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The Massachusetts General Hospital, a
900-bed academic medical center located in
Boston, is a founding member of Partners
HealthCare System and is the largest
and oldest teaching affiliate of Harvard
Medical School.

This magazine is intended to present advances in
medicine and biotechnology for general informational
purposes. The opinions, beliefs and viewpoints
expressed in this publication are not necessarily
those of the MGH. For personal health issues, the
MGH encourages readers to consult with a qualified
health care professional.



When scientific disciplines meld, unexpected things happen. A recalcitrant problem may finally yield, conquered by collaboration among researchers willing to breach boundaries and blend knowledge. Consider the quest to find circulating tumor cells, or CTCs: stealthy, deadly vehicles for spreading cancer to distant organs. Detecting CTCs early can give physicians a jump on therapy, but traditional approaches miss most of the cells. Now a very tiny, very powerful “lab on a chip”—the brainchild of a team that includes Mehmet Toner, a member of the surgery department and director of the BioMicroElectroMechanical Systems Resource Center at the Massachusetts General Hospital; Daniel Haber, director of the hospital’s cancer center, and surgeon Ronald Tompkins—is proving able to detect one CTC among billions of blood cells.

That astonishing feat, which we recount in this issue of *Proto*, is one of many in the burgeoning field of microfluidics. Other applications utilize similarly tiny, powerful platforms to diagnose tropical diseases quickly, cheaply and far from medical facilities. Recent progress in microfluidics has sprung from the contributions of bioengineers, computer scientists, physicists, and other thinkers responding to the needs of chemists and molecular biologists, who yearned for a technology that would do for their research what computers had done for their data calculations.

Although there’s nothing new about an interdisciplinary approach to biomedical research, efforts have become more overt. A decade ago, at the MGH, a place now called the Center for Integration of Medicine and Innovative Technology was formed to bring together experts in medicine, science and engineering with leaders in industry and government. Today CIMIT has expanded to include many other Boston teaching hospitals, universities and laboratories. And three years ago, the MGH’s Richard B. Simches Research Center opened to house such collaborative research as computation and integrative biology, and regenerative medicine and systems biology. Similar initiatives are under way at other universities. For anyone seeking the next big thing in biomedical research, interdisciplinary approaches are where the action is.

But they are more than a trend. They’re a necessity in a world in which, as knowledge expands, no single field of scientific inquiry can adequately address the many challenging questions being posed. We need the best and broadest range of minds working together, discovering together.

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