

New Fashions in Molecular Pharmaceutics: Nanoscience and Nanomedicine. Does Size Matter in Delivery?

When one looks at the trends and progress of any scientific field, it is often true that one sees a sudden use of new terminology that resembles the waves of new fashions in New York or Paris. In some instances, scientists create those new vocabularies to describe brand new concepts that are difficult to describe without resorting to coining new words. In these cases, other scientists in the field, whether from an understanding of the true need for these expressions or from sheer personal bias or respect for the “coolness” and elegance of the term itself, may well lend credibility to their further usage, thereby qualifying and solidifying the fashion and engendering a real trend. In other cases, however, the new “terms” are somehow generated as sort of “buzz” words, while not being entirely brand new, as a way of describing the concept, although not necessary in absolute terms. This latter creation of jargon may not serve as many useful purposes as the former, but certainly occurs often enough to carry at least a pragmatic role in helping define new scientific vistas, forcing thoughts and attention from scientists in the field, especially for science policy makers, funding agencies, and scientific journal editors.

Transcriptome, proteome, interactome, metabogenomics, toxicogenomics, pharmacogenomics, gene medicine, nanomedicine, etc.: We have been hearing and learning new words in recent years, new concepts or merely buzz words, that represent attempts to concisely describe and catch the essence of new ideas in the modern era of molecular/cellular biological and pharmaceutical sciences. Will these terms be necessary and useful for a better understanding of nature and for the advancement of biomedical science? In time, I am sure we will be able to answer this question. While in the middle of all these new things in their beginning stages, however, an average scientist might ponder upon this and try to figure out his or her reaction or response to the seemingly new and potentially revolutionary changes that come along with the new vocabulary. As a pharmaceutical scientist, and as a “molecular pharmaceutics” scientist, I hear

and think about “nanobio-”, “nanomedicine”, nanocarriers, etc. When the biological sciences moved from “macro” to “micro”, significant changes had to be brought about when we started dealing with structures around the micron scale. The Reynolds number difference dictated greater consideration of random motions and diffusion than classical fluidics with big Reynolds numbers, for example. We had to adjust and think about microscopic targeting and also submicroscopic targeting like differentiating various subcellular compartments on top of macroscopic targeting. It is still unclear to me what the verdict will be on the use of the term and the area of research defined as “nanomedicine”. It is, however, clear to me that one can promote “nanomedical” research more forcefully and effectively if this concept were to bring us something legitimately different and provide a better handle on the objectives of improved delivery.

For the first one and one-half years of this young journal *Molecular Pharmaceutics*, we have seen quite a bit of research that can be classified as “nanomedicine” and “nanocarriers”. I have no doubt that we recognized these as the types of research projects that we have been doing and would have done regardless of these new terminologies. But, with these new words and trends, and the accompanying excitement, are we moving into a new research concept which many “molecular pharmaceutical” scientists can identify with and benefit from? Will we be able to take advantage of these new vocabularies “in fashion” to recruit competent scientists from different disciplines? Will we be able to accomplish the goals of biomedical research that would not have been possible unless we started thinking at the nanolevel in pharmaceutics and drug delivery? It is my hope that, in 10 years, hindsight will prove me correct for fully recognizing the potential of the “nanobiorevolution”.

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