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SIgN Immunology Seminar

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Ultrasensitivity and oscillation of the MAPK pathway are products of compartmentalisation and influenced by the mode of pathway stimulation"

Host
Dr Wong Siew Cheng
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Date
Friday 12 September 2014

Time
3pm – 4pm

Venue
SIgN Seminar Room
Immunos Building
Level 4
Biopolis

The MAPK pathways are instrumental to various cellular responses, ranging from differentiation, proliferation and apoptosis. The regulation of these pathways is complex as it involves intra- and inter-pathway crosstalk, many feedback mechanisms and compartmentalisation. Nonetheless, MAPK signalling has a high level of fidelity and efficacy when transducing the activating signal. The study presented here looked at the effects of multi-compartmentalisation and mode of stimulation of the MAPK cascade on the dynamics of MAPK activation using an agent based computation model (ABM). This model reveals that multi-compartmentalisation might be essential for the development of rapid responses transmitted by the MAPK pathway. Furthermore, we suggest that the mode of activation/excitation at the level of the MAPKK could drive the emergence of oscillatory behaviour. The model combines the spatial and temporal regulatory mechanisms influencing the cascade and further supports the hypothesis that these may have a major impact on signal outcome and the MAPK dynamics.