people is fairly well understood, doctors cannot explain why people with diabetes have wounds that will not heal. Now NIDCR-funded scientists have identified a key factor involved in the healing process that may act as a molecular switch that functions differently in diabetics. This molecule, called Foxo1, normally protects cells in the oral wound from dying and enhances the activity of another molecule, TGF-β1, which is critical to the healing process. In diabetic mice, Foxo1 seems to have the opposite function - it inhibits the healing process. This finding suggests that interventions to block Foxo1 could help improve oral wound healing in people with diabetes. In addition, Foxo1 is involved in the inflammation and bone loss that occurs in periodontal disease. Since periodontal disease is more common in people with diabetes, Foxo1 may play a unique role in how tissues respond to diabetic environments. Given these intriguing results, NIDCR-supported researchers are continuing to explore the complex role of Foxo1 in diabetes, periodontal disease, and wound healing throughout the body.

To improve the oral health of the Nation, NIDCR is committed to developing novel approaches to retain exceptional scientists. In FY 2017, NIDCR is launching a new initiative called SOAR –

[2] Centers for Disease Control and Prevention. National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2014. Atlanta, GA: US Department of Health and Human Services; 2014
[3] American Diabetes Association. Economic Costs of Diabetes in the U.S. in 2012 (2013) Diabetes Care, 36(4): 1-33-46.

the Sustaining Outstanding Achievement in Research award. This award will provide longer-term funding to experienced NIDCR-supported investigators with outstanding records of productivity. The award is intended for mid-career scientists to maintain their career trajectory and embark on ambitious longer-term projects that could truly revolutionize oral health through research. NIDCR also recognizes that training the next generation of researchers includes building capacity in developing countries to tackle unique oral health challenges. NIDCR partners with the Fogarty International Center on a number of global research training and career development initiatives. NIDCR co-funds two training awards to support junior faculty in the Medical Education Partnership Initiative. These awards provide research training focusing on HIV/AIDS and other diseases or risk factors associated with oral health in Sub-Saharan Africa. A key component of these awards are collaborations between foreign and U.S. institutions, ensuring that U.S. scientists maintain their integral role in supporting global health research. NIDCR remains committed to strengthening the biomedical workforce by cultivating a diverse, innovative, and creative cadre of oral health researchers to ensure a productive, sustainable workforce.

Budget Policy: The FY 2017 President's Budget estimate for this program is $197.455 million, a decrease of $1.120 million or 0.6 percent compared to the FY 2016 Enacted level. Greatest priority will be given to supporting meritorious new research projects and ongoing initiatives.

NIDCR is introducing several new initiatives for FY 2017, including efforts to understand the role of glycans in HIV infection and HIV/AIDS-related oral pathogens and SOAR – the Sustaining Outstanding Achievement in Research mid-career scientist award.

NIDCR will launch an initiative to develop miniature three-dimensional (3D) models of human dental, oral and craniofacial tissues and organs capable of mimicking the structure and function of native tissues and organs. These innovative 3D models provide the structure and organization that are lacking in standard two-dimensional cell culture systems and will allow scientific researchers the unprecedented opportunity to study complex questions of health and disease.

The Institute will also encourage the development of non-invasive biosensors for the oral cavity that will provide dynamic, real-time monitoring of a number of physiological processes. This promising new initiative will allow oral health researchers to leverage the power of technology to drive the development of new approaches to prevention, detection, diagnosis and treatment customized for specific patient populations.

Clinical Research: High-quality clinical research is essential to successfully translate basic scientific findings into evidence-based dentistry. NIDCR's Clinical Research program supports and conducts a wide-range of activities aimed at improving the dental, oral, and craniofacial health of the nation. This includes multi-center clinical trials and two initiatives: the National Dental Practice-Based Research Network (NDPBRN) and the Centers for Research to Reduce Disparities in Oral Health.

