

# The Role of Synaptonemal Complex Proteins in Cancer

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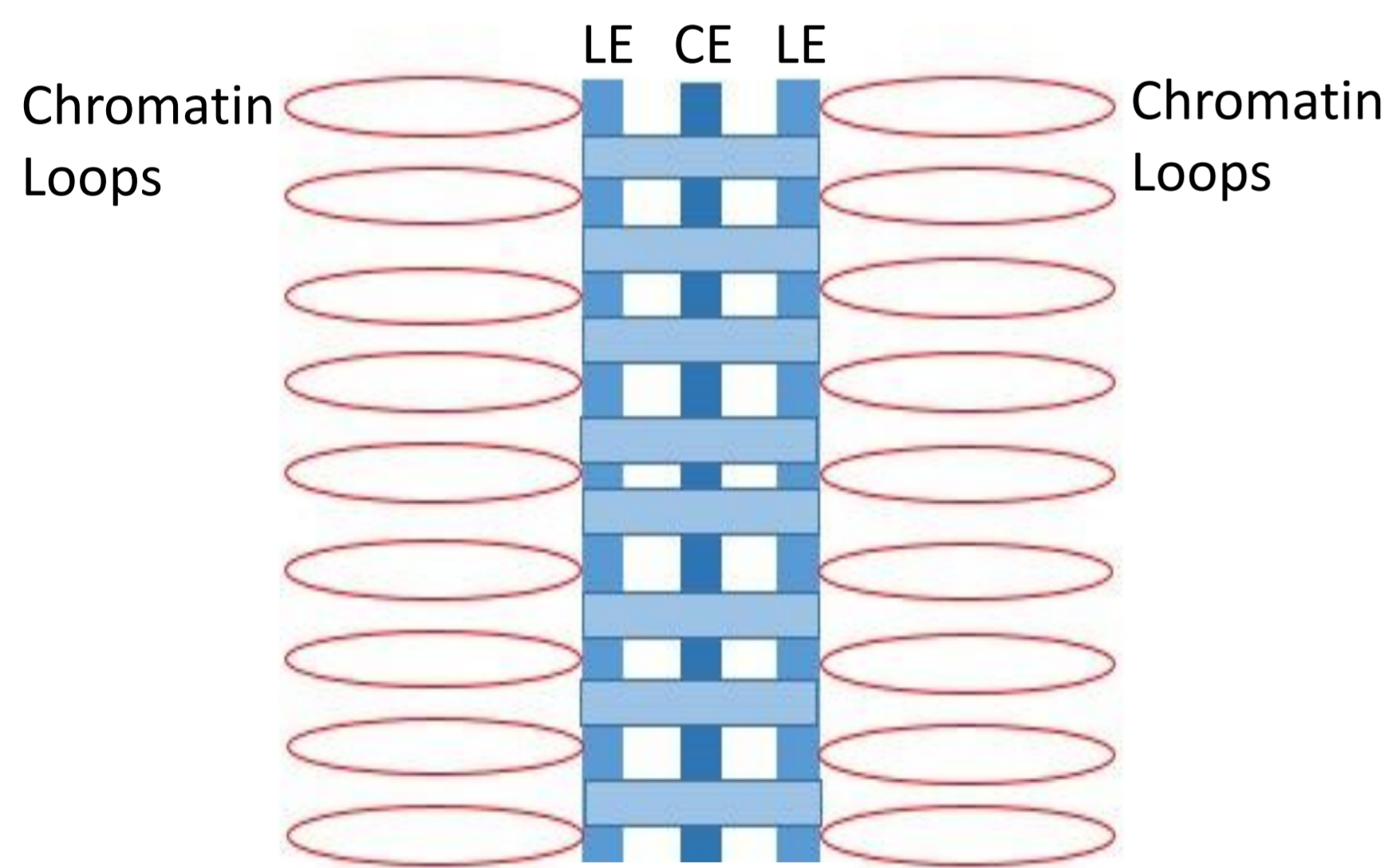
## Aims

To investigate the relationship between genetic changes in synaptonemal complex (SC) genes and survival of breast cancer patients.

## Introduction

Meiosis is a type of cell division that reduces the number of genetic material in the parent cell by half and produces four sperm cells or one egg. During meiosis, the synaptonemal complex (SC) acts as a zipper that holds the similar pairs of dividing genetic material together. (1)

3 of publicly available datasets from cBioPortal database are analysed. The 8 components of SC genes are queried because SC proteins have never been explored in the context of cancer research. Breast cancer is chosen because it is the third most common cause of cancer deaths in UK (2014). The hypothesis is "Are genetic changes in SC genes related to breast cancer?"

