My Research Experience

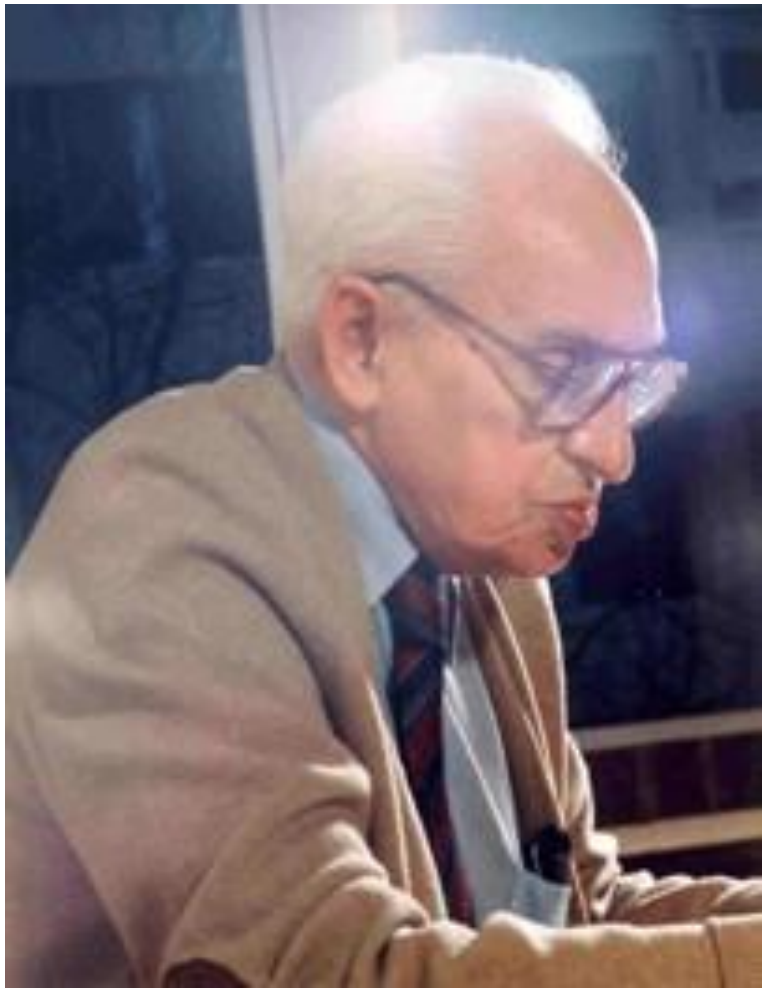
Margarita Salas
Centro de Biología Molecular "Severo Ochoa"
CSIC–UA

CNIC PhDay

November 23, 2018

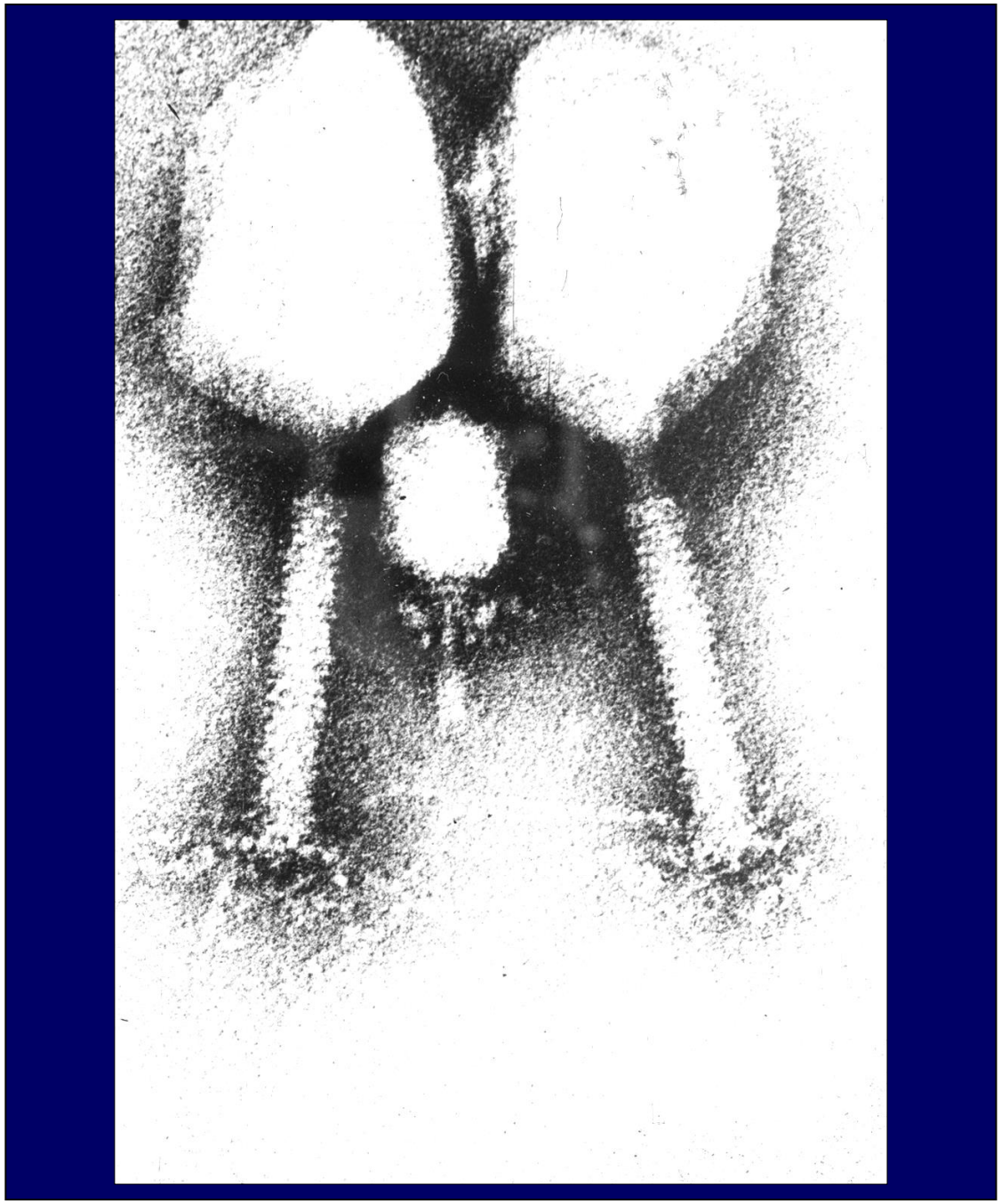
SEVERO OCHOA
(1905-1993)