Established in FY 2012, NDPBRN includes almost 6,000 dental practitioners representing all 50 states. Recognizing the need for scientific evidence to guide treatment decisions for dental practitioners, the main goal of this program is to facilitate translation of evidence-based research findings into clinical practice. The network conducts a broad range of studies, including research on dental treatment and restorations, temporomandibular joint disorders (TMD), and health

screening in the dental office setting. For example, an NDPBRN study is investigating the differences between individuals who experience acute versus chronic pain after root canal treatment. By focusing on these two groups of people, investigators are developing new precision medicine approaches to identify and effectively treat those who might transition from acute to chronic pain. A related practice-based research study is investigating how frequently patients report orofacial pain, including TMD, in the real world setting of dental offices. A surprisingly high number of people had pain in their temporomandibular joint and associated muscles, almost as many as those with pain related to the teeth and surrounding tissues. These findings demonstrate the importance of NIDCR-supported research to understand the basic mechanisms of pain, including the transition from acute to chronic pain, and the individual differences that may contribute to a predisposition to pain. Evidence and knowledge gained from both basic research and studies conducted in dental offices by practitioner-investigators can together help solve the many clinical challenges faced by dentists every day.

NIDCR also supports studies to understand sex-related differences in disease occurrence and the development of treatment strategies that are personalized for each patient. Adenoid cystic carcinoma (ACC), a particularly aggressive form of malignant salivary gland cancer, occurs much more frequently in females compared to males. Currently, very little is known about the factors that cause such sex-related differences. In an effort to accelerate research advances in this field, NIDCR led the effort to establish a centralized salivary gland tumor biorepository and encouraged molecular characterization of these tumors. Scientists have identified a unique gene signature that is enabling researchers to generate and validate new preclinical models to expand our understanding of sex-related differences in the development of ACC and to improve treatment approaches. Building on this momentum, NIDCR is launching a new initiative in FY 2017 to examine the underlying reasons for sex-related differences in dental, oral, and craniofacial disease incidence with a goal to advance precision medicine-based prevention, diagnosis, and treatment.

Management of non-traumatic dental conditions (NTDC), such as periodontal disease and dental decay, is best accomplished in the dental office. In recent years, visits to emergency departments (ED) for NTDC-related pain have increased dramatically, placing considerable strain on the healthcare system. ED physicians often prescribe opioid and other analgesic medications critical to managing the acute pain symptoms of their patients; however, long-term opioid use can create challenges in treating the underlying disease and create a potential for substance abuse. NIDCR-supported researchers conducted the first study examining a nationally representative dataset for trends in the prescribing practices of ED physicians for opioid and other analgesics during NTDC-related visits. They found empirical evidence that the prescription of opioid analgesics by ED physicians to treat NTDC pain has increased over time. The findings from this important study provide the foundation to develop evidence-based programs and policy interventions aimed at balancing the need to mitigate risks of opioid misuse with the need to provide optimal patient care.

NIDCR is leading efforts to advance the use of electronic health records in clinical settings and to help inform oral health research. For example, NIDCR funds studies to integrate oral and dental health data into patients' electronic health records to improve the continuity of care. Scientists are developing practical approaches to improve the utility of electronic health record systems by considering a clinician's dual responsibilities to enter data and to focus on patient

care. This could potentially provide significant public health benefits by reducing errors and improving patient safety across the medical and dental settings.

Budget Policy: The FY 2017 President's Budget estimate for this program is $52.358 million, a decrease of $0.297 million or 0.6 percent compared to the FY 2016 Enacted level. High priority will be given to support meritorious new research projects and ongoing initiatives.

In FY 2017 NIDCR will encourage scientific research to understand why certain dental, oral, and craniofacial diseases are more prevalent in women or men. For example, a woman is more likely than a man to be diagnosed with an orofacial pain condition such as temporomandibular joint disorder, salivary gland tumor known as adenoid cystic carcinoma, or Sjögren's syndrome. This initiative will help address the critical gaps in our understanding of the underlying mechanisms of these differences and help identify new precision medicine-based prevention, diagnosis, and treatment methods.

