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Staphylococcus aureus induces DNA damage in host cell

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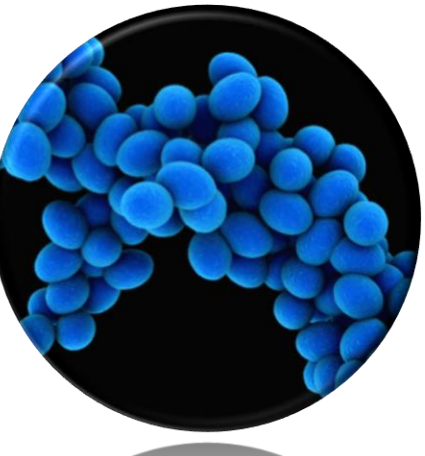
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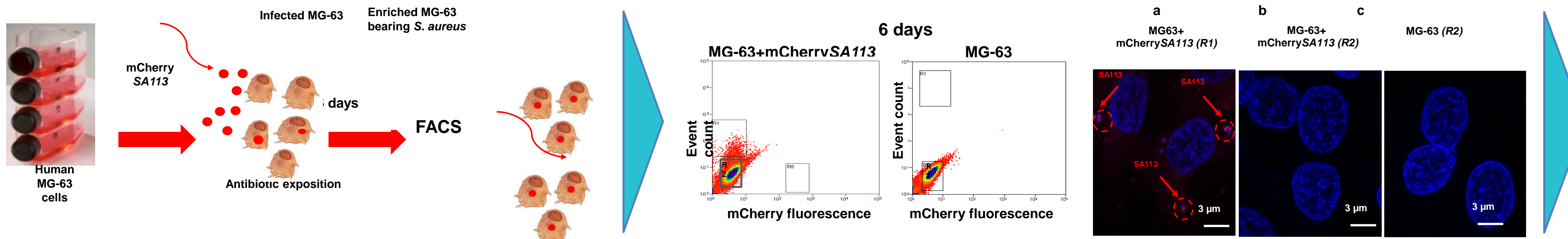


CONTEXT

Eukaryotic cells are permanently exposed to environmental and endogenous factors that induce DNA damage, thus affecting genomic integrity. The host cells counteract the consequences of lesions by DNA damage response and checkpoint systems that repair DNA structure or trigger cell death when DNA is irredeemably damaged. *S. aureus*, a highly versatile gram-positive bacterium, can cause a multitude of human diseases ranging from mild superficial skin to life-threatening disseminated infections. *S. aureus* is one of the most prevalent pathogen that cause chronic ruminant mastitis. Chronic *S. aureus* infection is likely to be associated with the internalization of the pathogen by host cells, where bacteria are protected from host defenses. We aimed to investigate whether *S. aureus* can compromise host genomic integrity.