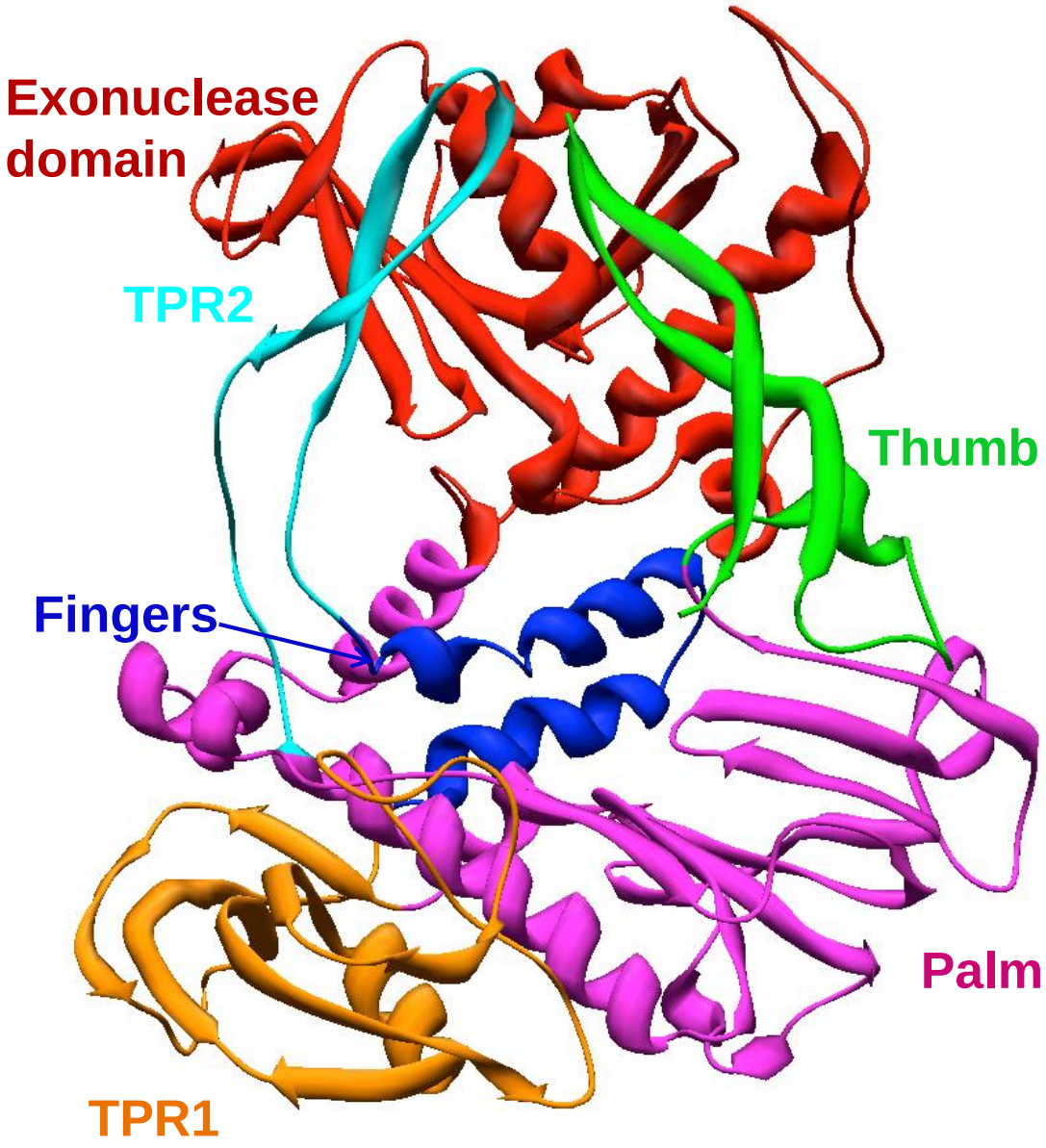
Premio Nobel de
Medicina 1959



Alberto Sols
1917-1989

Eladio Viñuela
1937-1999

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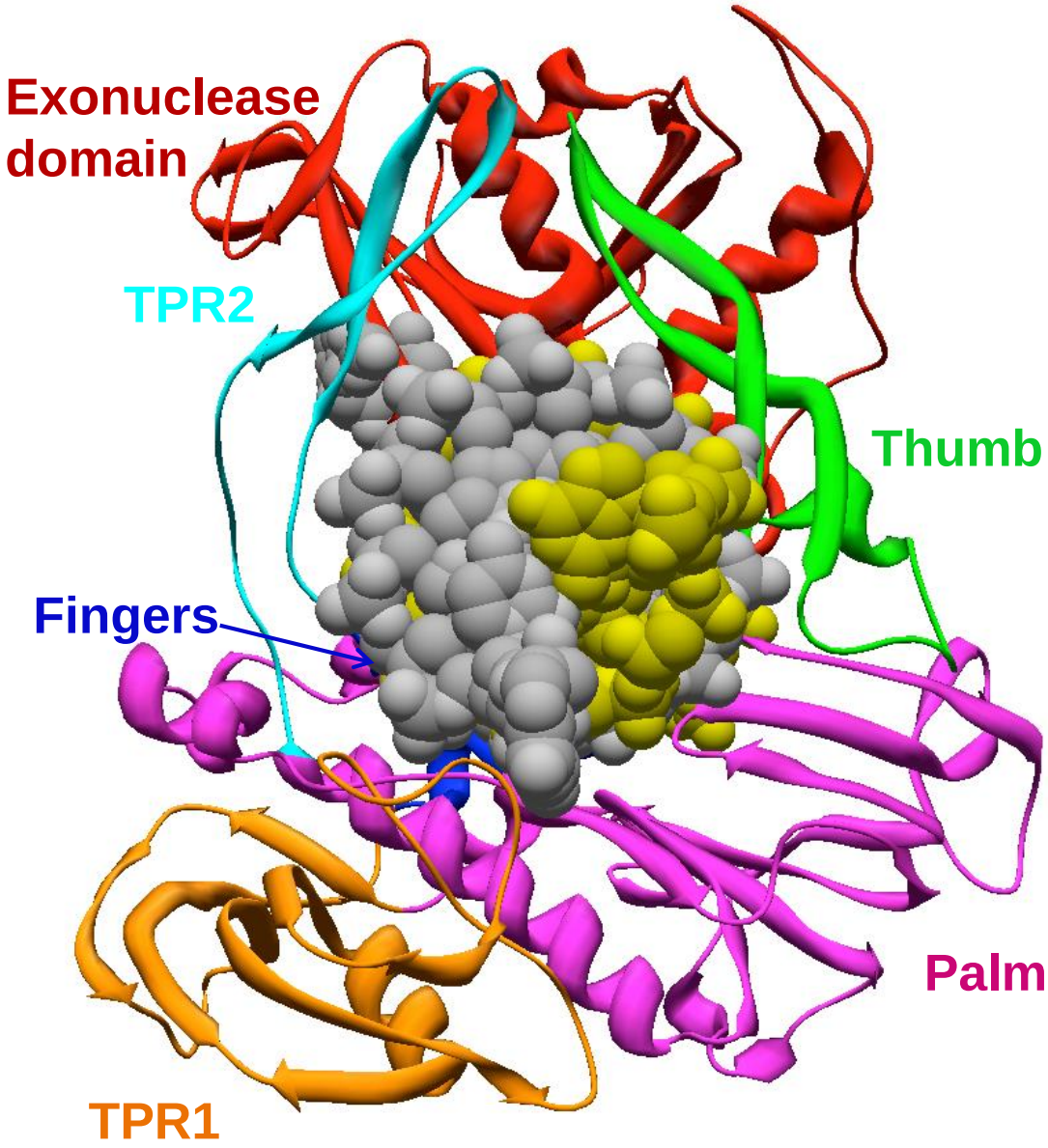

Exonuclease domain
TPR2
Thumb
Fingers
Palm
TPR1

Phage ø29 and Biotechnology

1989. **ø29 DNA polymerase patent**
(Inventors: Luis Blanco, Antonio Bernad, Jose M. Lázaro, Margarita Salas)
Licensed to USB