Behavioral and Social Sciences Research: The Behavioral and Social Sciences Research Program funds basic and applied research to understand how to improve oral health by targeting behavioral and social factors. This program encompasses a diverse portfolio focused on developing effective strategies to prevent and treat dental disease, support recovery from oral disease, and promote life-long habits to improve oral health.

One area of particular interest for behavioral research is devising ways to modify the dental office to improve patient access to oral health care. For example, studies have shown that children with autism spectrum disorder (ASD) can get overwhelmed in an environment with lots of sounds, smells, and sights, which are often found in a dental office. ASD children are therefore less likely to receive routine care in a typical dental setting, leading to increased costs and a greater risk for oral disease. NIDCR-funded scientists are testing relatively simple modifications to the dental office environment to avoid the sensory overload often experienced by children with ASD and thus improve their access to care. Given that many people visit the dental office regularly for preventative oral care and treatment, NIDCR is also supporting studies to investigate ways to combine a dental visit with additional health screening and referrals. A national survey of providers, patients, and third-party payers suggests that the dental office could be a good opportunity to screen for HIV and then advise and refer a patient. This strategy could target at risk individuals who visit a dental office, but are unlikely to have other opportunities to be tested for HIV or receive preventative care services.

NIDCR also funds research into behavioral interventions to improve the quality of life for individuals recovering from oral diseases. Patients with oral cancers often receive radiation treatment that can damage the salivary glands, tongue, and jaw muscles. The damage to these structures can significantly impact chewing, swallowing, and taste. Most patients are instructed to perform a variety of exercises after surgery to help the rehabilitation process, but many do not adhere to the exercise schedule. Researchers are showing that early behavioral approaches emphasizing patient support and accountability can increase adherence and improve the likelihood that swallowing function will be preserved.

The Institute recognizes the need to understand the fundamental mechanisms behind behavioral interventions so that individualized prevention and treatment strategies can be developed.

NIDCR is co-leading the NIH Common Fund Science of Behavior Change initiative to support research that uses a structured, experimental medicine approach to behavioral science. NIDCR has a particular interest in the science of behavior change since understanding and improving behavioral interventions is an opportunity to substantially improve oral health.

Budget Policy: The FY 2017 President's Budget estimate for this program is $18.442 million, a decrease of $0.105 million or 0.6 percent compared to the FY 2016 Enacted level. High priority will be given to support meritorious new research projects and ongoing initiatives, particularly those that advance our understanding of behavioral and social interventions that improve oral health across a range of underserved or vulnerable populations and encourage the establishment of life-long habits to improve oral health.

Translational Genetics and Genomics: A detailed knowledge of the genetic variations in each individual and how those differences contribute to both health and disease is one of the foundations of precision medicine. The Translational Genetics and Genomics program aims to improve understanding of the genetic and molecular mechanisms underlying dental, oral, and craniofacial development and disease in children and adults. The ultimate goal of the program is to translate findings from basic research and population-based data analysis into clinical studies that will lead to improved preventative measures, diagnostic testing, and treatments to minimize the negative impacts of dental and craniofacial disorders.

Program Portrait: Combatting the Increasing Threat of Oral Cancer (HPV+)

FY 2016 Level: $15.2 million
FY 2017 Level: $15.2 million
Change: $0.0 million

Doctors around the world are concerned about the rising number of people diagnosed each year with oral cancers, including those that start in the tonsils, base of the tongue, soft palate, or throat. The reason for this increase is human papilloma virus (HPV), the same virus that causes cervical cancer. Although more cases of oral cancer are being diagnosed, doctors have noticed that people with HPV+ oral cancer usually respond better to treatment and survive longer than people with HPV- oral cancer. To help both groups of cancer patients, NIDCR-supported scientists are comparing the molecular profiles of HPV+ and HPV- oral cancers and developing drugs that will exploit the molecular differences. Such targeted therapies will enable more precise treatment approaches so that people with HPV+ oral cancer may be spared the side effects of the more aggressive treatments that seem to be needed for people with HPV- oral cancer.

