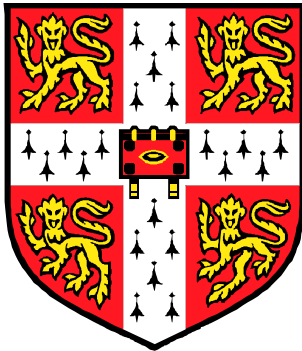


# Molecular genetics of manuscripts

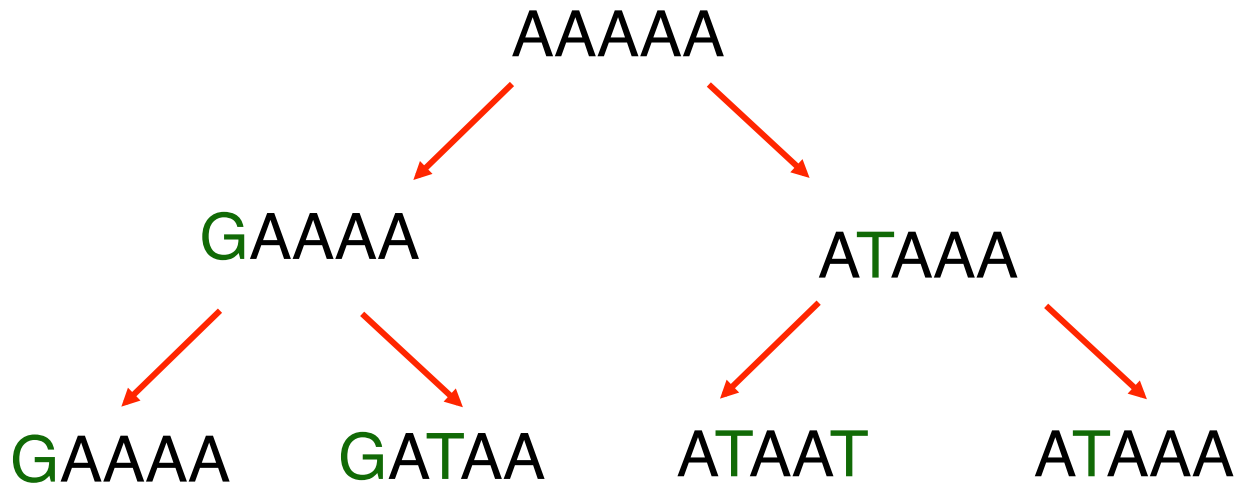
Christopher Howe & Heather Windram  
([c.j.howe@bioc.cam.ac.uk](mailto:c.j.howe@bioc.cam.ac.uk))



Dept of Biochemistry  
University of Cambridge



As species get separated in evolution, differences accumulate between their DNA sequences.



We use these differences between the equivalent gene in a set of species to work out their evolutionary relationship.

