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Obama Budget 2016 Funds Fight Against Antibiotic Resistance

奥巴马 2016 年预算抗“耐抗生素”

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E.coli is one of many types of bacteria that rapidly develops immunity to modern antibiotics and poses a constant challenge to researchers and drug developers attempting to stay ahead of the resistance curve. U.S. President Barack Obama's 2016 budget proposal includes an unprecedented \$1.2 billion effort to fight antibiotic resistance. Suzanne Plunkett/ Reuters 大肠杆菌等，有许多种（细菌）都能迅速衍生对现代抗生素的免疫，总在挑战科学家和医药科研试图胜算耐药菌发展的努力。美国总统奥巴马的 2016 年预算建议书，包括了从来没有过的 12 亿美元，激战“耐抗生素”。

Margaret Riley, a molecular biologist at the University of Massachusetts Amherst, tried and failed for 15 years to find funding to study and develop a new antibiotic for urinary tract infections caused by the insertion of a catheter -- an affliction suffered by 1 million people per year who typically contract it while admitted to U.S. hospitals. She approached the National Institutes of Health and pharmaceutical companies, to no avail. 玛格丽特·莱利是马萨诸塞大学(阿穆赫斯特)的分子生物学家。她十五年来试了、失败了，在追求研发经费来开发新的抗生途径，对抗导尿管植入时造成的感染。这种常见疾病每年有百万住进美国医院的病人被感染。她建议了国家健康研究院和医药公司，都没有结果。

Recently, though, Riley was contacted by Xiao-Qing Qiu, a researcher with Pheromonicin

Biotech Ltd. in China, who asked if she was interested in collaborating with his lab, which, she says, has received financial support from the Chinese government to develop novel antibiotics. Riley now plans to develop her drug there instead of in the U.S. “I want to solve the problem and if I have to fly to Beijing to do my animal trials, that's what I'll have to do,” she says. 但是最近，一位在北京的信息菌素生物技术有限公司（Pheromonicin Biotech, Ltd.）科学家丘小庆联系了莱利博士，问她是否有兴趣和他的实验室合作。据莱利讲，丘博士研究创新抗生药物的发明已经得到了中国政府的财政资助。莱利博士现在计划放弃征求美国基金，转到中国去进行她的研发。她说，“我需要的是实际解决这个（科学）难题，如果必须飞到北京去做我的动物实验，那我也不得不过去做。”



玛格丽特·莱利：

[Antibiotics](#) -- the primary weapons against harmful bacteria like those that cause strep throats or staph infections -- have become less effective in recent years as the bacteria that they attack morph into "superbugs": new strains that are resistant to many prescriptions. But neither the U.S. government nor pharmaceutical companies have seemed to care much about developing new antibiotics or warding off resistance. 抗生素，是对抗有害细菌例如引起链球菌喉炎（strep throats）或金黄色葡萄球菌感染（staph infections）等的主要武器。近年来由于它所抵抗的细菌变形成了所谓“超级细菌”而效果渐弱：新的菌株能已经能耐受很多处方所开出的药物。可是不论是美国政府还是医药公司似乎对开发新抗生素或对抗耐药性等都没有什么兴趣。

Now the Obama administration has pledged a [major investment](#) of \$1.2 billion across a half-dozen agencies to classify and monitor antibiotic-resistant bacteria, discover new antibiotics and improve the methods by which doctors prescribe them. “I think it's phenomenal and long overdue,” Riley says. The biggest chunk of the money allotted to the effort as part of the 2016 budget proposal -- nearly \$1 billion -- will go to the Department of Health and Human Services, which will effectively double the agency's funding from 2015. 现在，奥巴马政府承诺了覆盖数个政府部门、高达 12 亿美元的重大投资，用于分类和检测耐抗生素的细菌、发现新抗生素、改善医生开抗生素处方的方法等。莱利博士说“我想这真是来得非凡，但姗姗来迟”。在 2016 年这个预算中的一大部分，将近 10 亿美元，将交给卫生与公共服务部支配。这笔资金的效果足以把该部门的体量扩大一倍。

“I think for many decades, the assumption was always that one way or another, new antibiotics would be discovered and we didn't have to worry that much about resistance because there would always be another bullet in the belt,” Joe Guglielmo, dean of the school of pharmacy at the University of California, San Francisco, says. 加州大学旧金山分校药学院的教务长乔·古列尔莫说：“我想已经几十年了，这些假设总是这样或那样地说，新的抗生素会被发现的，我们似可不必担心耐药性的发展，我们腰带总还会有另外一颗子弹。”

Meanwhile, [antibiotic-resistant bacteria cause 2 million illnesses](#) and 23,000 deaths a year in the U.S., according to the Centers for Disease Control and Prevention. Riley says that's a very

conservative estimate and that the real number of deaths is likely double or triple that number. The economic price is high, too -- as much as \$20 billion a year in health care costs and \$35 billion in lost productivity due to people staying home from work. 同时，美国疾病控制和预防中心的数字披露：耐抗生素细菌在美国造成着每年 2 百万例的疾病和 2.3 万例的死亡。莱利博士说，这是个非常保守的统计，真实情况的死亡率可能是这个数字的二至三倍。经济损失也很大，大约每年它耗资 200 亿美元的卫生保健费用，加上 350 亿美元是由于疾病造成的生产力损失。

