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From novel parasite invasion processes, to deviant chromatin organisation, Alveolate eukaryotes provide new inroads in cell biology

Thursday 30 May 2013, 1pm

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Slatyer Seminar Room, Building no. 46, Linnaeus Rd, ANU



Toxoplasma gondii cells displaying novel apical ring protein RNG2

Infrakingdom Alveolata comprises three important eukaryotic groups: apicomplexan parasites, dinoflagellate algae and ciliate micropredators. The relationship of these phyla is strongly supported by gene phylogenies, and yet remarkable diversity of lifestyle, cell organisation, and genetic systems is seen throughout its members. Alveolata, thus, provides fertile territory for exploring eukaryotic cell evolution and diversification. We are examining both conserved and divergent characters found within Alveolata to better understand the cell and molecular biology of its members. A common ultrastructural feature of Alveolata is a cell pellicle comprising flattened membrane sacks beneath the plasma membrane and supported by a proteinaceous membrane skeleton. We have discovered that many novel proteins are common to this alveolate structure. By cataloguing these pellicle proteins in a model ciliate we have identified numerous new proteins in apicomplexan cell pellicles. Functional investigations of these proteins in *Toxoplasma gondii* are illuminating novel processes in parasite

invasion and replication. In dinoflagellates, on the other hand, highly divergent nuclei have long been observed but poorly understood. We have shown that soon after divergence from apicomplexans, histone function was practically abandoned, and a novel viral protein became the dominant nucleoprotein. Dinoflagellates, therefore, present a challenge to the dogma of a histone-based nucleus, and a new perspective on chromatin structure.

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