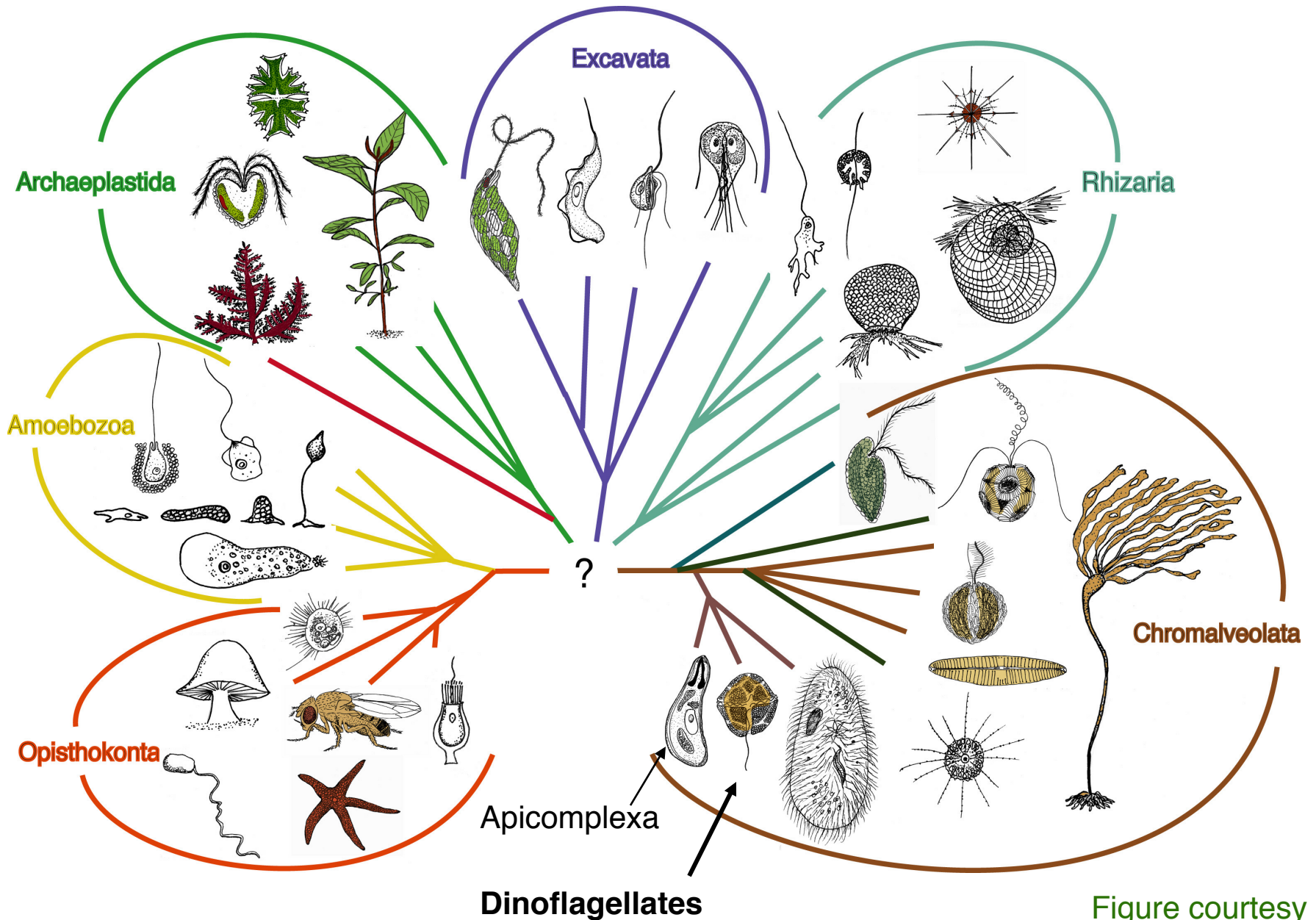
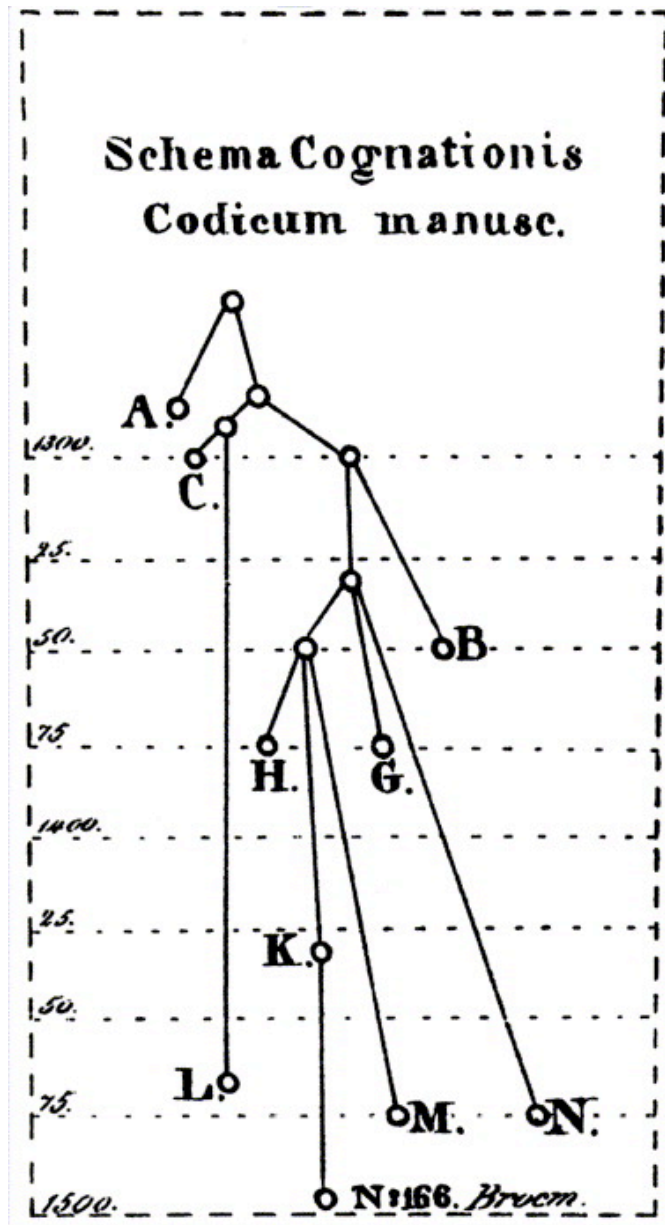