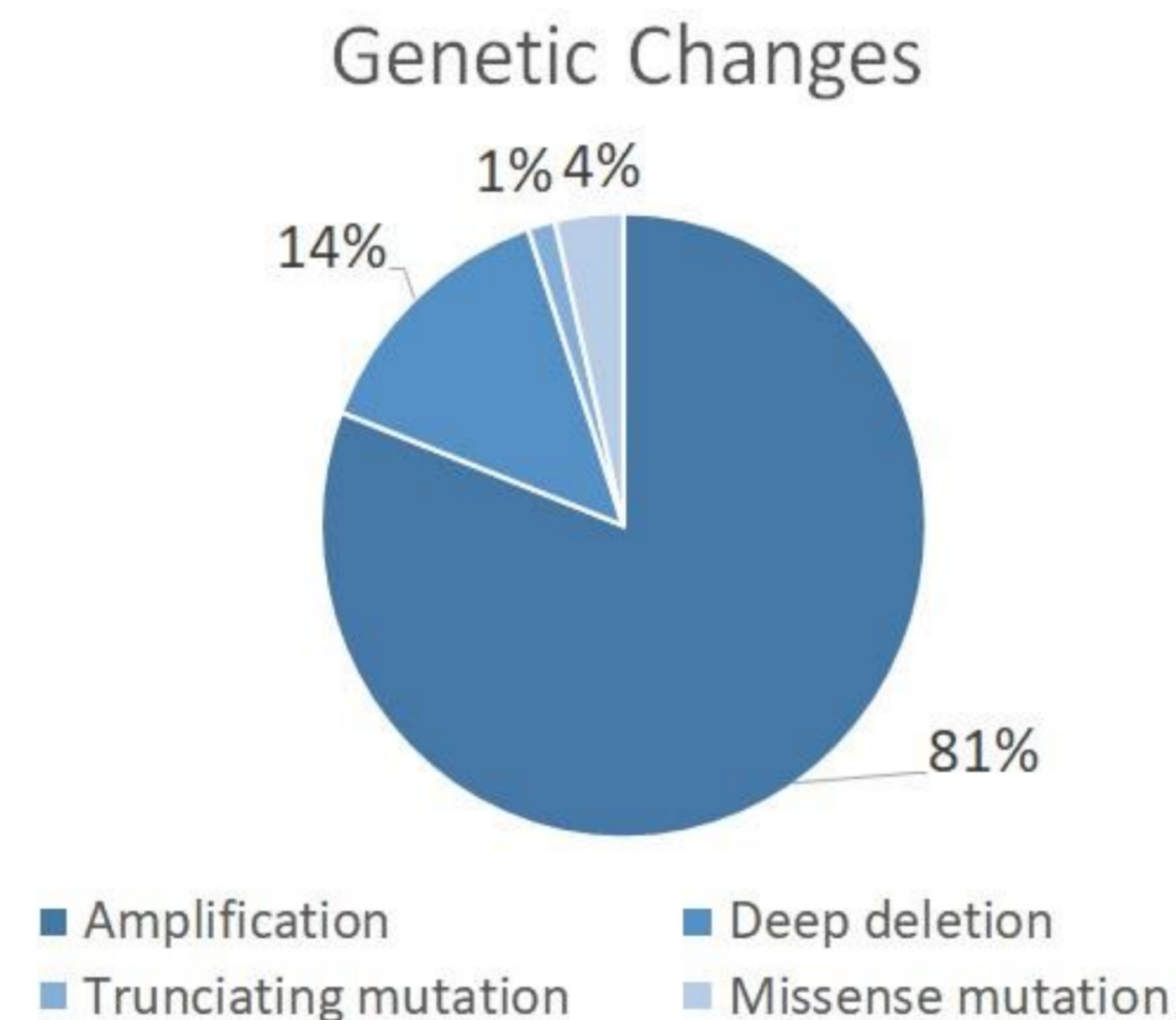


■ = SYCP1 Transverse Filament  
 LE = Lateral Element (~100nm) CE = Central Element  
 SYCP2, SYCP3 SYCE 1-3, TEX12