EXPERIMENT DESIGN

DEVELOPMENT OF AN INFECTION MODEL TO ISOLATE SOLELY CELLS CONTAINING INTERNALIZED *S. aureus*

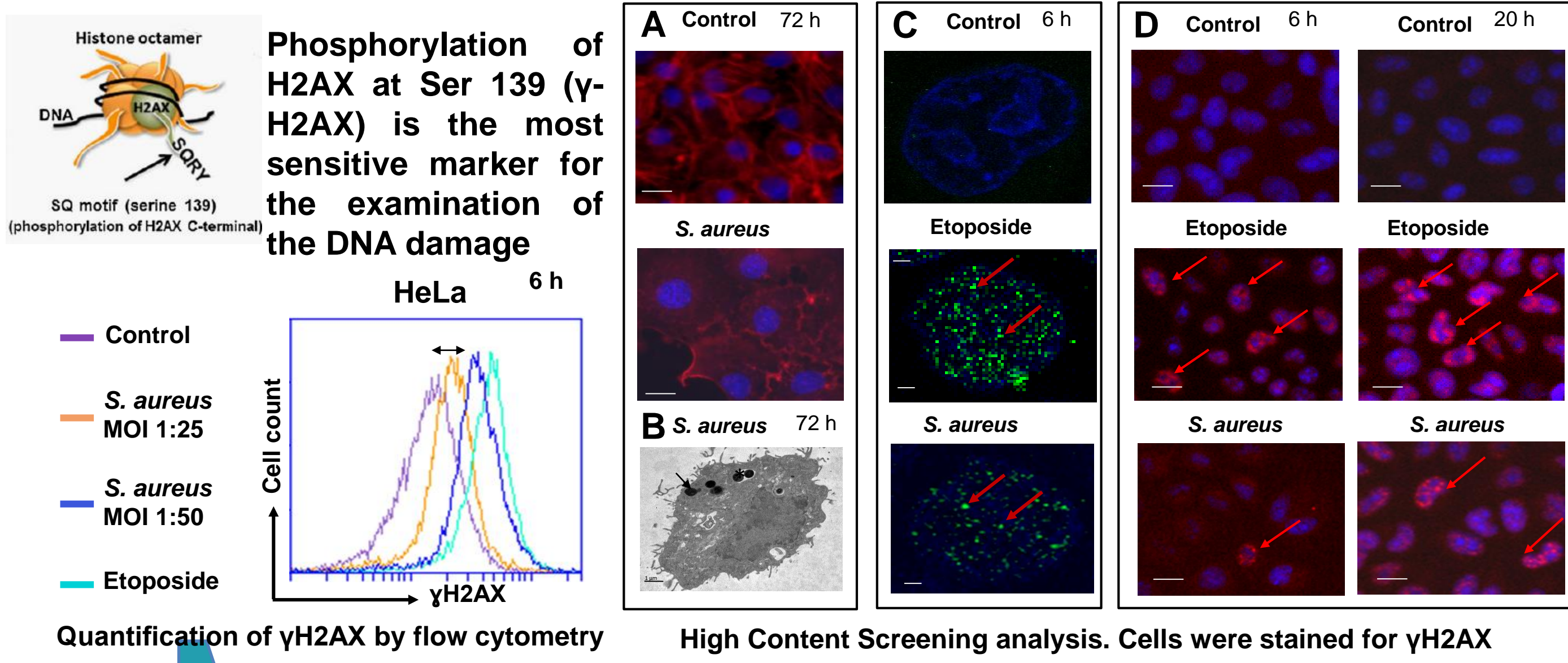


RNA sequencing of hosting intracellular *S. aureus* cells or non-infected cells.

RESULTS

1. *S. aureus* INDUCES DNA DAMAGE IN HOST CELLS

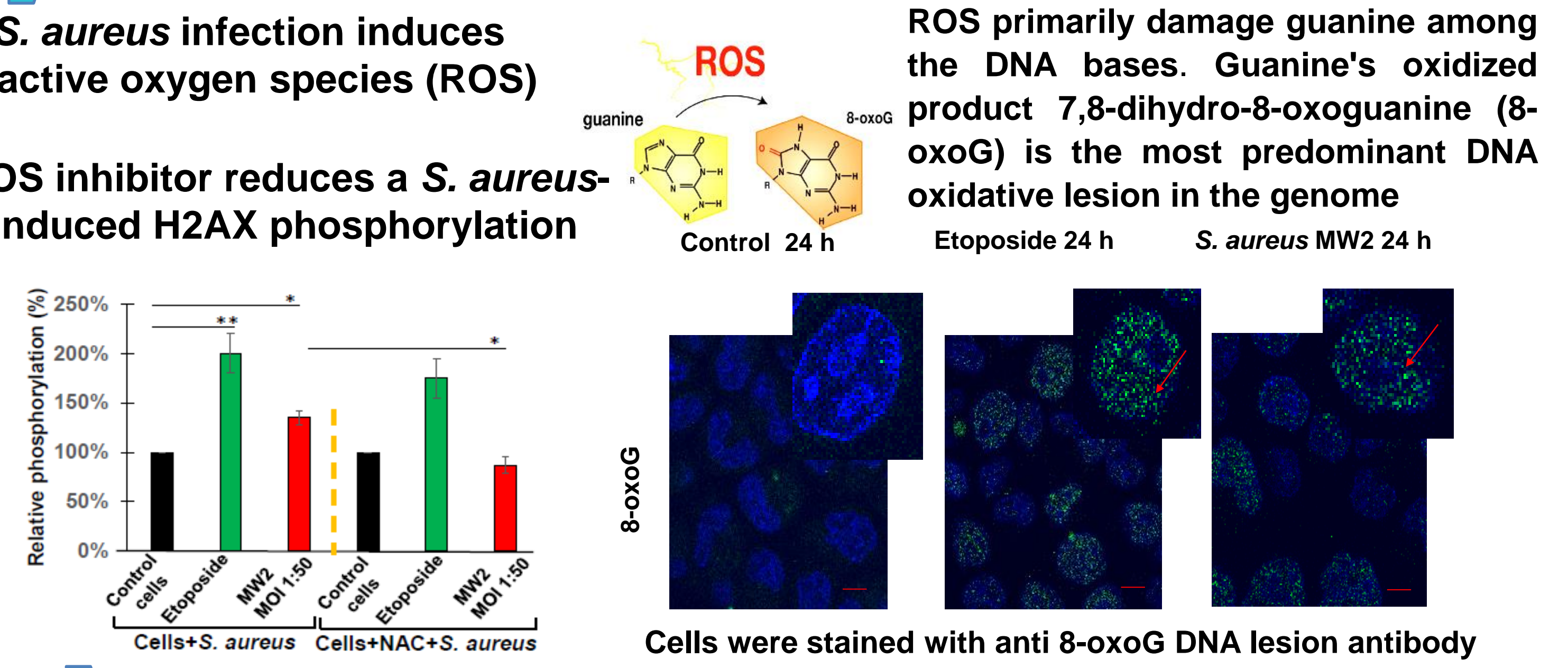
S. aureus increases γ H2AX phosphorylation