Figure courtesy of Giselle Walker



The first Stemma?

Collin & Schlyter 1827  
Swedish legal texts



Karl Lachmann 1793-1851

Collin & Schlyter 1827

Ashmole 59  
Digby 186  
BL Ad 31042  
Lansd. 762  
de Worde  
R. Wyer

Buryed at Caane thus seythe the Croniculer  
Beryed att Cane & thus says the cronyclere  
Beryed at caene so seyth the cronyclere  
Buried at cane this saith the croneclere  
And is buried at Cane as the Cronycle sayes  
And buryed at cane as the Cronycle sayes

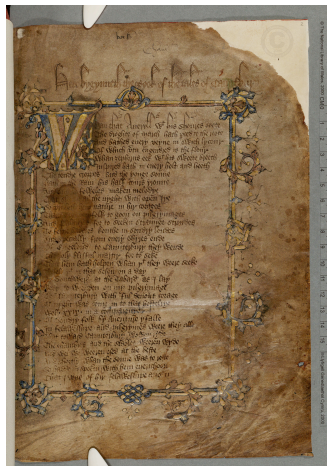
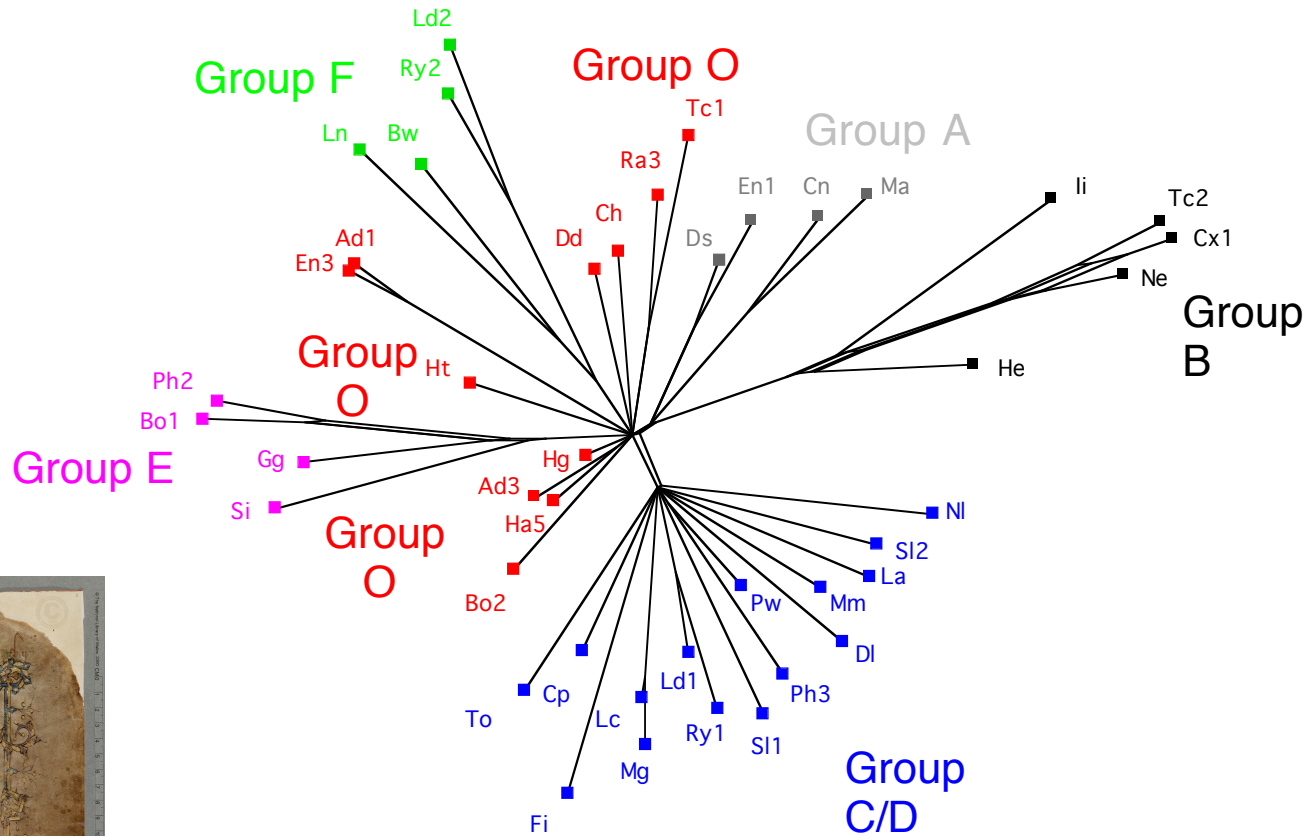
**Ashmole 59**  
**Digby 186**  
**BL Ad 31042**  
**Lansd. 762**  
**de Worde**  
**R. Wyer**

