

In Memory of Harold Weintraub

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The death of a great scientist by devastating circumstances in the prime of his career gives us pause and calls for reflection on our careers, our labs, and ourselves.

Harold Weintraub died of complications from a brain tumor at age 49, in Seattle, Washington, on March 28, 1995.

To those who knew him, Hal represented science at its purest, friendship at its most generous, and mentorship at its most nurturing. Hal was one of those rare scientists who continually reminded us of the nobility of our careers, and one of those rare friends who continually reminded us of our value as people.

Throughout his career, Hal Weintraub looked for the linkage between gene expression and cell differentiation. He reveled in the complexity and uniqueness of eukaryotic cell processes but believed optimistically that simple experiments could elucidate the principles behind these complex mechanisms. The beauty of his scientific style was in its clarity and simplicity. Before the advent of cloning, he showed that active genes had different chromatin structure using DNase hypersensitivity. He developed the method of antisense RNA expression to regulate protein expression, opening many processes to surrogate genetic investigations. He and his students discovered the first master regulatory gene, *myoD*, which defined the cellular strategy for the control of cell differentiation. In his last few years he identified some of the positive and negative control circuits in muscle differentiation.

In the highly competitive and intensely studied area of gene transcription, Hal's approaches stood out as models of originality and economy. His experiments were lightning strikes that identified critical mechanisms, which led other, capable scientists to generalize and extend his results. His experimentation always drew criticism, as the best research does. It stimulated lively debate, which Hal not only accepted, but relished. Yet despite the precociousness of his experiments, Hal's interpretations almost invariably proved correct.

What explains both the extraordinary scientific accomplishment and the deep affection that surrounded Hal? Those who knew and cherished him

recognize that Hal the scientist, Hal the friend, Hal the mentor, Hal the father, and Hal the husband were all facets of one remarkable person. One inevitably came away from a conversation with Hal thinking better of oneself. A hallmark of Hal was his humility; he delighted in others' ideas and accomplishments; his dedication, absent of rivalry, at every stage of his career, was rare in science. And yet in every reassuring encounter there were always his simple, penetrating questions, reminding us of the limits of our knowledge, of the generalizations and potentialities we had not appreciated, and of experiments beyond our own imagination.

It is hard to complete a picture of Hal without describing his appearance: always sneakers, never a tie; no matter what the occasion, better dressed for basketball than the opera.

Hal's lectures were not theatrical, but modest, always concluding in the reformulation of a basic concept in biology. Though he was modest in style, he was not modest in his aspirations for the promise of science. He received many awards and certainly would have received many more, for Hal's accomplishments touched our deepest understanding of cell and developmental biology.

In his early years at Princeton, where Hal and I started as assistant professors, there seemed to be no question he would not ask, and no experimental problem he could not attack personally in the lab with his own hands. When most of us left there in the late 1970's, Hal, typically concerned more with research opportunity than with glamour, went to a young research institution where the practice of science would be paramount. Due in great part to Hal's contributions, the Fred Hutchinson Cancer Research Center grew in prestige to become a major center of learning. Hal infused his new colleagues with a sense of fearlessness and courage as well as total dedication. The purity of his approach was contagious to students and colleagues alike.

Most important to Hal were honest relationships with people. He was always grateful for and devoted to his strong and loving wife Nancy, and his fine sons, Josh and Adam. In the early days, on many occasions, I saw Hal with one child perched

on his lap and another threatening to overturn a piece of apparatus while their dad managed nonetheless to successfully conduct an experiment. Hal told me that his most valuable training for a career in research came when he worked as a short-order cook.

The loss to all of us of Hal Weintraub is inestimable. We hoped he would somehow survive to be there, with a question, a criticism, a comforting thought, showing his true desire and willingness to critique a

paper, or to help a student. He was an antidote to the egotism, materialism, and self preoccupation that affects most of us. He died without aging, still conserving his competitive juices for basketball and reserving his more cerebral periods for laboratory experimentation. He was excited by others' ideas, willing to the end to tackle the unglamorous activities that are the mark of true science. Someday we will celebrate what he gave to all of us, but today we can but mourn for what might have been.