Preface

An introduction to the most cited papers in the history of Advanced Drug Delivery Reviews (1987–2012)☆☆

This special anniversary issue of Advanced Drug Delivery Reviews (ADDR) celebrates 25 years since the publication of the first issue of the journal and includes the most cited articles in the history of ADDR. As I was going through these seminal reviews in the field, the subjects brought back memories, and even a tear, from the glorious early period of drug delivery and controlled release. It made me remember how important this journal is in the history and growth of the drug delivery field.

Since May 1987, when the first issue of the journal came out, ADDR has made significant contributions to the education of our practitioners in the field, especially with the exceptional theme volumes on biological and medical aspects of drug delivery. We all join in celebrating 25 years of exceptional work and we thank the editors, notably the initial Senior Editors George Poste, Eric Tomlinson (with Colin Pouton, Sadao Hirota, and Vince Lee as editors), and then the more recent Editors-in-Chief Vince Lee and Hamid Ghandehari for their strong leadership and high standards.

As I reviewed again the most cited articles in ADDR I came back to important marks in the history of drug delivery. Most of the papers presented in this issue have received more than 250 citations since the founding of the journal according to the Scopus® abstract and citation database (see Table 1). About three-quarters of the papers are post-2000. The impact in the field is really significant as these reviews have 30–90 citations per year. The most highly cited paper in ADDR is the classic work of Lipinski et al. of Pfizer, Inc. [1]. This review article was published in 1997 and addresses one of the simplest, yet most important, methods for the estimation of drug solubility and permeability, the so-called “rule of 5”. The contribution has a very useful analysis of permeability of high and low solubility drugs with emphasis on the use of the “rule of 5” in analyzing barrier transporters. It has become a standard on design of new drug delivery systems as more than 2700 citations indicate.

The second most highly cited paper is by Hoffman of the University of Washington [2], who in 2002 published a most successful review on liposomes in medical applications, a review that attracted almost 1100 citations in 10 years. This is an authoritative contribution that has been used by many scientists in the field. An equally exciting work is on the use of nanoparticles in cancer therapy. This review article written by Couvreur and associates of the University of Paris-Sud [3] is a masterful presentation and an update of tumor targeting with conventional and long-circulating nanoparticles. It has amassed more than 900 citations in ten years, one third of which have come in just the last two years.

Kataoka et al. of the University of Tokyo [4] published a great review on block copolymer micelles just eleven years ago. The Kataoka group is known for their imaginative work on micellar structures and this article, presently at 848 citations, is a masterful analysis of their work in the field. Another class of materials of importance in drug delivery is that of hydrogels. This very important field for drug delivery is addressed by another review from 2001 by Qiu and Park of Purdue University [5]. This fifth most cited paper has 680 citations and addresses the equally important field of environmentally sensitive hydrogels.

Panyam and Llabetsewar of the University of Nebraska at the time [6] have addressed the use of PLGA biodegradable nanoparticles for drug and gene delivery to cells and tissues, an important subject of research in the last ten years. Another contribution that addresses the biocompatibility and biodegradability of PLGA microspheres was published by Anderson and Shive of Case Western Reserve University [7] in 1997 and has more than 650 citations. The article is particularly important because it addresses the incorporation of bone-morphogenetic protein (BMP) in microspheres for important applications in tissue engineering.

In the last ten years, we have seen an explosion of the use of nanoscale structures for novel applications in drug delivery, including targeting. Two papers, by Mehnert and Mäder [8] and Svenson and Tomalia [9], discuss two areas of drug delivery that have received a number of important applications. The first paper [8] is on the use of solid–lipid nanoparticles and discusses their stability and stabilization processes by lyophilization and spray drying. The second paper [9] is an exceptionally well written review on the early days of dendrimer development, with emphasis on the classical chemical methods of dendrimer production, their conjugation with important biologicals and their applications in the field.

The use of protein PEGylation to improve protein delivery has been a subject of major interest. Harris and collaborators [10] are authorities in the field and their review paper from 2002 that has 593 citations more. It presents a complete analysis for the reasons for PEGylation, the PEG conjugation processes, and the associated results of renal filtration and biodistribution. Similarly, Williams and Barry of the University of Bradford [11] contributed an important review on penetration enhancers to improve delivery through the skin by decreasing the associated barrier resistance. This highly cited review is a lucid presentation on how to overcome some of the natural barriers of transdermal delivery. Another important subject in the use of novel delivery formulations is the identification of efflux transporters. Schinkel and Jonker of the Netherlands Cancer Institute [12] presented a detailed analysis of the ABC transporters that have a well-defined role in drug transport. The review addressed especially P-glycoproteins and multidrug resistance proteins.

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The field continues to utilize new polymers as carriers for improved delivery. The next four papers cited, with 500 or more citations, present some important drug delivery carriers. The first one by Jeong et al. of the Max Planck Institute in Mainz[23] who address pioneering work on self-assembly-based amphiphilic block copolymers. Siepmann of the University of Lille and Peppas of the University of Texas [14] contributed a mathematical modeling paper on the details of drug delivery from hydroxy propyl methylcellulose (HPMC) products. This is an important contribution because when it was published in 2001, it was the first time that "classical" tablet-based formulations of the swellable type could be analyzed by exact mathematical expressions. The third paper by Lawrence and Rees of King's College and (then) SmithKline Beecham [15] presented a thorough analysis of microemulsion-based media for drug delivery. Finally, Gombotz and Wee of Immunix Corporation [16] addressed protein release from alginate matrices, a subject that has received significant attention since its publication in 1998.

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by Torchillin of Northeastern University [26] and is the “youngest” re-
view included in this article, published in 2006 and with more than
300 citations in six years. It addresses the importance of a wide range
of nanocarriers in drug delivery, from liposomes to micelles and from
polymeric nanoparticles to nanoemulsions. The group of Langer at
MIT has contributed two important and highly cited reviews. The first
one by Gref at el. [27] addresses the use of PEG decorated nanospheres
for IV delivery, while the second by Kost and Langer [28] is one of the
early pioneering contributions in responsive delivery systems.

My review of the most cited ADDR papers closes with two impor-
tant subjects in drug delivery. The review by Lu and Low of Purdue
Medical School [30] addresses the importance of folic acid in anticancer
therapeutic agent delivery, while the review by Jain from Harvard
Medical School [30] is a thorough analysis of therapeutic delivery to
solid tumors.

We marvel at the importance of these seminal publications appearing
in ADDR. These review articles that follow in this volume in their fully-
reproduced version, celebrate the importance of the drug delivery field
in today’s pharmaceutical and medical sciences and stress the impor-
tance of our work in the improvement of health care and the lives of
our patients.

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