SPRING 2023

Biochemistry and Molecular Biology Brown Bag Series

Alex Carpenter

Postdoctoral Researcher

"DNA Containing UVB photoproducts is released from keratinocytes after UVB exposure"

Tuesday, March 7, 2023

11:00 AM

Location 135 Oelman Hall

Lab: Mike Kemp, Ph.D.

Boonshoft School of Medicine
WRIGHT STATE UNIVERSITY

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https://science-math.wright.edu/biochemistry-and-molecular-biology

Abstract:

DNA Containing UVB photoproducts is released from keratinocytes after UVB exposure

Exposure to UVB wavelengths of sunlight induces the formation of photoproducts in DNA that are potentially mutagenic or lethal if not repaired properly. UVB photoproducts such as cyclobutane pyrimidine dimers (CPDs) can be removed from the genome via nucleotide excision repair (NER) and can lead to apoptosis and other forms of cell death. However, the ultimate fate of the UVB-damaged DNA is not well understood. Interestingly, recent work in the field of extracellular particles has indicated the presence of DNA and chromosomal proteins associated with small extracellular vesicles (SEVs). Furthermore, we have discovered CPDs in DNA associated with SEVs secreted from UVB-irradiated keratinocytes. I will present our work showing stimulus dependent release of CPDs in keratinocyte-derived extracellular vesicles that is modulated by caspase inhibitors. Parallel analyses were performed in cultured keratinocytes and in skin explants. Lastly, we have found that SEV-associated CPDs are taken up by adjacent cells. Recent work has been exploring the impact that uptake of damaged DNA in SEVs has on DNA damage response and cytosolic DNA sensing pathways. Improved understanding of release of damaged DNA in EVs could lead to improved clinical tools for understanding DNA damage-response status after exposure to environmental or therapeutic genotoxin treatments.