Chair's introduction

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I attended my first Ciba Foundation Symposium in this room in 1972. The symposium topic was cell locomotion, which was one of the most exciting areas in cell biology at that time. The most exciting and unique aspect of that symposium was the active participation by all those in attendance, not just those invited to speak. This great tradition still holds true.

I'd like to introduce the main subject of this meeting by telling you a bit about nuclear structure and how our views of it have changed over the years. Drawings of the interphase nucleus derived from direct observations during the bright-field microscopic era in the 1920s, typically showed only a spherical structure at the cell centre containing chromatin. By the early 1970s, textbook images of the nucleus, using the higher resolution afforded by transmission electron microscopy, showed that the nucleoplasm was filled with relatively amorphous structures (mainly chromatin), a nucleolus, the nuclear envelope membranes, the nuclear lamina and nuclear pore complexes. More recently, the use of high-resolution confocal imaging has shown that many of the 'amorphous' structures seen by electron microscopy are involved in splicing and gene expression.

During this meeting we will discuss the nuclear envelope/lamina complex and we will have a look at how chromatin interacts with the nuclear lamins, the major components of the lamina. We will also consider, in detail, the multitude of interesting proteins known to be associated with the inner nuclear envelope membrane, many of which are lamin binding partners. In contrast, the outer membrane of the nuclear envelope has been grossly neglected, as it is generally assumed simply to be an extension of the endoplasmic reticulum. I would like us to think about this latter point during the meeting because it is quite possible and even likely that there are specific proteins associated with the outer nuclear membrane which act as receptors for cytoplasmic components or which are involved in the molecular cross talk between the outer and inner nuclear envelope membranes. We will also discuss the finding that lamins are not restricted to the lamina subjacent to the inner nuclear envelope membrane. They are found elsewhere in the nucleus, possibly forming an extensive nucleoskeletal network. The existence of such a network may ultimately help to explain many of

the defects caused by the numerous lamin mutations, collectively known as the 'laminopathies', which we will learn more about this week. We will also hear a bit about studies of cytoskeletal intermediate filaments (IFs), which are closely related to the lamins, and their roles in various types of diseases.

By the end of this meeting we should be in a position to understand some of the specific functions of, and interactions amongst, the many nuclear proteins to be discussed. Hopefully our discussions will carry us beyond the definition of protein–protein interactions based only on circumstantial evidence such as co-immunoprecipitation. This is critically important as we move forward in developing a comprehensive mechanistic understanding of how the nucleus, and in particular the nuclear lamins, regulate and orchestrate a wide array of remarkably complex functions.