**AAAAAAAAAAAA**  
**AAAAACA AAAA**  
**AAAAACA AAAA**  
**AAAAAGAAAA**  
**CCAAAATGACA**  
**CAAAAATGACA**



William Rufus  
Kings of England II  
(British Library, Harley  
4205 f.1v copyright)

# SplitsTree analysis of the Prologue to the *Wife of Bath's Tale*

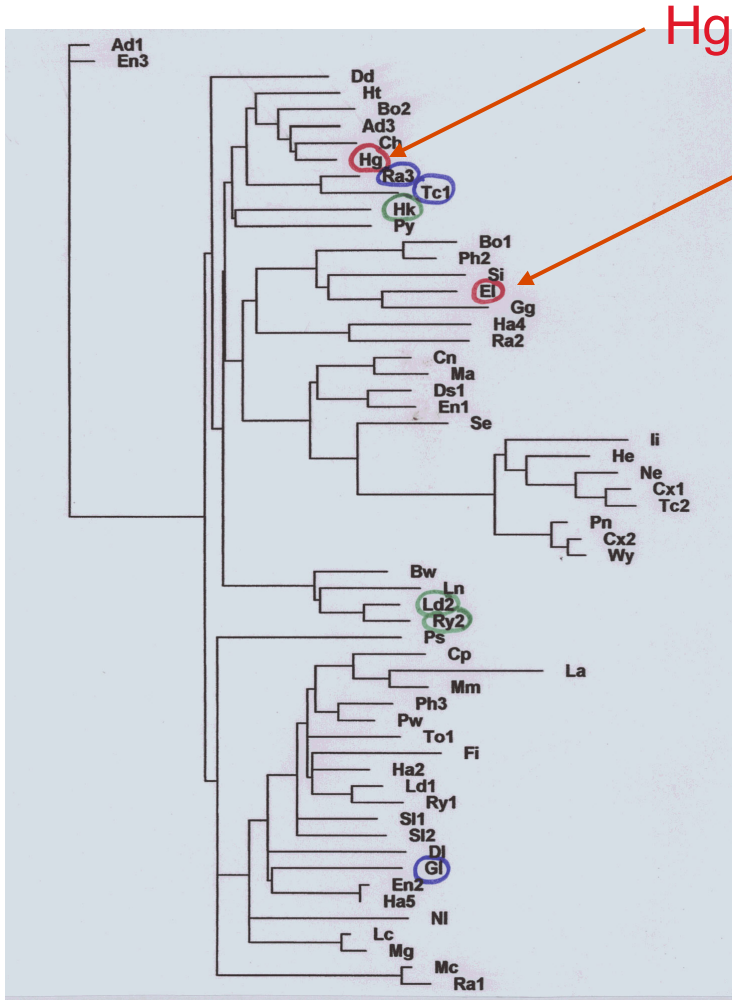


'Hengwrt Chaucer'