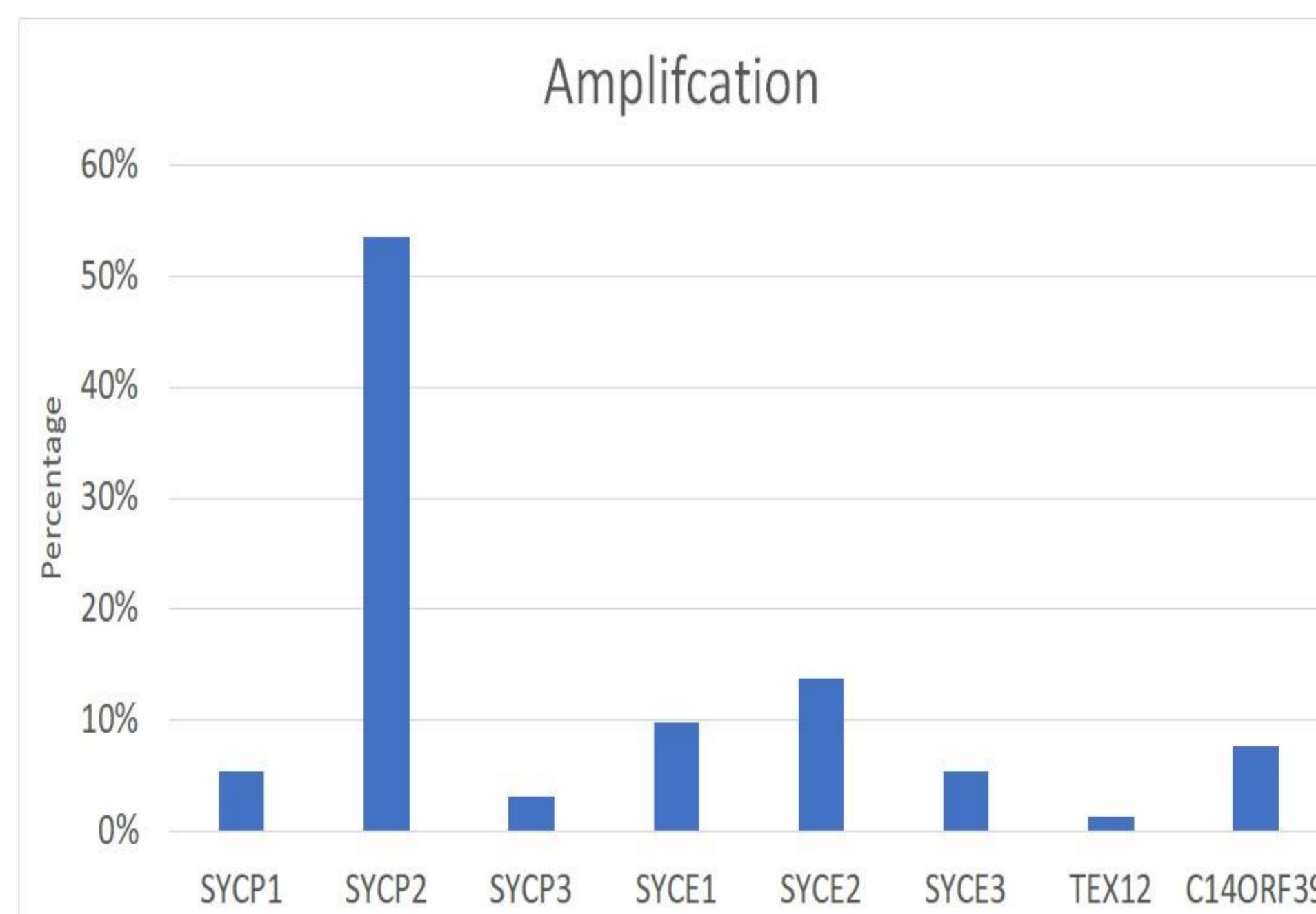
Figure 1 – SC holds the similar pairs of dividing genetic materials together.