2001. Comercialization of the ø29 DNA polymerase
Amersham Biosciences —> GE Healthcare

Kit Templiphi: amplification of circular DNA

2003.Kit Genomiphi: amplification of linear genomic DNA

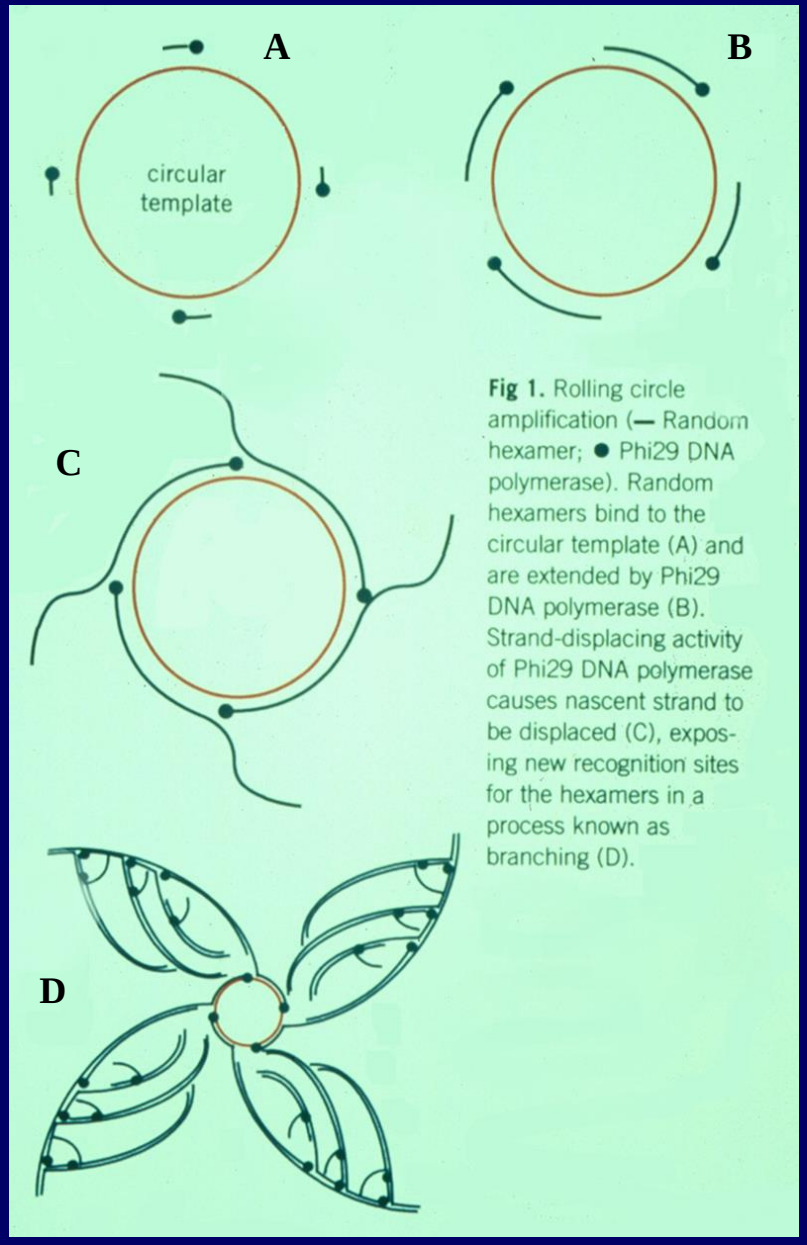
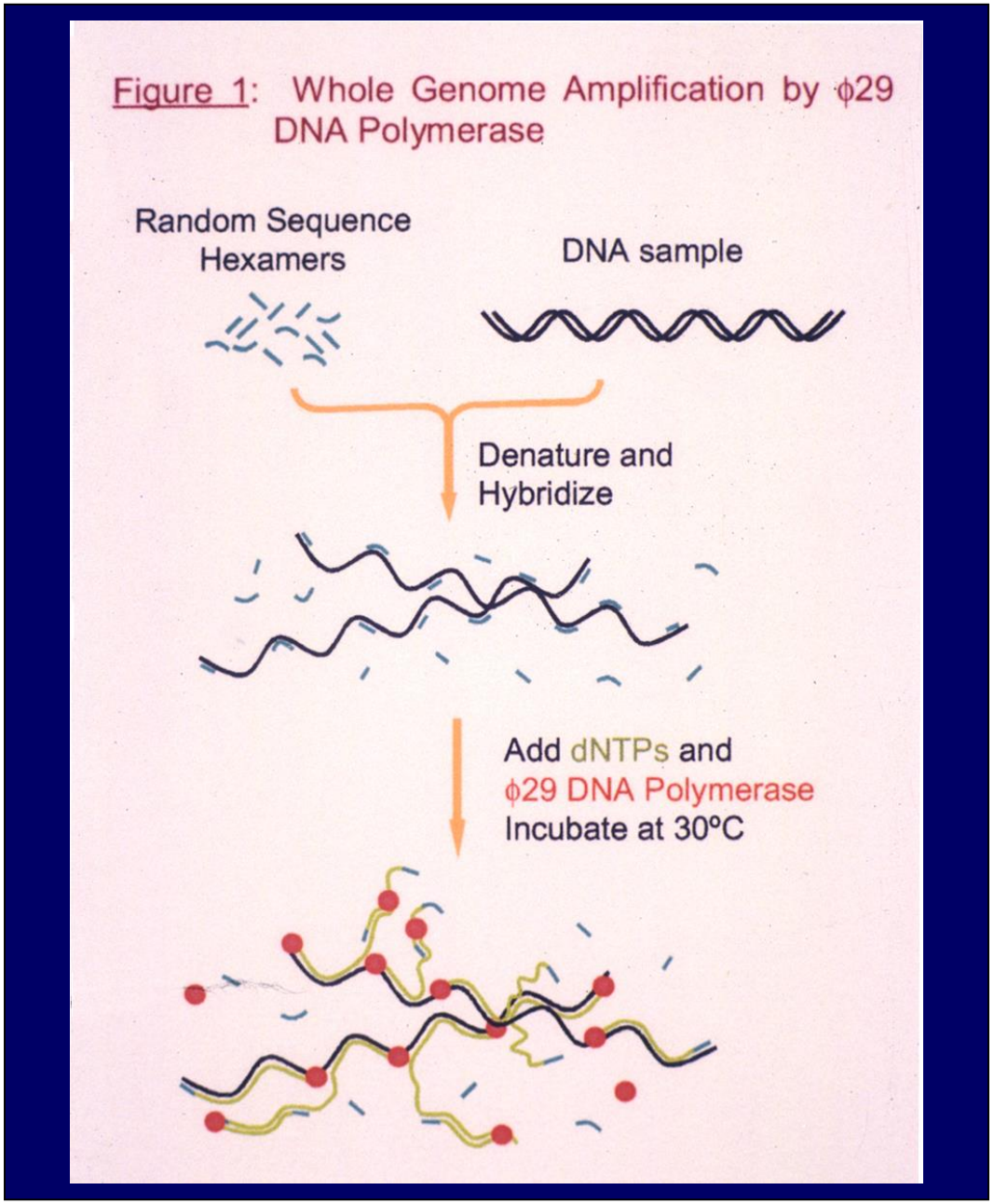


Fig 1. Rolling circle amplification (— Random hexamer; ● Phi29 DNA polymerase). Random hexamers bind to the circular template (A) and are extended by Phi29 DNA polymerase (B). Strand-displacing activity of Phi29 DNA polymerase causes nascent strand to be displaced (C), exposing new recognition sites for the hexamers in a process known as branching (D).



Li, W. *et al*
Amersham Biosciences

GenomiPhi

-Amplification of genomic DNA

- Genetic analysis
- Construction of libraries
-DNA archives
-Forensic medicine
-Archeological studies