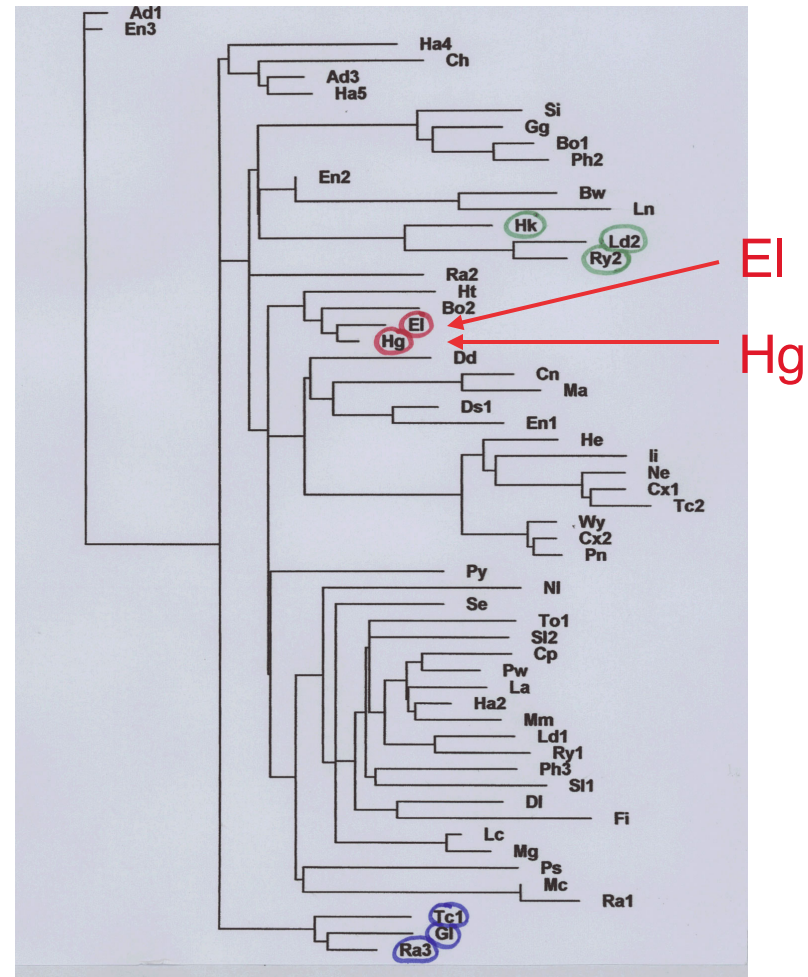
National Library of Wales  
(MS Penarth 392D) Around 1400

Barbrook et al. (1998)  
*Nature* 394 839

# Relationship of Hengwrt and Ellesmere manuscripts



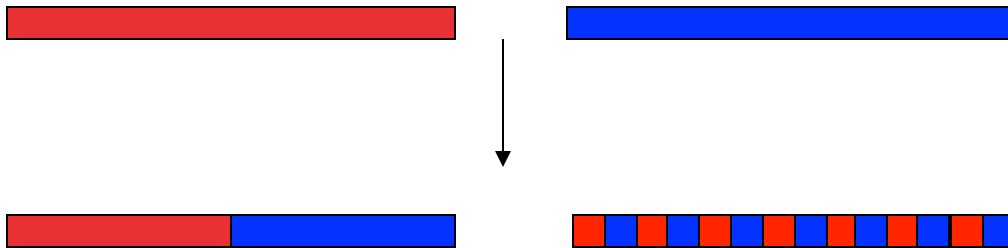
1st quarter



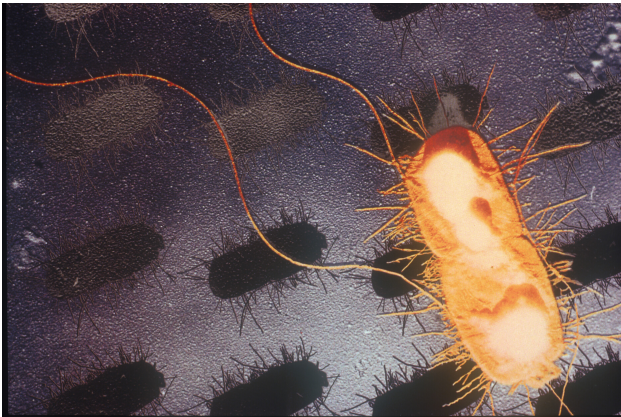
Last quarter

Prologue to the Wife of Bath's Tale

- Contamination - scribe used more than one exemplar in making a copy
- Can be successive (changes at a point) or simultaneous/incidental