Unlike the HPV DNA tests used routinely for women being screened for cervical cancer, doctors do not have a screening test for HPV+ oral cancer. The Institute is leading the way in advancing technologies to use saliva to detect oral cancers. In an exploratory study, researchers found that studying cancer-specific DNA in saliva and plasma could distinguish between HPV+ and HPV- oral cancers. This test could also successfully detect cancer in 90 percent of participants and identify cancer recurrence far earlier than other methods. Future studies will focus on improving the technology so that saliva alone can be used to identify the initiation and recurrence of oral cancers as well as other cancers throughout the body. In related research, investigators are partnering with industry to develop a rapid oral test to detect HPV and more easily identify those at increased risk for oral cancer and other HPV+ diseases. These investments will increase our understanding of oral cancer and advance the development of novel tools and technologies to improve diagnoses and individualized treatment.

NIDCR is supporting research that uses the power of big data, such as genome-wide association studies (GWAS) – a technique that analyzes large groups of people to find rare genetic variants

that are associated with diseases. Scientists studying children with cleft lip and/or palate (CL/P) have found five genes that could play a major role in the development of the CL/P. Related studies in a dog breed with high rates of naturally-occurring CL/P identified a variant in the gene *ADAMTS20*, which is implicated in development of the craniofacial region in humans. Identification of genetic variants involved in CL/P will help advance prevention strategies and determine those most at risk of developing CL/P. NIDCR funds the collaborative FaceBase Consortium that collects, integrates, and disseminates a wide variety of data on the genomics, gene expression, and imaging of the face and skull. Using this wealth of information, researchers are identifying the underlying genetic causes of previously unexplained craniofacial birth defects and are developing three-dimensional imaging tools to detect these types of developmental disorders.

It is well understood that tobacco and alcohol contribute to many cancers of the oral region by damaging DNA; however, the exact genes involved are largely unknown. NIDCR-supported scientists studying cancers of the upper aerodigestive tract (UADT), including those of the oral cavity, larynx, and esophagus, have identified two key genes that may confer a risk for UADT cancer: RAD52 and BRCA2. These two genes are also involved in other cancers, suggesting that targeted therapies for RAD52 and BRCA2 may provide new avenues to treat UADT cancers.

Genetic and genomic discoveries are being translated into therapies to treat rare diseases. Foundational research supported by NIDCR revealed the molecular basis of a rare bone disease called hypophosphatasia (HPP). Individuals with HPP can have brittle bones, lose their teeth, and develop craniosynostosis, a premature fusion of the skull bones. This breakthrough led to a therapy where the missing enzyme, called alkaline phosphatase, is replaced in children with HPP. Although this treatment improved bone mineralization in children with HPP, the enzyme replacement did not prevent craniosynostosis. Using a genetic mouse model of HPP, NIDCR-funded scientists demonstrated that earlier enzyme replacement therapy could prevent craniosynostosis, suggesting that providing the therapy at an earlier time may be a more effective strategy to treat those with HPP.

Scientists have seen similar success when translating basic research knowledge into treatments for cherubism, a rare genetic condition resulting in inflammation of the jaw bone and severe facial swelling. Researchers have found that a protein called spleen tyrosine kinase (SYK) is a key part of the pathway that leads to the inflammation associated with cherubism. Since drugs that inhibit SYK have been developed for other inflammatory diseases, these therapies may be effective in treating cherubim. In addition, studies on cherubism may offer new avenues for the treatment of other inflammatory diseases. For example, a new strategy to prevent and treat cherubism using bone marrow transplantation reduces inflammation, facial swelling, and bone loss in a mouse model. With an understanding of these basic disease mechanisms there is tremendous potential for translation into clinical practice to treat a variety of inflammatory diseases, not only those of the dental, oral, and craniofacial region.

Budget Policy: The FY 2017 President's Budget estimate for this program is $50.864 million, a decrease of $0.288 million or 0.6 percent compared to the FY 2016 Enacted level. High priority will be given to support meritorious new research projects and ongoing initiatives.