1989. **Patent of ø29 DNA polymerase**
(Inventors: Luis Blanco, Antonio Bernad, Jose M. Lázaro, Margarita Salas)
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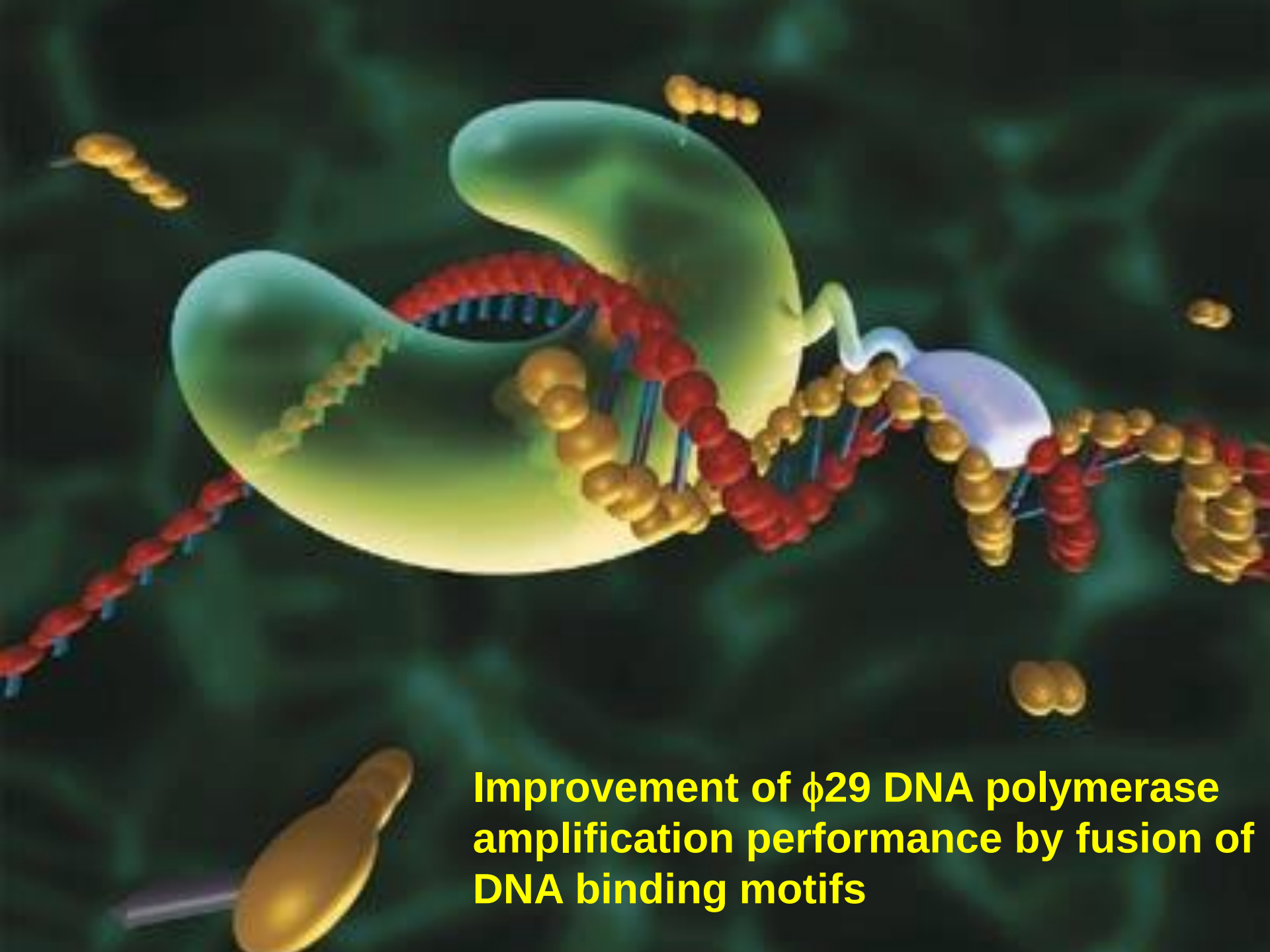
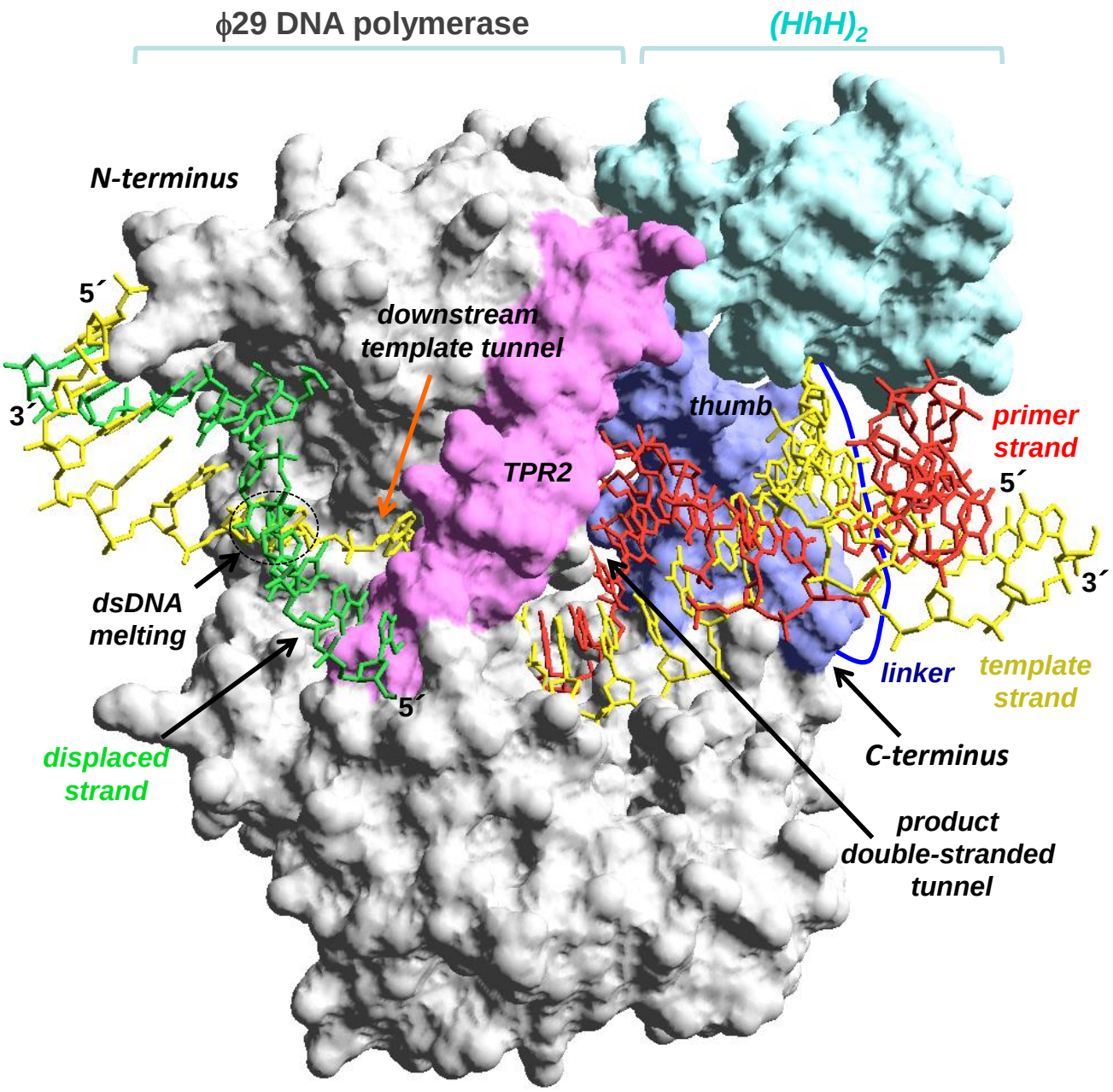
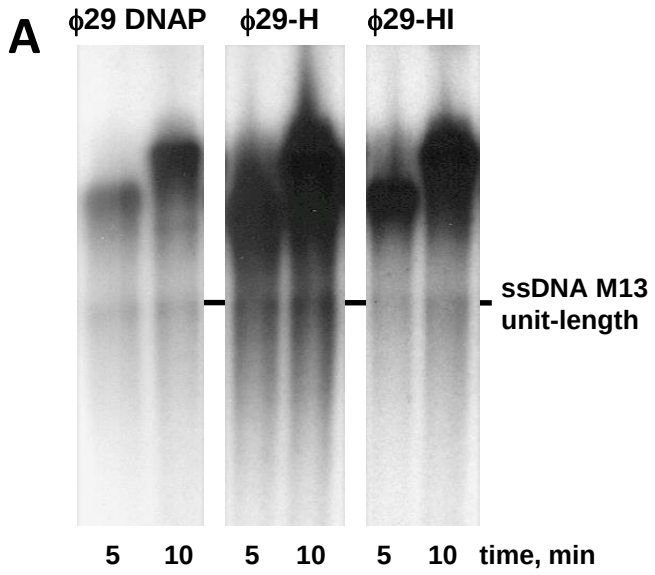
The patent has produced to the CSIC royalties of 6.624.118 euros