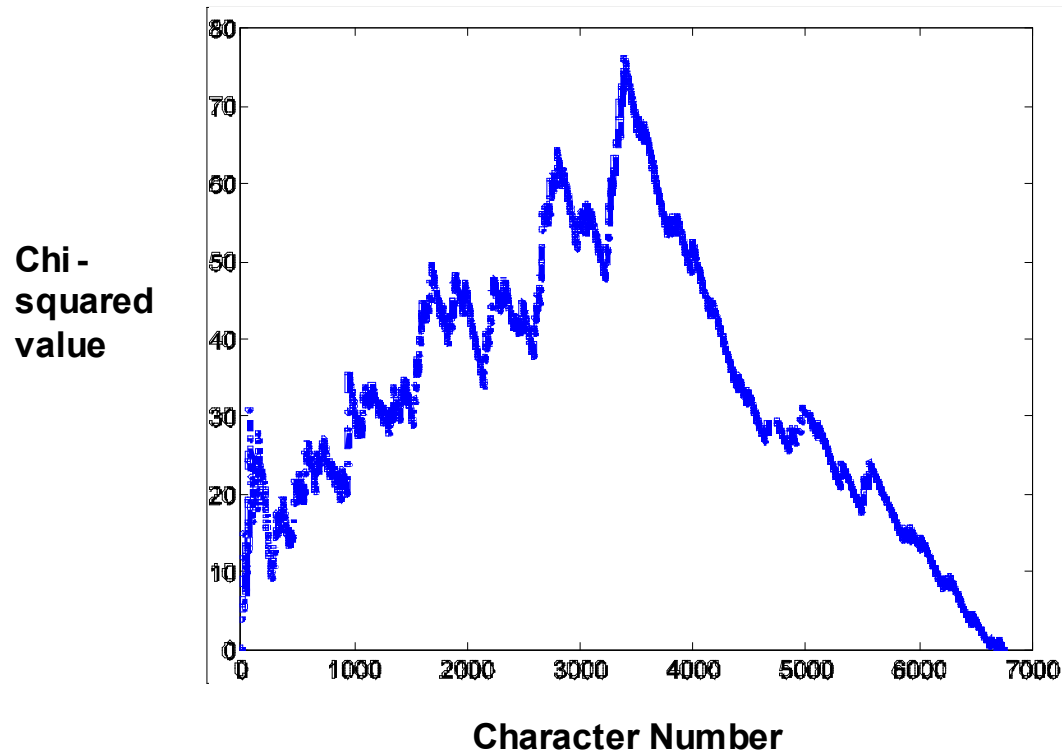
- Analogous to lateral (horizontal) gene transfer or genetic recombination



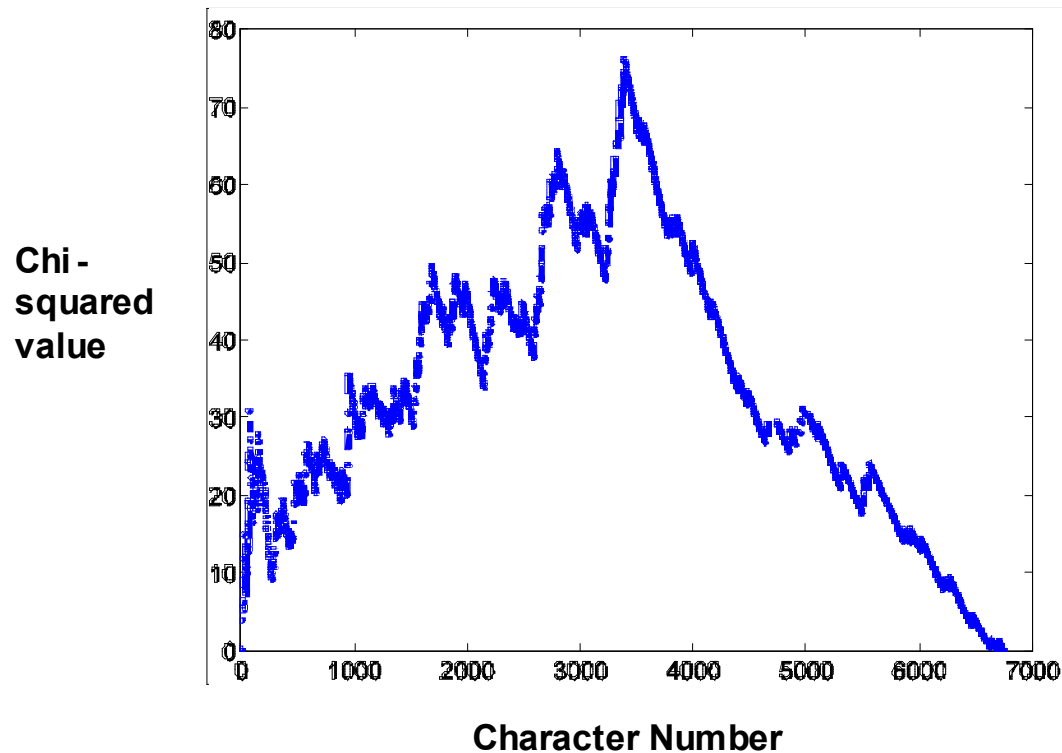
With successive contamination, trees constructed from different sections of the text should be different