In FY 2017 NIDCR will launch an initiative to improve dental treatment of those with systemic diseases that also have oral complications. Certain genetic disorders, many systemic diseases such as diabetes, and some cancers therapies are associated with damage to oral tissues, and yet current oral health treatment guidelines are based on studies of fairly healthy individuals. The goal of this initiative is to encourage research to understand the impact of systemic diseases on oral health and to tailor guidelines for optimizing oral health in these individuals.

Intramural Research: The NIDCR Intramural Research Program (IRP) conducts cutting-edge basic, translational, and clinical investigations related to dental, oral, and craniofacial diseases. Taking advantage of the world class NIH Clinical Center and outstanding collaborations with extramural investigators, intramural scientists study topics at the center of oral health: the biology of pain, itch, and taste; oral and craniofacial genetics and development; immunology of the mucosal system; salivary gland development and function; and stem cell biology and tissue regeneration. Intramural scientists are also developing new tools and technologies to diagnose and treat dental, oral and craniofacial disease. A cornerstone of the IRP is a strong focus on training the next generation of researchers and the program draws highly talented trainees from diverse backgrounds to participate in a variety of research training programs.

Program Portrait: Decoding Our Sense of Taste to Improve Health

FY 2016 Level: $3.6 million
FY 2017 Level: $3.6 million
Change**:** $0.0 million

We use our sense of taste every day to savor our favorite foods. And of course, our food choices are often based upon how good something tastes, rather than how good it is for our health. We all know that many diseases – such as dental decay, obesity, and diabetes – are linked to our food choices. So an understanding of how taste influences what we choose to eat could help us improve our diet and nutrition. One of the most important tastes related to our health is the sensation of sweetness. NIDCR intramural scientists are investigating how the receptors in our taste buds detect the molecules in our foods that result in our sense of taste. They have found that humans and other mammals have a single receptor for both natural and artificial sweeteners, adding to our understanding of how we detect sweet tastes at the molecular level. In related research, NIDCR-supported investigators are studying the complex interplay of diet, nutrition, and genetics that determines why certain people are more likely to develop dental decay. It turns out that our genetics play a major role in the sense of taste. Variations in genes that are part of the taste receptor pathway predispose some people to prefer sweet foods. These discoveries help us to understand how we taste sweetness and how this may affect our food choices, which in turn affects our overall health.

Many other factors affect our desires for certain foods, including emotions, hormones, and stress. Therefore, we need to understand the higher level brain processing that influences taste and impacts our eating decisions. Taking advantage of precise tools and technologies such as live imaging and genomics, NIDCR intramural researchers are beginning to map the sense of taste in the brain to determine how the other senses and emotions combine to make food rewarding. Increasing our understanding of the mechanisms of taste at the levels of the taste bud and the brain circuitry will allow individualized approaches to identify those at risk of developing dental decay and other diet-related diseases and help develop new strategies to improve our health.

Intramural scientists are conducting state-of-the-art research on how nerves in the face and oral cavity transmit information to the brain for higher processing. These nerves detect a number of sensations, including touch, temperature, pain, and itch. Although itch is often thought to be a minor annoyance, it can be a substantial problem for those with allergies, disorders that cause severe itching, or as an unpleasant side effect of certain treatments. Work in mice has

demonstrated that a molecule called brain natriuretic peptide (BNP) transmits the itch sensation, providing a new target for therapeutic intervention. NIDCR scientists are working with colleagues at the National Center for Advancing Translational Sciences (NCATS) to identify and test inhibitors of BNP-signaling as a potential treatment for intractable itch.

NIDCR has a long standing interest in understanding the molecular and cellular mechanisms of salivary gland development to identify strategies to regenerate and treat damaged or diseased salivary tissues. Intramural scientists have demonstrated that proteins called Wnts are essential for establishing communication between cells in the developing salivary gland and neighboring nerve cells. Future studies will use this knowledge to promote salivary gland nerve cell survival and function, which is required for gland regeneration. Another approach to treat salivary disorders is to increase salivary flow in the damaged or diseased gland tissue. Clinical investigators have completed an early gene therapy trial, introducing a water channel into the damaged glands to improve salivary flow. The encouraging outcomes from these investigations have the potential to treat a variety of salivary gland disorders and diseases including the autoimmune disease Sjogren's syndrome, as well as the dry mouth that results from radiation therapy to treat head and neck cancers.