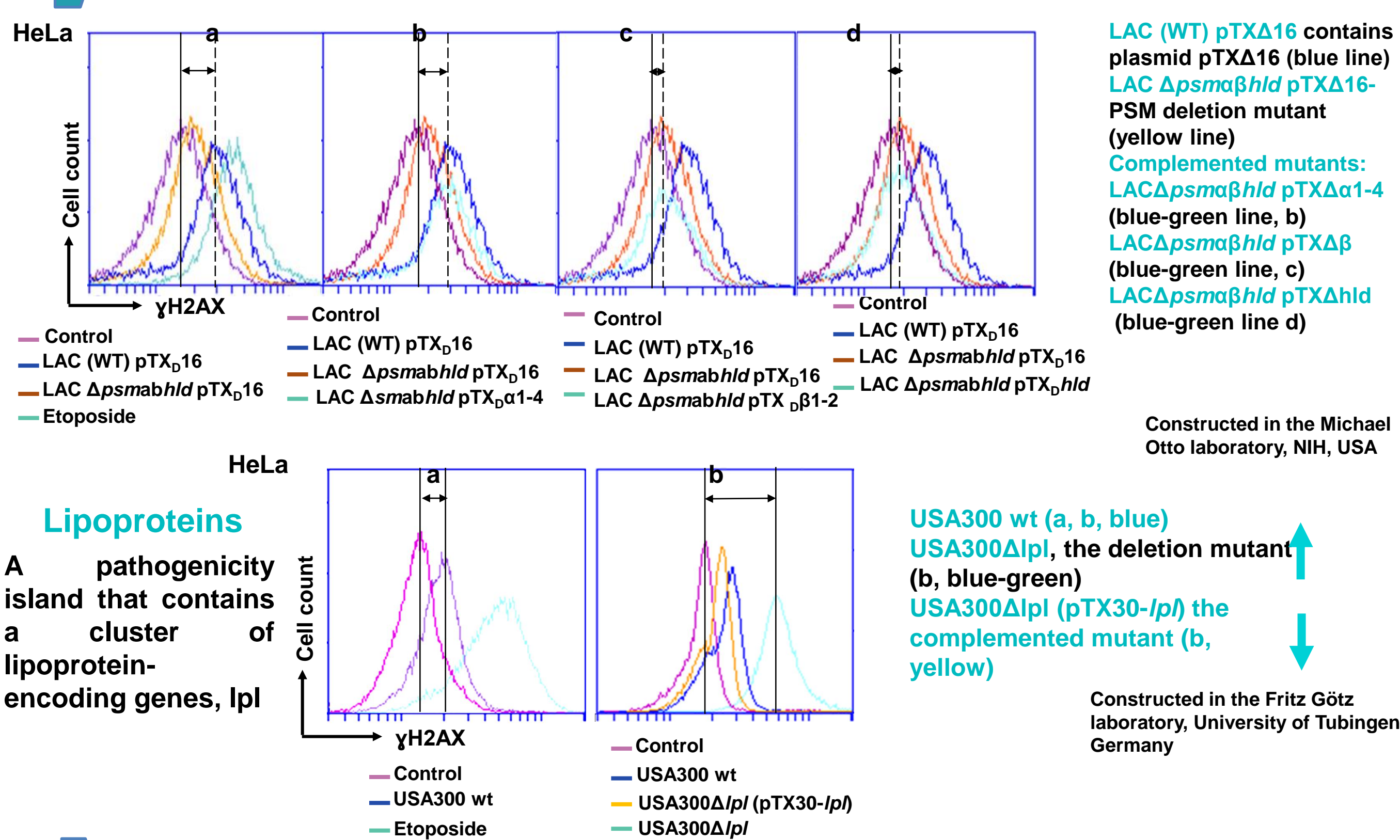
2. *S. aureus* INDUCES 8-OXOG DNA LESIONS IN THE HOST CELLS