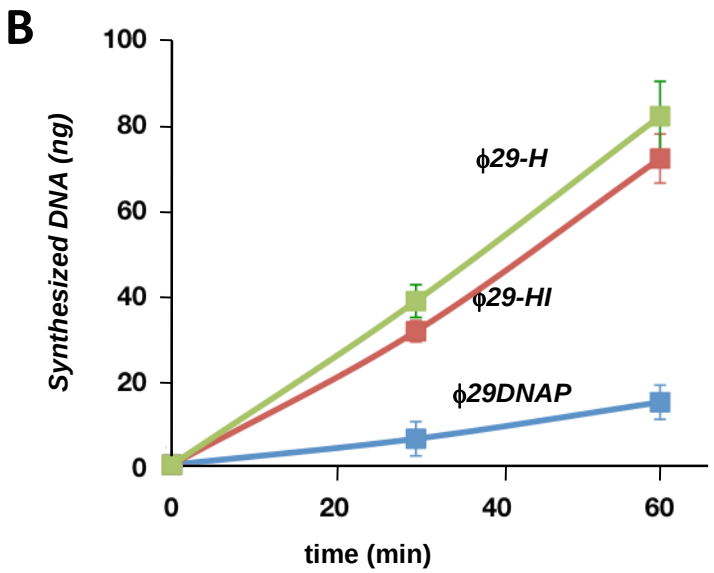

Improvement of ϕ29 DNA polymerase amplification performance by fusion of DNA binding motifs

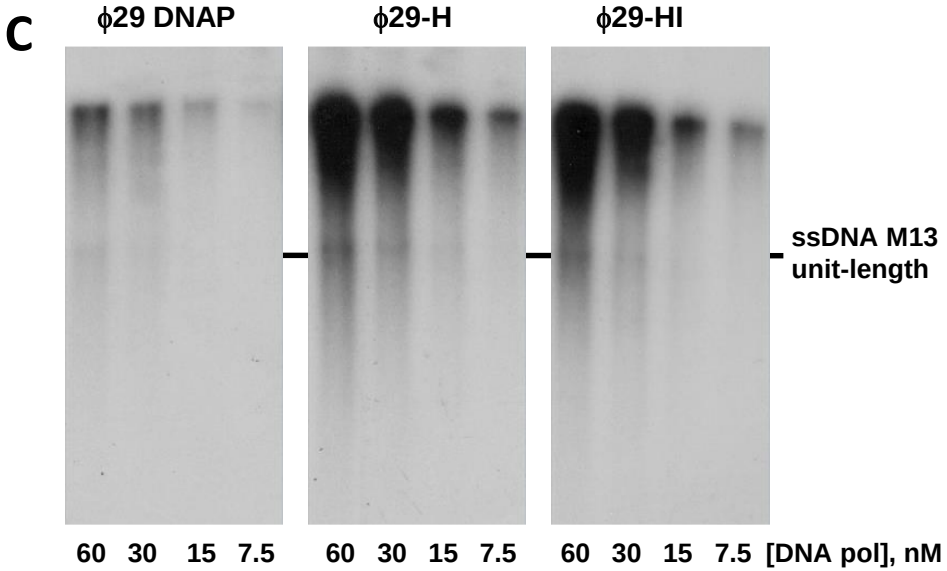
Modelling of the chimerical DNA polymerase