The NIH IRP includes the Clinical Center, which is the Nation's largest research hospital. As an integral part of the Clinical Center, the NIDCR Dental Clinical Research Core provides oral medicine and dental consultation services for those undergoing treatment for a variety of diseases and conditions that affect oral and craniofacial health. As an example, patients receiving treatment for cancers of the immune system and blood forming tissues can get an autoimmune-like disease called Graft versus Host Disease (GVHD). GVHD can cause chronic dry mouth and painful sores which can significantly impact a person's quality of life. NIDCR intramural researchers are working with colleagues at the National Cancer Institute to treat the oral lesions using a steroid mouth rinse called clobetasol, and with scientists at the National Heart Lung and Blood Institute to identify salivary biomarkers in GVHD patients. This research will expand our understanding of oral immunology and may offer potential new therapeutic avenues for other autoimmune disorders with salivary dysfunction such as Sjögren's syndrome.

Intramural scientists at the Clinical Center are fostering innovative new therapies for rare diseases through the development of public-private partnerships. Through these collaborations researchers are using repurposed drugs to treat two disorders of abnormal calcium levels, called autosomal dominant hypoparathyroidism and tumor-induced osteomalacia. These studies demonstrate the value of public-private partnerships to develop therapies and the importance of rare disease research to understand mechanisms and inform treatments.

Budget Policy: The FY 2017 President's Budget estimate for this program is $67.500 million, an increase of $1.279 million or 1.9 percent compared to the FY 2016 Enacted level.

Intramural scientists will continue to pursue research aimed at connecting basic, translational, and clinical science and to develop novel approaches to study dental, oral and craniofacial health. NIDCR supports research to understand the complexity of our sensations, including the identification and study of the molecules and pathways responsible for detecting heat, pain, itch, and taste. NIDCR scientists are studying the basic biology of bone and skeletal tissues, identifying the molecular basis for rare bone diseases, and leveraging existing drugs to develop treatments for these bone disorders. Intramural researchers will continue studies to understand

normal salivary gland development and function and clinical researchers are developing improved gene therapy strategies to improve salivary gland function in patients with chronic dry mouth.

Research Management and Support (RMS): The RMS budget supports the scientific, administrative management, information technology, communication, and clinical trial and management activities needed to effectively lead and manage the world's largest oral health research enterprise. These activities provide stewardship for NIDCR's investments, including the review, award, and monitoring of research grants, training awards, and research and development contracts. The Office of Science Policy and Analysis (OSPA) leads strategic planning, analyses, and evaluation activities along with internal coordination, reporting, and liaison activities with other Federal agencies and Congress. OSPA also oversees the Dental Public Health Residency program, which is partnering with the NIDCR Clinical Research Fellowship program to provide training in dental public health. The Office of Communications and Health Education develops, implements, and evaluates the Institute's science, health, and digital communication programs. These programs are designed to promote the timely transfer of knowledge gained from research and its implications for health to scientists, health professionals, policy makers, patients, the general public, and the media.

Budget Policy: The FY 2017 President's Budget estimate for this program is $26.777 million, an increase of $0.531 million or 2.0 percent compared to the FY 2016 Enacted level. NIDCR will use these resources to fund the scientific and administrative management and oversight activities of the Institute.

