# The effect of the E7 oncoprotein and PKM2 on the growth of HPV-induced cervical cancer

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## Background

- There are both low-risk (benign wart-causing) and high-risk (cancer-causing) HPVs.
- In high-risk types, it has been found that the proteins E6 and E7 are produced at a much higher rate.
- E7 from the high-risk type HPV16 has been found to interact with the M2 form of the metabolic enzyme pyruvate kinase (PKM2).
- This project analyzes the mechanism by which E7 as well as PKM2 interact to encourage cancerous growth by analyzing the activation of three transcription factors found to be related to other forms of cancerous growth.
- Understanding this growth is a step towards developing a treatment that could decrease or fully inhibit the growth of HPV-induced cervical cancer.

## Methodology

- To determine the activation of these transcription factors, several cell lines were cultured:
  - C33A: HPV-negative parent cell line
  - C33A mock: C33A cells transformed with an empty vector
  - C33A E7: C33A cells transformed with a vector containing HPV16 E7
  - C33A mock and E7 PKM2 knockout: the previous two cell lines were made to not express PKM2
  - C33A mock and E7 scramble: control for the PKM2 knockout cell line
  - SiHa: HPV-positive parent cell line
- These cells underwent western blotting analysis for the inactivated (YAP, STAT3, and actin) and activated forms (YAP, phospho-STAT3, and Beta-catenin) of three transcription factors.

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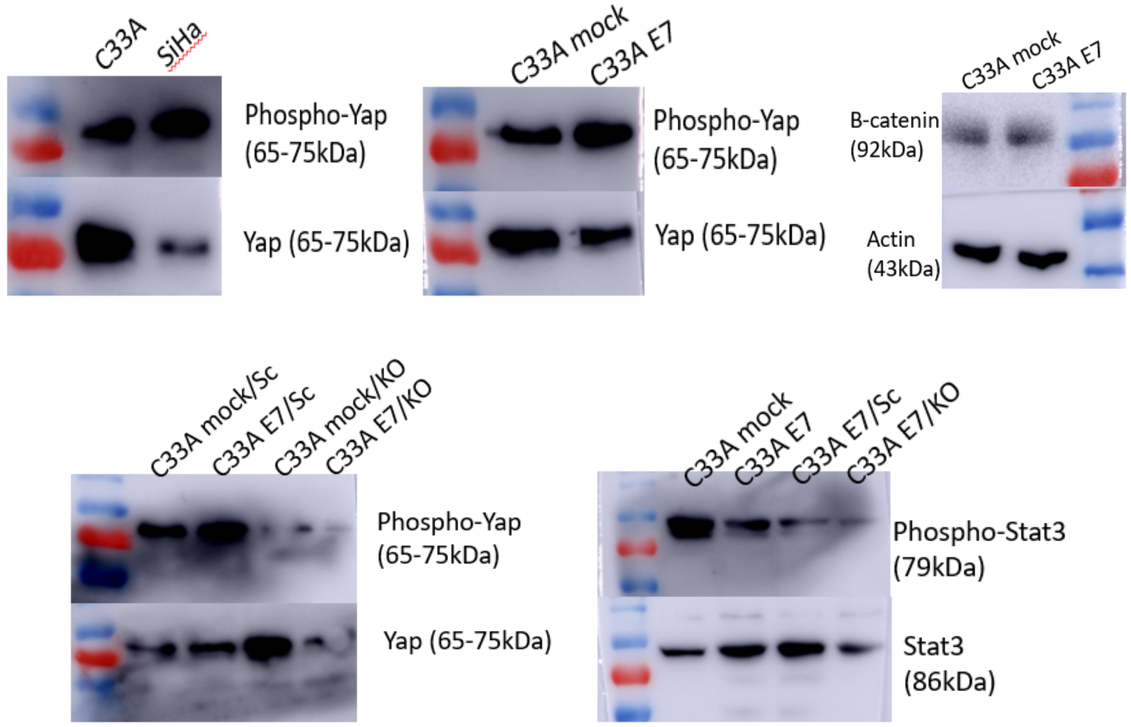
## Results




## Conclusions

- The presence of E7 increases activation of YAP.
- The absence of PKM2 decreases the activation of STAT3 and YAP.
- Beta-catenin was not shown to be involved in the growth of HPV-induced cervical cancer, while YAP was shown to be significantly activated in this growth process. The role of STAT3 is inconclusive at this point.
- As a next step, an immunofluorescence assay will be done to ascertain if the transcription factors have localized to the nucleus as expected.

## References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