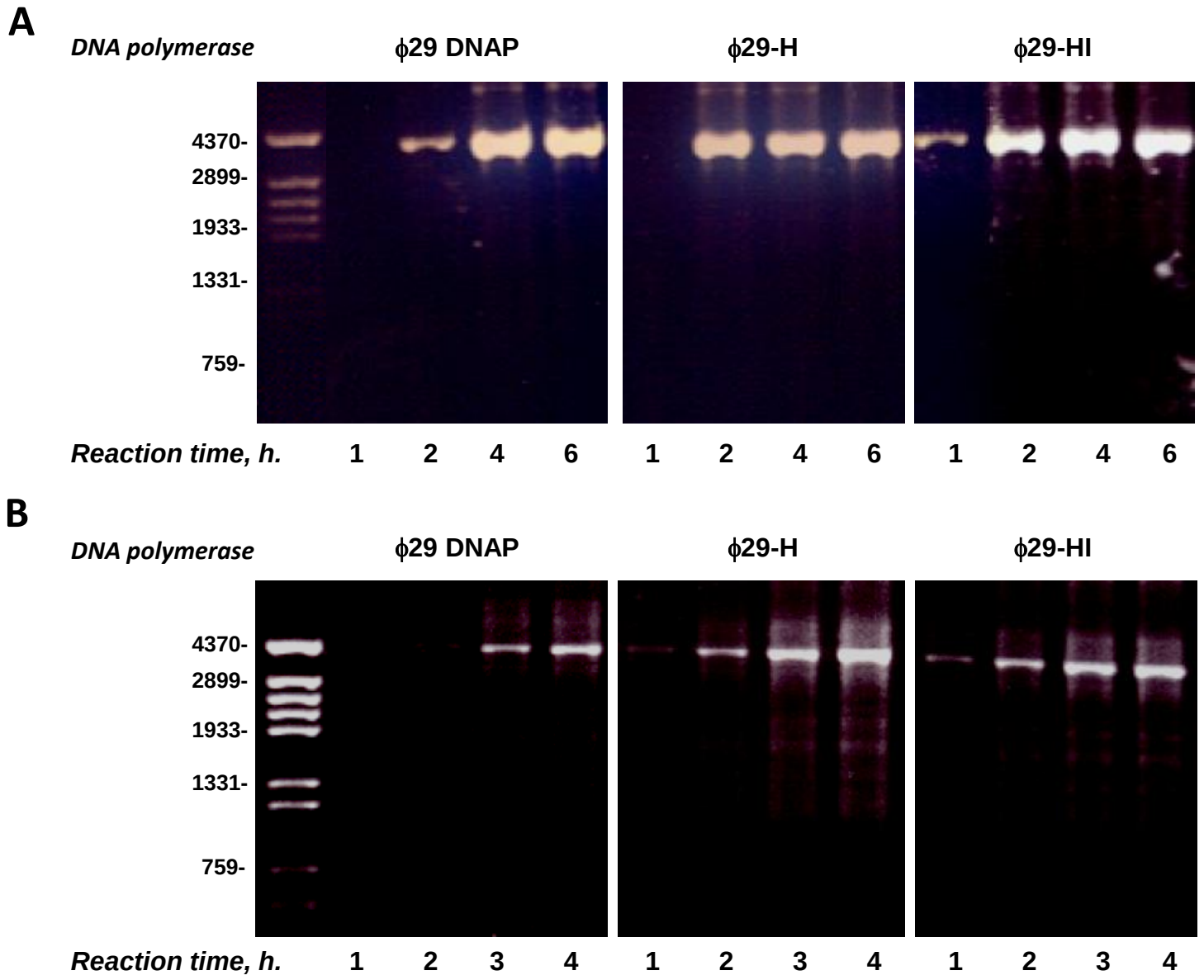
Chimerical DNA polymerases show an enhanced Rolling Circle Replication efficiency



