

## Highlights from the VIIIth International Myeloma Workshop

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### **Innovative Technologies**

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QUESTION: We're at the Eighth International Myeloma Workshop in Banff, Alberta, speaking with Dr. Keith Stewart from Princess Margaret Hospital in Toronto. Welcome, Dr. Stewart.

KEITH STEWART, M.D.: Nice to be here.

QUESTION: We just left a very interesting session, in which you were part of a panel called "Innovative Technologies." And I'd like to start off the questions by asking how the human genome has changed the way we look at myeloma?

KEITH STEWART, M.D.: Well, now that we know the make-up of the human genome, we believe that we may be able to actually change the entire pathogenic classification of cancers in general, and myeloma, in particular. We think we can now begin to catalog myeloma not by what it looks like under the microscope, but by its expressed gene profile. What genes are expressed in a myeloma cell that are not expressed in other malignancies and are not expressed in normal cells?

And secondarily, even within myeloma are the different types of myeloma, which can be identified based on their genomic make-up, as opposed to their physical appearance, which is, as one can imagine, a rather unsophisticated way of looking at a myeloma cell. And now we're mining deep into the cell and really asking: What's the genetic make-up? What does that do? What does it mean? How does it predict for survival? How does it predict for response to treatment?

And we believe, I think I speak for all the panel members, we believe today that this is going to completely transform the way we diagnose the disease. It's going to completely transform the way we decide what therapy a patient will get. It is going to rapidly accelerate the speed at which we understand the disease, and the speed at which we can develop new drugs. In short, I think it's going to revolutionize myeloma.

QUESTION: We heard a lot today in the sessions about microarray technology. Can you describe that a little bit, and specifically some of the ones that were mentioned today in the session?

KEITH STEWART, M.D.: Microarray technology essentially is a platform in which one spots individual genes at very high density. There are a number of competing technologies. We heard today about glass slide-based microarray, where a microscope slide is used, and one can spot on that microscope, in a grid-like

fashion, in an automated way, up to 20,000 genes. Which means the entire human genome can be placed on two microscope slides.

An alternative way is to use lithography, and there's some commercial applications. We heard about the so-called gene chip manufactured by Affymetrix today, which is a lithography-based mechanisms of spotting smaller pieces of DNA for subsequent analysis. But essentially, all of the technologies involve just placing as many genes as possible in as small an area as possible, so that there's ease of use.

QUESTION: So what's this going to translate to, first for the researcher, and then potentially second for the patient?

KEITH STEWART, M.D.: Well, most of this is at the research stage, as the technology is evolving, as the genes that are placed on the arrays are discovered, or catalogued. And to some degree, researchers are still dealing with technical issues about how many cells you need from the patient to conduct an array, how many genes you're going to analyze, whether you're going to analyze the whole genome or just part of it, whether the technique is reproducible. Those kind of technical issues are still hurdles for scientists to get over. But we're already seeing today some very exciting information, even in this first pass at using this technology. So for research, this is a fundamental tool that will be employed by everyone very quickly, as I already mentioned, to define the make-up of myeloma and to rapidly accelerate our understanding of the disease.

For the patient, the benefits of this will be slightly further away, but we heard one speaker today describe a hand-held device, on which one could, within 10 minutes, look at specific gene profiles of a patient. We heard another speaker describe the fact that rapidly one could dissect, on an individual patient basis, who would be a candidate for certain treatments. And I think certainly within the next five to 10 years, we would expect that patients will have microarray profiling of their cancer performed at diagnosis, and that that will be used to direct their subsequent therapy. And we see, I think, more and more of this tailored therapy emerging. And particularly in myeloma, where at this meeting we're seeing all kinds of new drugs being described, which will be useful, one of the challenges is going to be which patient gets which drug. And I think we'll see the use of this technology to help us make those decisions.

QUESTION: So we are potentially seeing in the future, maybe in as soon as five years, where each individual patient potentially could be analyzed and their treatment somewhat based on their own individual genetic analysis?

KEITH STEWART, M.D.: That's correct. And in fact, we see, in one of the presentations from Dr. Shaughnessy today, that they're already using microarray profiling of their patients to direct therapy. For some patients at some specialized centers, it's already a reality. So the five-year horizon is one in which I think is the time frame in which it will become a generalized phenomenon, where certainly in five years, most academic centers will be using this technology. And perhaps in 10 years, this is something that will be routine, even in community hospitals.

QUESTION: So I think it's important to re-emphasize that in some academic centers, what we heard today that this is actually the state-of-the-art at this time, for each individual patient, although it's probably under a research-type protocol.

KEITH STEWART, M.D.: It's certainly under research mandate, but there are clearly clinical decisions being made already on the basis of gene-expression profiling.

QUESTION: Right. Dr. Stewart, thank you very much for your interesting comments.

KEITH STEWART, M.D.: Thank you.