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## Preface

Exciting discoveries in a field of medical research can sometimes be tainted with frustration due to conflicting results within the field. Some of the ensuing controversies can be due to differing experimental conditions, by misinterpretation of the data, and, sometimes, simply the alignment of the planets. While mortals cannot remedy the latter, we can try and reach some consistency with the first – a tabulation of clear and informative protocols.

More often than not, it is the tidbits of information that one absorbs from a colleague while observing a protocol that are the crucial difference between empowering experimental success and demoralizing technical failure. I am sure everyone has his or her favourite example – ‘make sure you angle the tube at 45°, facing west, while chanting “Kumbaya” before you resuspend the cells in degassed, isotonic, pH-balanced, sterile, 5.6°C buffer.’ Sheesh. This book attempts, with a ‘Notes’ section, to highlight some of the seemingly mundane and trivial practical aspects to ensure a successful dendritic cell biology protocol.

In this edition of *Methods in Dendritic Cell Research*, I have tried to compile a list of protocols from experts in the field that cover some of the basics and some of the more complex forays into the exploration of DC development and function, both in mice and humans. This is a field that, like a vine, is ever-growing and by its nature therefore ever-entangling.

Many authors (named in parentheses below) have worked hard on the fantastic contributions presented in this book. To set the stage, we start off with an informative introduction of human DCs (Hart) and mouse DCs (Garbi), including the subtypes, their development, and their function.

The methods chapters are then split into human and mouse (rodent) protocols. Described in the human section are protocols for the isolation of blood DC subtypes (Radford), primary skin Langerhans cells (Geijtenbeek or Stoitzner), as well as the generation of gene-manipulated human DCs (Schotte) or DCs in humanized mice (Le Grand). From a more clinically relevant perspective, we then also discover methods to generate DCs that can induce different Th responses (Kalinski), tolerize T cells (Thomson), as well as a protocol hoped to be a ‘standard’ for comparison between different trials using patient-derived DCs (Erdmann).

In the mouse section, we see methods for the generation of DCs *in vitro* (Naik and O’Keeffe) with more recent protocols in the isolation (Onai) or generation (Naik) of DC precursors. *Ex vivo* isolation of DCs or their precursors is not forgotten. There is an extended protocol for the isolation of primary immature DCs from several organs by its inventor (Vremec) and other protocols for the isolation of DC precursors from the thymus (Wu), intestinal rat DCs (MacPherson), lung DCs (Stumbles), and cutaneous DCs (Merad or Stoitzner). Protocols of DC function also have a home here including T-cell activation assays with low numbers of DCs and high sensitivity (Belz), of DC migration and location properties based on labelling and depletion (Randolph) or parabiosis (Waskow), their phagosomal properties (Amigorena), regulatory T-cell (T<sub>reg</sub>) generation (Wang), and the use of the CD11c-DTR model of DC depletion (Jung).

Finally, we have several detailed models on the identification and functional testing of DCs in disease. These include asthma (Lambrecht), virus infection (Belz), and bacterial infection (Busch).

This methods book hopes to become a bench-side handbook for both beginners and experts in the field of DC research. It is hoped to be a long-term reference for some of the most popular methods in the field by those who lead the field. Hopefully, it will inspire new forays into the study of DC biology – independent of the alignment of the planets.

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