

Seminar in Life Science

“Plasma membrane damage-dependent cellular senescence”

July 13th (wed) 17:30-18:30

Seminar Room 103

Scientific Frontier Laboratory, Medical School Campus

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Abstract: Cellular wound healing, the repair of local plasma membrane damage, occurs frequently in nature. To uncover the underlying mechanisms of cellular wound healing, we performed a comprehensive analysis using mutants covering the whole budding yeast genome. Unexpectedly, our screening uncovered a strong genetic link between cellular wound healing and replicative senescence. Similar to aged plasma membrane, the lipid composition was altered at the damage site after wound healing (the “scar” formation). Interestingly, this scar was formed after every cytokinesis as well. Genetic removal of the scar extended the replicative lifespan, suggesting that plasma membrane damage-dependent cellular senescence is mediated, at least in part, by scar formation. Strikingly, plasma membrane-dependent cellular senescence was conserved to human cells. We propose that the scar may function as ‘an aging clock’ counting down the number of cytokinesis and to initiate cellular senescence at a pre-defined time, as telomeres do so in chromosome replication.

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