

While still a doctoral student, this Russian-born biochemist began to publish a series of high-profile papers on the basic mechanisms of gene transcription, going on to join the faculty of the School of Medicine at the age of 26. As a 2006 recipient of the prestigious NIH Director's Pioneer Award, he is endeavoring to create conceptually new approaches to treat and prevent infectious diseases.

Pioneer on Myriad Frontiers

Evgeny A. Nudler, Ph.D.

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Asked if there is any parallel between his interest in the Japanese martial art form Shorinji Kempo, in which he has a Black Belt, and his scientific research, Dr. Evgeny Nudler speaks of the diversity of techniques that each requires. "A common thread in my career has been the use of unorthodox approaches to more than one endeavor," said Dr. Nudler, who at 37 supervises a staff of 15 researchers and no less than five major projects in non-overlapping fields of cellular and molecular biology.

He has tackled several different complex biological questions, and found novel answers in each case. His studies on bacterial gene regulation led to the discovery of riboswitches (metabolite-sensing RNA) that control more than 3 percent of all bacterial genes. Riboswitches are now promising new targets for antimicrobial therapies and are also new tools for biotechnology.

On another biochemical frontier, Dr. Nudler has also made important contributions in the area of nitric oxide (NO) biochemistry in both animal and bacterial systems. NO is a crucial signaling molecule that is involved in numerous physiological and pathological processes, including blood pressure control, blood clotting, nerve transmission, and immune response. In addition to therapeutic treatments for heart attack, this work is opening new directions in the area of developing antimicrobial drugs against which it would be very difficult for bacteria to acquire resistance.

Working on numerous biochemical frontiers simultaneously seems to agree with Dr. Nudler. "I like to have more irons in the fire. Sometimes, on the borders where one field touches another, we make interesting discoveries."

In 2006, Dr. Nudler's group identified the existence of a eukaryotic RNA thermosensor that acts as the principal regulator of what is known as the heat shock response, which cells mobilize under stress. "This is the most ancient defense system, fundamental from bacteria and fruit flies to plants and humans," explains Dr. Nudler. "Thermosensors act like a molecular thermometer, and their malfunction plays a pivotal role in inflammation, cancer, and aging." These findings open the possibility of manipulating the heat shock response to make cells more or less responsive to stress, thus offering a unique pharmacological target. They are likely to yield advances in areas ranging from heart attack and stroke prevention to more effective treatments for cancer.