S. aureus infection induces reactive oxygen species (ROS)

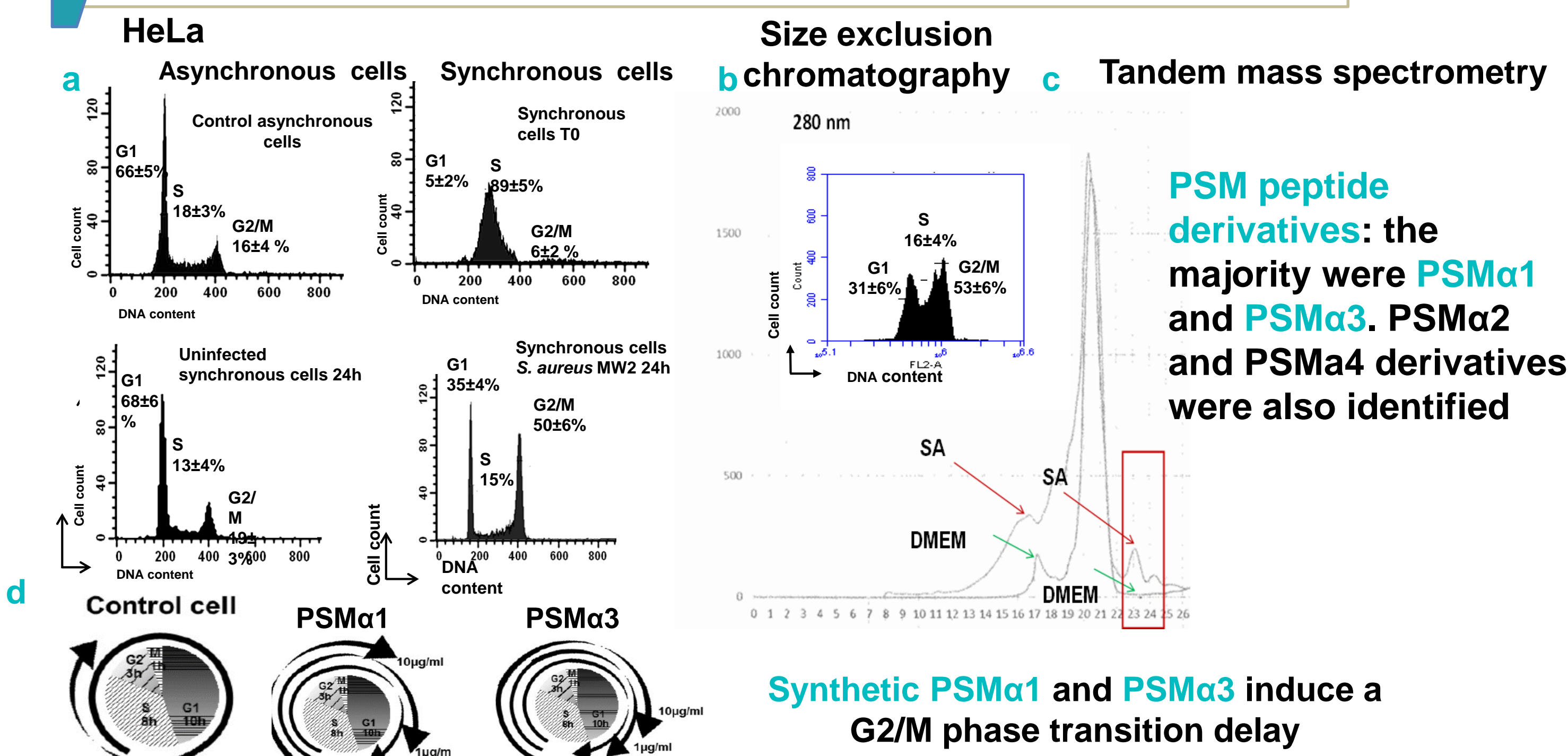
ROS inhibitor reduces a *S. aureus*-induced H2AX phosphorylation