Even the antibiotics that doctors do employ use a "shotgun approach" that targets healthy as well as harmful bacteria, Chris Butler, a physician and professor of medicine at the University of Oxford, says. Part of the administration's aim with the new funding is to help researchers look for antibiotics that are engineered to kill only foreign bacteria instead of also attacking the beneficial microbes within a person's body. The all-or-nothing nature of today's antibiotics can cause more harm than good -- especially for children who take antibiotics while young and may sustain long-term damage to their microbiome. 牛津大学的医学教授和医生克里斯·巴特勒说，医生甚至运用所谓“鸟枪法”施加抗生素，它同时杀死了益生菌和病菌。当局新经费的部分目标是资助科学家找到能只杀死外界入侵病菌的抗生素，而不是同时攻击人体中应存在的益生菌。所谓当今的“都杀死或都杀不死抗生素特性”，实际上对人类造成更多的是疾病和破坏。尤其是对于儿童，他们从年轻就使用抗生素，将终生损害他们的微生物系统平衡。

Another longtime hurdle to progress is a fundamental lack of information that still plagues the field even though the first antibiotic -- penicillin -- was discovered in 1928. "We're at the tip of the iceberg in understanding how many antibiotic-resistant genes there are and what they are," Riley says. Beth Bell, director for the National Center for Emerging and Zoonotic Infectious Diseases at the CDC, adds that right now, her agency analyzes only about 10 percent of the strains of salmonella, a common culprit of foodborne illnesses, that are reported in the U.S. With the \$280 million that Obama plans to grant to the CDC, administrators would establish regional centers that could analyze 100 percent of salmonella cases. 另一个长期障碍是对信息的基本缺乏。我们还在承诺着一个老的领域，明知第一个抗生素的发现（盘尼西林）是早在 1928 年。莱利博士说：“到底有多少耐抗生素的基因、它们都是些什么，我们真正的了解还只相当于冰山的一角。”疾病控制中心新发现及动物传染病国家中心的主任贝丝·贝尔刚刚补充说，她的部门才仅在美国分析和报告了大约 10%的沙门氏菌株（该常见病菌是食物感染的罪魁祸首）。奥巴马预算中有 2.8 亿美元给了疾控中心，用于在全美建立区域性中心、要分析 100%的沙门氏菌感染病案。

Until these bacteria are better understood, physicians will struggle to prescribe antibiotics most effectively. It's often difficult for physicians to determine which strains of problematic bacteria a patient possesses during a routine visit. "We need the sort of basic diagnostics to help us say, this patient sitting in front of me now will benefit from antibiotics but I can safely withhold antibiotics from another patient," Butler says. Obama's budget proposal also grants more than \$100 million to develop new therapies and diagnostics. 直到我们能对这些病菌有了更多的了解，医生将还只能靠开抗生素处方来抵制它们。当一个病人走进来做常规的检查时，如何决定到底是那些菌株在个别人身上造成了问题，对于一个医生通常确是个非常艰难的决断。波尔勒医生说，“我们需要约略地借助于基本诊断，就得告诉一位坐在我面前的病人说，他能受益于抗生素；但我也会为了安全不向另一位病人开抗生素的处方。奥巴马的预算还建议了 1 亿多美元用来开发新的治疗和诊断方法。

Aside from finding new antibiotics and filling in knowledge gaps, the administration is also taking aim at a lesser-known problem. Studies have shown that doctors are in the habit of offering antibiotics to patients for viral infections like a cold, which these drugs don't cure. Jeffrey Linder, a professor at Harvard Medical School and a physician at Brigham and Women's Hospital in Boston, once found that about 5 percent more patients with an acute respiratory infection will receive a prescription for an [antibiotic](#), which can't treat these infections, during an appointment in the fourth hour of a doctor's shift than in the first hour. Linder attributes this to physician fatigue. If doctors

prescribed more appropriately and decreased the number of antibiotics in circulation, bacteria would become resistant at a far slower rate -- and their patients would avoid potential side effects and developing resistance to a medicine that they may someday really need. 除了发现新抗生素和缩短对相关知识的脱节这两个措施，政府还瞄准了鲜为人知的难题。调查表明，医生习惯于给病毒感染的病人开抗生素。例如感冒，其实抗生素并不对症。杰弗里·林德（他是哈佛医学院教授和波士顿布里格姆妇女医院的医生）曾发现，在医生换班 4 小时之后，比起换班刚 1 小时之内，大约 5% 以上的急性呼吸系统感染的病人就会被发给并不对症这种感染的抗生素处方。林德把这个现象的发生归结为是医生的疲劳所致。如果医生能更正确地开处方，并能减少抗生素在人群中的循环，病菌的耐药性发展就会大大放慢；而病人就可以避免可能的抗生素副作用；还能避免特定耐药性在某人身上得以发展，以备这种药可能迟早会成为这个病人的亟需。

With the additional millions in funding, Bell says the CDC would set up a nationwide reporting system for antibiotic use in hospitals, establish national standards and possibly offer financial incentives to hospitals for reducing antibiotic use that would be tied to the Centers of Medicare and Medicaid Services. 另外，这笔预算中有数百万美元，贝尔说将用于在疾控中心建立覆盖国家各地的医院的使用抗生素报告系统；建立使用抗生素的国家标准；对于医疗保险和医疗补助中心相关的医院，减少使用抗生素还可能受到国家奖励。

Overall, researchers are delighted to see that Obama's budget proposal includes what they consider a comprehensive and science-based approach to antibiotic resistance -- even if it's a bit overdue. "It's already translated into new opportunities," Riley says. "There's been new attention on novel approaches to antibiotics." 总之，对于奥巴马的预算建议书，科学家所兴奋的在于其包含了全面、有科学根据的针对耐抗生素途径，虽然已经有些晚了。莱利博士说，“它已经产生出新的机会，已经对创新抗生药物发明带来了新的关注。”

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