## Results

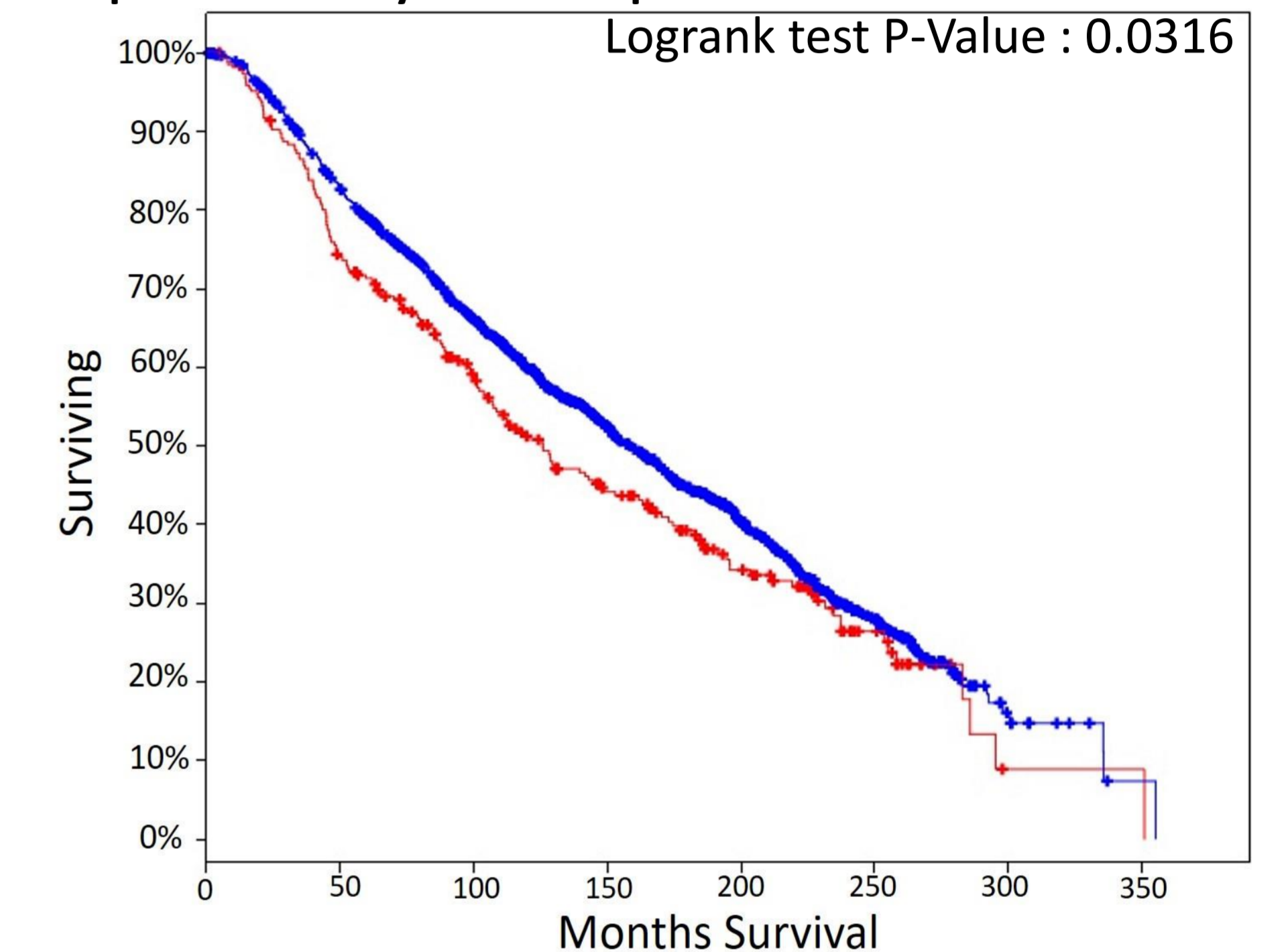
•The genetic change in the 8 components of SC gene were analysed. Amplification (81%) is the most common genetic change among the breast cancer patients from 3 datasets, which are "METABRIC, Nature 2012 & Nat Commun 2016", "France, 2016" and "TCGA, Cell 2015"



•From the 3 cohorts of breast cancer patients selected, SYCP2 has the highest genetic change in amplification (53%) compared to the other queried SC genes.



• In "METABRIC, NATURE 2012 & NAT COMMUN 2016" dataset, patients without changes in all the queried genes have longer median months survival than patients with changes in all the queried SC genes, predominantly SYCP2 amplification.



■ Cases without changes in all the queried SC genes  
 ■ Cases with changes in all the queried SC genes, predominantly SYCP2 amplification

## Conclusion

- The genetic changes and survival analysis of SC suggest that genetic changes in SC genes are related to breast cancer, predominantly SYCP2 amplification.
- The level of protein expression of the SC genes should be further analysed to have a better understanding about the role of SC in cancer

## Acknowledgement

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## References

1) Syrjänen JL, Pellegrini L, Davies OR. A molecular model for the role of SYCP3 in meiotic chromosome organisation. 2014 [cited 2017Aug18]. Available from: <https://lens.elifesciences.org/02963/>