**Maximum chi -squared analysis for Wife of Bath's Prologue indicates breakpoint at character 3384 (line 404) in Hengwrt/Ellesmere comparison**



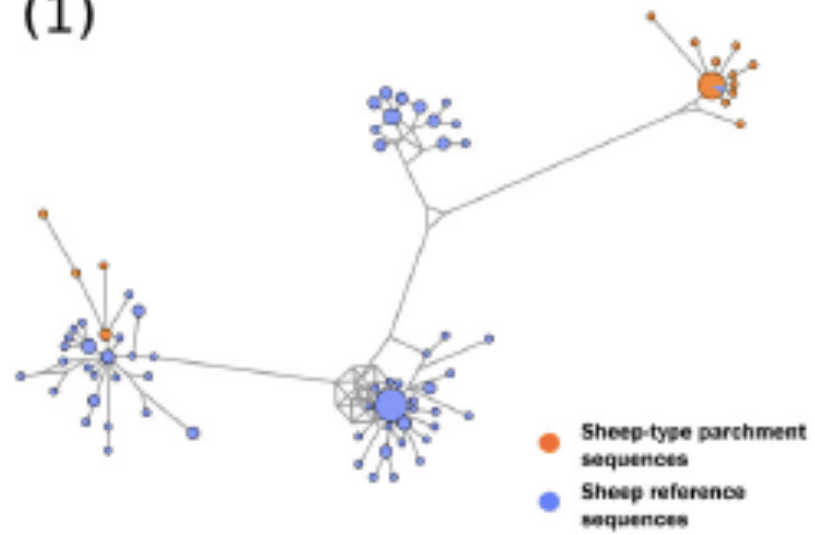
**Maximum chi -squared analysis for Wife of Bath's Prologue indicates breakpoint at character 3384 (line 404) in Hengwrt/Ellesmere comparison**



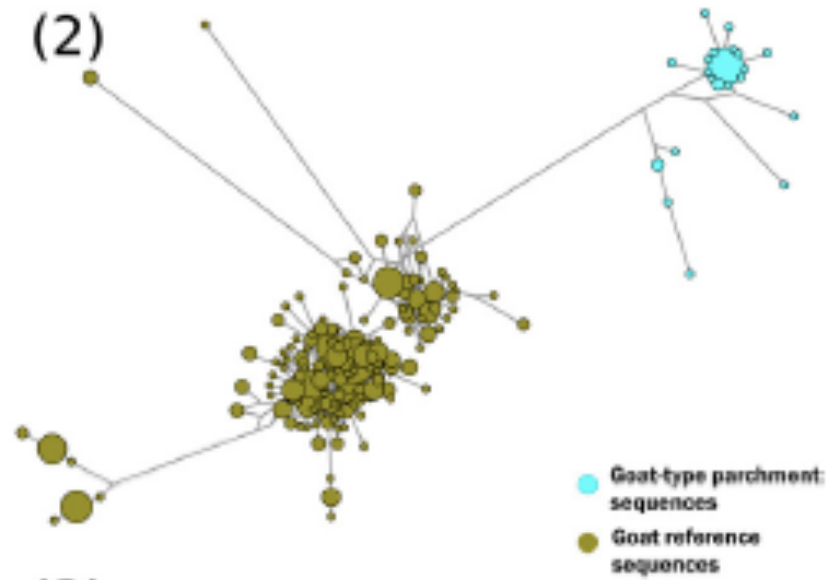
‘After line 400, EI changes character dramatically... It is possible that for lines 420 onwards, EI is actually based on the same exemplar as Hg’

(Robinson, 1997)

(1)



(2)



(3)