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[Commentary]

The Lasker Awards: Celebrating Scientific Discovery

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IN 1995, THE LASKER AWARD I RECEIVED FOR CLINICAL medicine helped push Helicobacter pylori across the threshold of global acceptance as the stomach bacterium that causes ulcers and possibly stomach cancer. The most respected scientific award from a US foundation served to drive home the message that the time had come to treat patients with ulcers with antibiotics. Within 2 years of the Lasker award, physicians in developed countries were handed the tools to accomplish the task of curing chronic peptic ulcers. Effective treatments were fast-tracked by the US Food and Drug Administration and new diagnostic tests moved ulcer treatment into the domain of primary care physicians. Ten years later, peptic ulcers are far less common, freeing up billions of health care dollars.

For the medical community and the community at large to accept H pylori as a cause of ulcer disease required a major paradigm shift, demolishing traditional views on the harmful effects of "stress." Recognition of this research by the Lasker committee helped to activate this dramatic shift. Once peptic ulcer was moved into the realm of infectious disease, researchers were prompted to consider infection in other chronic diseases with unknown etiology.

Papillomavirus for cervical cancer is one example but many other conditions are being considered as possibly having an infectious etiology including rheumatoid arthritis, inflammatory bowel disease, Alzheimer disease,

cardiovascular disease, and even obesity. In addition, clarification of the H pylori issue has allowed resources to be directed toward ulcers caused by nonsteroidal anti-inflammatory drugs (NSAIDs). With H pylori out of the way, the COX-selective NSAIDs were more easily brought to market, and new research attempts can be easily directed at problems of NSAID ulcers now that rofecoxib and celecoxib have fallen into disrepute.

Clinically, the association of H pylori with gastric cancer, [1](#) especially in Japan, has driven many advances in basic research. In the hope of providing new vaccine and therapeutic targets, the genome of H pylori was sequenced by several groups starting in 1996. [2](#) Many interesting uses have arisen from this information. The first of these has been the newfound ability to track human migrations over the past 50 000 years by studying the gene sequence variations of the H pylori strains carried by various racial groups. [3](#) The new data support other sources, such as linguistic studies, which show migrations from Southeast Asia to the Pacific islands (New Zealand) and from Northern Asia to Alaska and down to South America. [4](#)

The focus on gastric cancer etiology resulted in the remarkable observation that not all strains of H pylori (or all humans) had the same propensity for developing that disease. In fact, cancer risk was greater in toxin-producing strains of H pylori, [5](#) but these strains predominate in most countries. In this regard, the toxin of greatest interest has been the so-called CagA protein, which is injected by a piluslike apparatus into the cytoplasm of the gastric mucosal cells, presumably boosting the associated inflammatory response. [6](#) Depending on genetically determined cytokine polymorphisms, individuals with an augmented response to bacterial infections are particularly likely to be harmed by H pylori.

Amazingly, however, in a prospective study of more than 1200 patients with untreated H pylori for up to 12 years, Japanese researchers found that a history of duodenal ulcer afforded almost complete protection from stomach cancer. [7](#) This means that high acidity is protective and low acidity is facilitative for stomach cancers associated with H pylori. These data suggest that some agents alter the distribution of H pylori in the stomach and therefore probiotics or natural dietary therapies could play a role in the management of H pylori.

Consistent with the idea that cancer risk from H pylori was not simply a carcinogenic substance produced by the bacterium, a recent study has shown that the cells responsible for stomach cancer, at least in one transgenic mouse model, were bone marrow-derived stem cells that had migrated into the gastric mucosa in response to damage caused by the bacterium. [8](#) If confirmed, these data could lead to simpler estimation of stomach cancer risk, or its management, in populations in which H pylori is ubiquitous. Second, this discovery may be an example of how the study of an H pylori-related tumor has caused a reevaluation of stem cells as a

cause of cancer in general.

Finally, and likely to drive basic research for years to come, is the recognition that the H pylori genome holds the key to bacteria survival adjacent to the gastric mucosa while avoiding acid-peptic digestion in the stomach. With at least 300 unique genes, H pylori has solved the problems of chemotaxis, adherence, and nutrition in this niche, all the while escaping the human immune system.

Looking back on when I received the Lasker award for clinical medicine, I tried to recall my thoughts during and after the event. It was then, and has remained, a defining point in my career. To me, the prestige of the Lasker award was derived especially by the excellence of the selection committee, all of them icons in their respective fields. On the night of the 50th anniversary of the Lasker awards, I sat at a table in the Metropolitan Museum of Art in New York, NY, with previous and current laureates, awestruck that such a gathering of minds and achievers could be collected in one place at any time, past, present, or future. Regardless of whether the laureates were household names, or less well-known leaders in their fields, the Lasker imprimatur had given them scientific authority. The Lasker awards still seem to be the most wonderful celebration of the best that modern medical science can achieve.

This success is multiplied because the Lasker awards celebrate scientific discovery beyond the scientific community by using a well-constructed media event to directly link new advances to the real world.

While many prestigious awards recognize advances in basic medical science, the Lasker award is the most recognized international award for clinical research. Clinical research is frequently less valued but often, as was the case with H pylori, it produces almost immediate direct improvements in health care and cost-effective advances in medical practice.

Awards such as the Lasker can publicize the value of continued financial support for all areas of research. Whereas academics seem to have a natural aversion to publicity, effective communication through the media to the public is important to encourage the establishment of role models and career paths for students, provide resources for their mentors, and stimulate future philanthropists in the style of Albert and Mary Lasker.

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