NATIONAL INSTITUTES OF HEALTH
National Institute of Dental and Craniofacial Research

Budget Authority by Object Class[1]
(Dollars in Thousands)

		FY 2016 Enacted	FY 2017 President's Budget[2]	FY 2017 +/- FY 2016
Total compensable workyears:				
	Full-time employment	234	234	0
	Full-time equivalent of overtime and holiday hours	0	0	0
	Average ES salary	$169	$171	$3
	Average GM/GS grade	11.7	11.7	0.0
	Average GM/GS salary	$97	$98	$1
	Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207)	$109	$111	$2
	Average salary of ungraded positions	$135	$137	$2
	OBJECT CLASSES	**FY 2016 Enacted**	**FY 2017 President's Budget[2]**	**FY 2017 +/- FY 2016**
	Personnel Compensation			
11.1	Full-Time Permanent	$14,420	$14,529	$110
11.3	Other Than Full-Time Permanent	10,621	10,702	81
11.5	Other Personnel Compensation	494	497	4
11.7	Military Personnel	254	255	2
11.8	Special Personnel Services Payments	3,389	3,414	26
11.9	**Subtotal Personnel Compensation**	**$29,176**	**$29,399**	**$222**
12.1	Civilian Personnel Benefits	$8,409	$8,575	$167
12.2	Military Personnel Benefits	149	150	1
13.0	Benefits to Former Personnel	0	0	0
	Subtotal Pay Costs	**$37,734**	**$38,124**	**$390**
21.0	Travel & Transportation of Persons	$665	$677	$12
22.0	Transportation of Things	88	89	2
23.1	Rental Payments to GSA	0	0	0
23.2	Rental Payments to Others	0	0	0
23.3	Communications, Utilities & Misc. Charges	458	466	8
24.0	Printing & Reproduction	0	0	0
25.1	Consulting Services	$1,454	$1,680	$226
25.2	Other Services	5,215	5,309	94
25.3	Purchase of goods and services from government accounts	52,798	54,687	1,889
25.4	Operation & Maintenance of Facilities	$139	$142	$3
25.5	R&D Contracts	5,516	6,457	942
25.6	Medical Care	156	160	4
25.7	Operation & Maintenance of Equipment	2,264	2,302	37
25.8	Subsistence & Support of Persons	0	0	0
25.0	**Subtotal Other Contractual Services**	**$67,542**	**$70,736**	**$3,195**
26.0	Supplies & Materials	$4,039	$4,112	$73
31.0	Equipment	3,435	3,497	62
32.0	Land and Structures	0	0	0
33.0	Investments & Loans	0	0	0
41.0	Grants, Subsidies & Contributions	299,435	295,694	-3,741
42.0	Insurance Claims & Indemnities	0	0	0
43.0	Interest & Dividends	0	0	0
44.0	Refunds	0	0	0
	Subtotal Non-Pay Costs	**$375,662**	**$375,272**	**-$390**
	Total Budget Authority by Object Class	**$413,396**	**$413,396**	**$0**

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund.
[2] Includes mandatory financing.

NATIONAL INSTITUTES OF HEALTH
National Institute of Dental and Craniofacial Research

Salaries and Expenses
(Dollars in Thousands)

OBJECT CLASSES	FY 2016 Enacted	FY 2017 President's Budget	FY 2017 +/- FY 2016
Personnel Compensation			
Full-Time Permanent (11.1)	$14,420	$14,642	$223
Other Than Full-Time Permanent (11.3)	10,621	10,763	142
Other Personnel Compensation (11.5)	494	500	7
Military Personnel (11.7)	254	258	4
Special Personnel Services Payments (11.8)	3,389	3,432	43
Subtotal Personnel Compensation (11.9)	**$29,176**	**$29,595**	**$419**
Civilian Personnel Benefits (12.1)	$8,409	$8,604	$195
Military Personnel Benefits (12.2)	149	150	1
Benefits to Former Personnel (13.0)	0	0	0
Subtotal Pay Costs	**$37,734**	**$38,349**	**$615**
Travel & Transportation of Persons (21.0)	$665	$677	$12
Transportation of Things (22.0)	88	89	2
Rental Payments to Others (23.2)	0	0	0
Communications, Utilities & Misc. Charges (23.3)	458	466	8
Printing & Reproduction (24.0)	0	0	0
Other Contractual Services:			
Consultant Services (25.1)	647	658	12
Other Services (25.2)	5,215	5,309	94
Purchases from government accounts (25.3)	38,441	39,346	905
Operation & Maintenance of Facilities (25.4)	139	142	3
Operation & Maintenance of Equipment (25.7)	2,264	2,302	37
Subsistence & Support of Persons (25.8)	0	0	0
Subtotal Other Contractual Services	**$46,706**	**$47,756**	**$1,051**
Supplies & Materials (26.0)	$4,039	$4,112	$73
Subtotal Non-Pay Costs	**$51,956**	**$53,101**	**$1,145**
Total Administrative Costs	**$89,690**	**$91,450**	**$1,760**