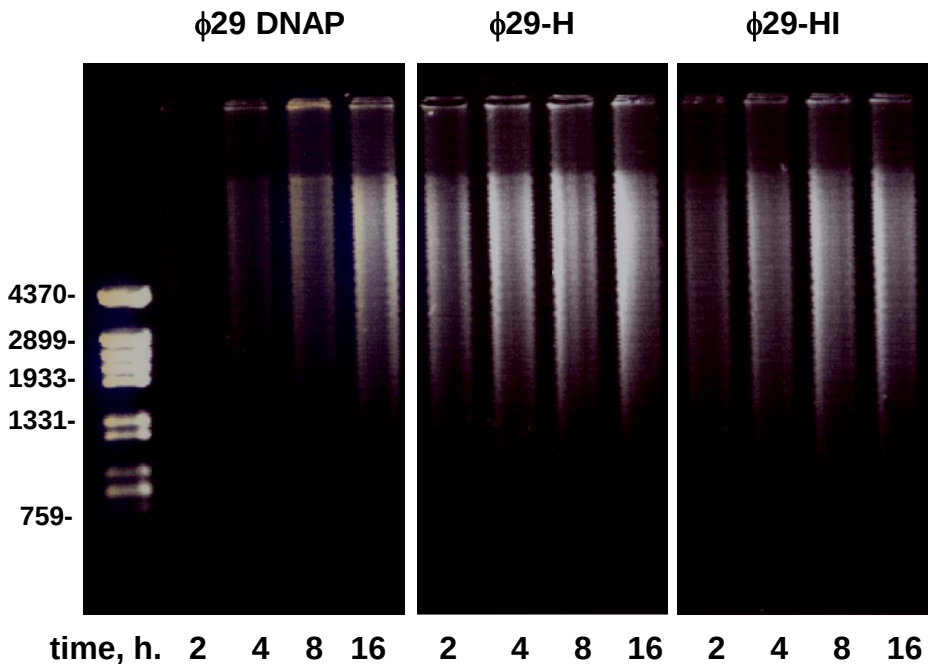




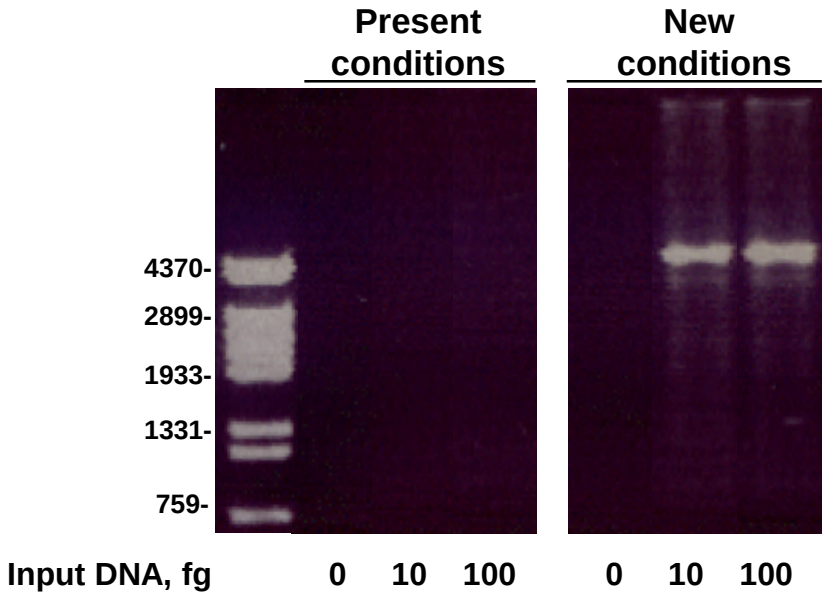
Multiply-primed Rolling Circle Amplification of plasmidic DNA by ø29 DNA polymerase and chimerical DNA polymerases



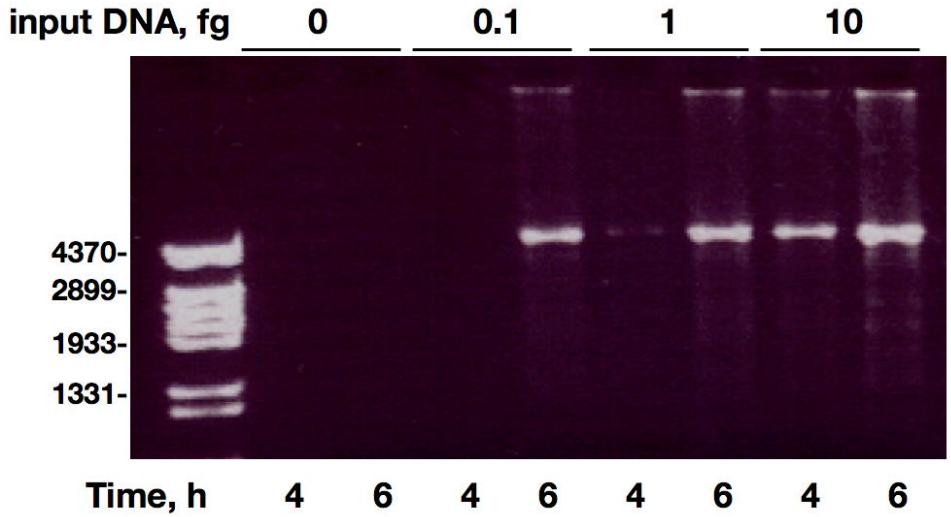
Multiply-primed Whole Genome Amplification of genomic DNA with ϕ29 DNA polymerase and chimerical DNA polymerases



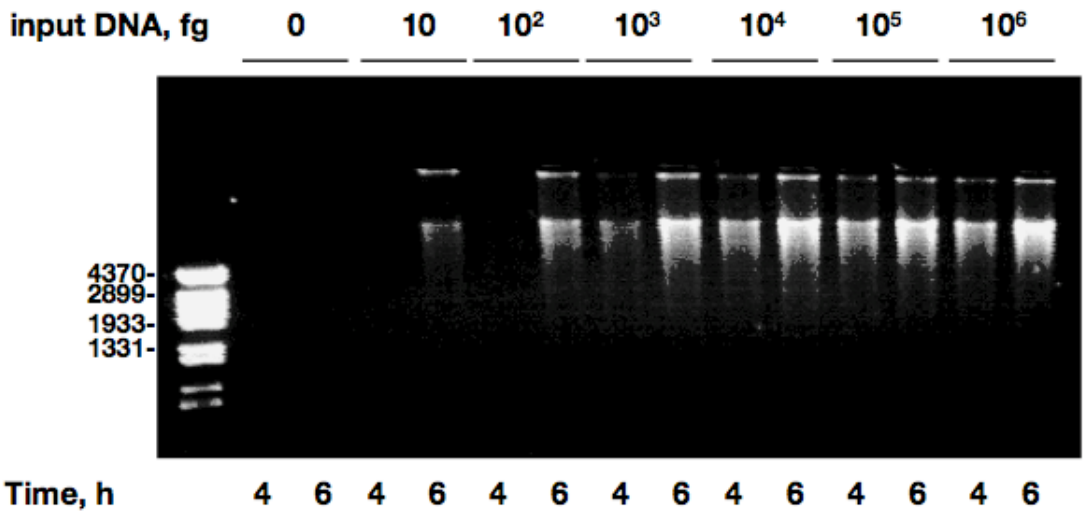
Effect of the new conditions on the ϕ29 DNA polymerase amplification capacity using plasmidic DNA



Effect of the new conditions on the ϕ29 DNA polymerase amplification capacity



plasmidic DNA



genomic DNA

CHIMERA OF Ø29 DNA POLYMERASE

Margarita Salas, Miguel de Vega, José Mª Lázaro, Luis Blanco and Mario Mencía

Patent N200930413

Licensed to Sygnis AG

Exploited by QIAGEN

Grupo ø29, 2015-2016