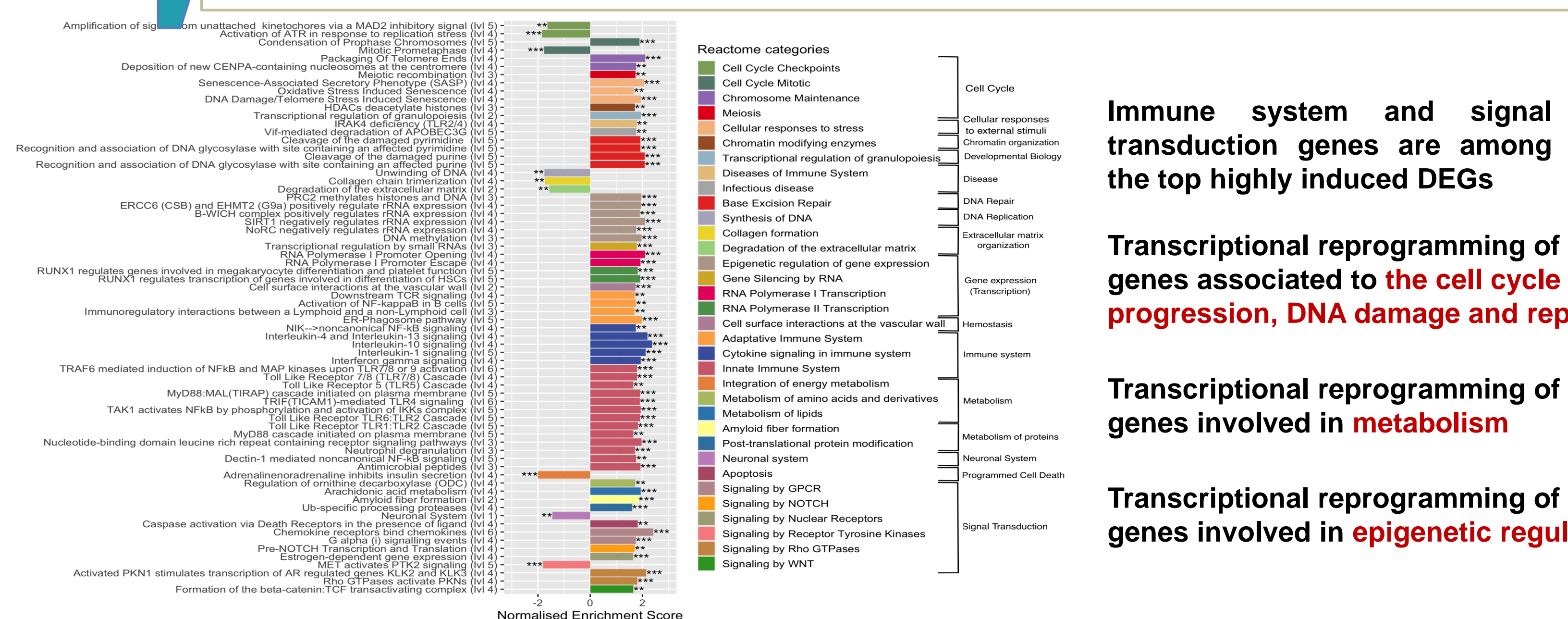
3. *S. aureus* PHENOL-SOLUBLES MODULINES PSM α 1-4 INDUCE, WHILE LPLs DAMPEN HOST DNA DAMAGE



4. *S. aureus* INDUCED A G2/M PHASE TRANSITION DELAY



5. GENE-SET ENRICHMENT ANALYSIS USING REACTOME DATABASE



CONCLUSION

Model of the immune, signal transduction, metabolic and epigenetic dysregulated signatures induced by long-term *S. aureus* infection

