Cite this as: Shi-yuan HONG, 2017. DNA damage response is hijacked by human papillomaviruses to complete their life cycle. *Journal of Zhejiang University-Science B (Biomedicine & Biotechnology)*, 18(3):215-232. http://dx.doi.org/10.1631/jzus.B1600306

DNA damage response is hijacked by human papillomaviruses to complete their life cycle

Key words: Papillomaviruses, DNA damage, Amplification, Differentiation, ATM/CHK2, ATR/CHK1, STAT-5

Research Summary

This review mainly focused on the roles of DNA damage response in human papillomaviruses life cycle:

- **Regulation of HPV genome mainentance**
- **Regulation of HPV genome amplification**
- **Crosslink between STAT-5 signaling and the DNA damage response**

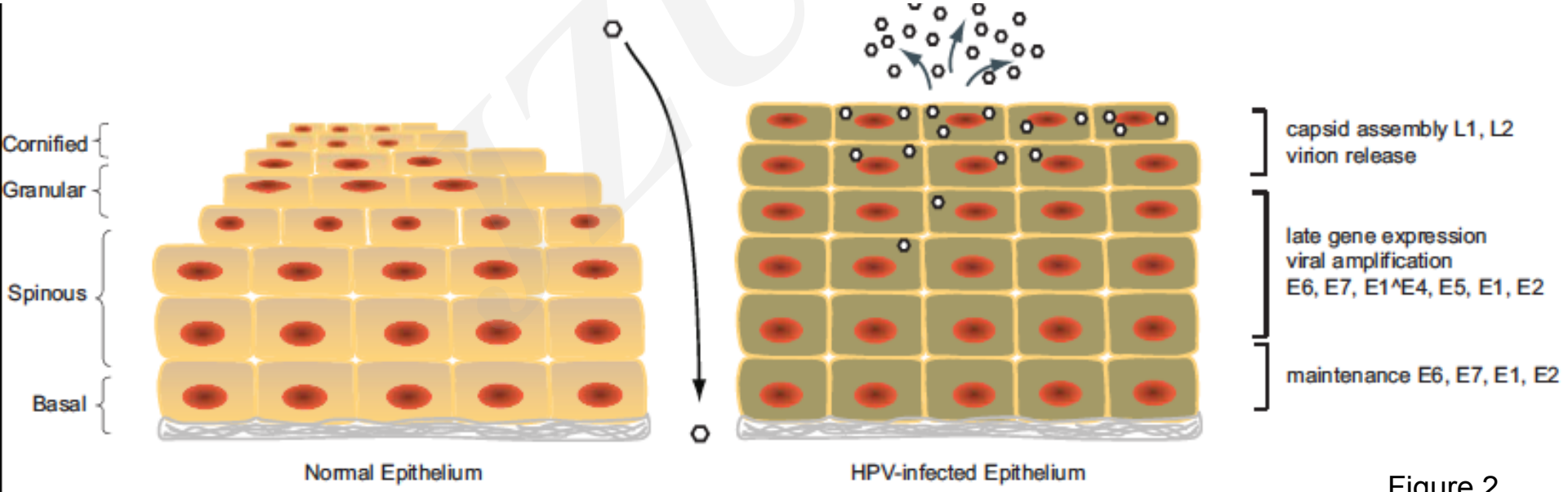


Figure 2

Innovation points

- **Introduction** of the DNA damage response and its association with HPV life cycle

- **Summary** of the most updated roles of the DNA damage response in HPV genome maintenance, genome amplification, and late gene expression.

- **Emphasis** of STAT-5 immune regulator crosstalk with the ATM and ATR DNA damage response pathways.

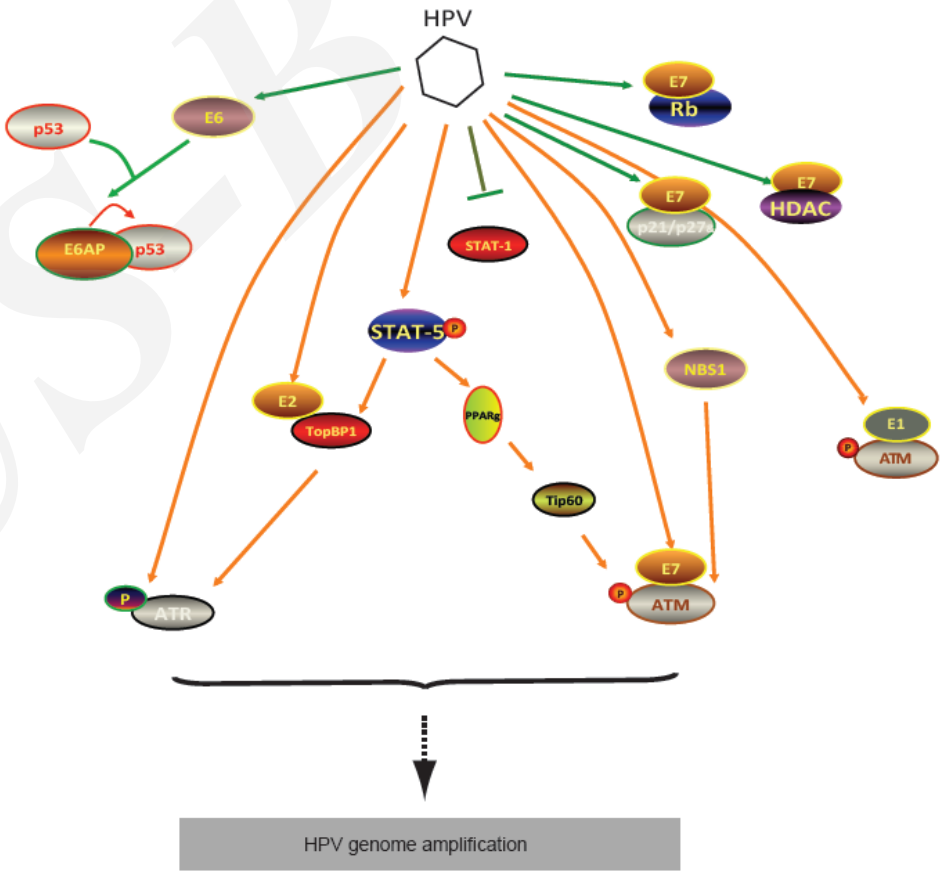


Figure 3

Innovation points

The DNA damage response is a protection mechanism to maintain genome stability. However, HPVs utilize this response to facilitate their replication. Moreover, HPVs promote STAT-5, an immune transcription factor, to regulate the ATM/ATR pathways to complete their life cycle.

Figure 1 | The signaling pathways of ATM and ATR.

Figure 2 | The life cycle of human papillomaviruses.

Figure 3 | STAT-5-dependent activation of ATM and ATR pathways is required for HPV genome amplification.

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