NATIONAL INSTITUTES OF HEALTH
National Institute of Dental and Craniofacial Research

Detail of Full-Time Equivalent Employment (FTE)

OFFICE/DIVISION	FY 2015 Actual			FY 2016 Est.			FY 2017 Est.		
	Civilian	Military	Total	Civilian	Military	Total	Civilian	Military	Total
Division of Extramural Activities									
Direct:	18	-	18	18	-	18	18	-	18
Reimbursable:	1	-	1	1	-	1	1	-	1
Total:	19	-	19	19	-	19	19	-	19
Division of Extramural Research									
Direct:	24	-	24	24	-	24	24	-	24
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	24	-	24	24	-	24	24	-	24
Division of Intramural Research									
Direct:	146	1	147	145	2	147	145	2	147
Reimbursable:	4	-	4	4	-	4	4	-	4
Total:	150	1	151	149	2	151	149	2	151
Office of Administrative Management									
Direct:	14	-	14	14	-	14	14	-	14
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	14	-	14	14	-	14	14	-	14
Office of Clinical Trial Operations and Management									
Direct:	2	-	2	3	-	3	3	-	3
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	2	-	2	3	-	3	3	-	3
Office of Communication and Health Education									
Direct:	6	-	6	6	-	6	6	-	6
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	6	-	6	6	-	6	6	-	6
Office of Information Technology									
Direct:	7	-	7	7	-	7	7	-	7
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	7	-	7	7	-	7	7	-	7
Office of Science Policy and Analysis									
Direct:	6	1	7	6	1	7	6	1	7
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	6	1	7	6	1	7	6	1	7
Office of the Director									
Direct:	2	-	2	3	-	3	3	-	3
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	2	-	2	3	-	3	3	-	3
Total	230	2	232	231	3	234	231	3	234
Includes FTEs whose payroll obligations are supported by the NIH Common Fund.									
FTEs supported by funds from Cooperative Research and Development Agreements.	0	0	0	0	0	0	0	0	0

FISCAL YEAR	Average GS Grade
2013	11.4
2014	11.4
2015	11.7
2016	11.7
2017	11.7

NATIONAL INSTITUTES OF HEALTH
National Institute of Dental and Craniofacial Research

Detail of Positions[1]

GRADE	FY 2015 Actual	FY 2016 Enacted	FY 2017 President's Budget
Total, ES Positions	1	1	1
Total, ES Salary	166,526	168,574	171,153
GM/GS-15	15	15	15
GM/GS-14	27	28	28
GM/GS-13	32	33	33
GS-12	32	32	32
GS-11	15	15	15
GS-10	0	0	0
GS-9	11	11	11
GS-8	9	9	9
GS-7	9	9	9
GS-6	4	4	4
GS-5	1	1	1
GS-4	1	1	1
GS-3	0	0	0
GS-2	1	1	1
GS-1	0	0	0
Subtotal	157	159	159
Grades established by Act of July 1, 1944 (42 U.S.C. 207)	0	0	0
Assistant Surgeon General	0	0	0
Director Grade	1	2	2
Senior Grade	1	1	1
Full Grade	0	0	0
Senior Assistant Grade	0	0	0
Assistant Grade	0	0	0
Subtotal	2	3	3
Ungraded	80	81	81
Total permanent positions	154	156	156
Total positions, end of year	229	231	231
Total full-time equivalent (FTE) employment, end of year	232	234	234
Average ES salary	166,526	168,574	171,153
Average GM/GS grade	11.7	11.7	11.7
Average GM/GS salary	95,787	96,966	98,449

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund.