

P006 An Agent-Based Model of the NF- κ B Signalling Pathway
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Nuclear factor κ B (NF- κ B) is a transcription factor induced through cellular signal transduction, and is central to inflammatory and immune responses. Modelling NF- κ B pathway activation is essential in order to gain a better understanding of how it can be controlled, helping to overcome the practical limitations of biological experiments. Methods previously used to model signalling pathways, such as reaction kinetics and π -calculus, consider pathways as being nothing more than the chemicals involved. Whilst this is appropriate in many circumstances, a more realistic description of the cell is necessary to understand the dynamics of the NF- κ B pathway, where cell structure and mechanical stimulation play a vital role. An agent-based (also known as 'individual-based') modelling approach is used to create a more realistic framework with which to model the intracellular NF- κ B signalling pathway, incorporating explicit spatial dimensions and allowing the modelling of low numbers of non-uniformly distributed molecules. This is verified by experimental results from single cell analysis.