# Supplementary Materials

## (5′*S*) 5′,8-cyclo-2′-deoxyAdenosine can't stop BER. Clustered DNA lesion studies.

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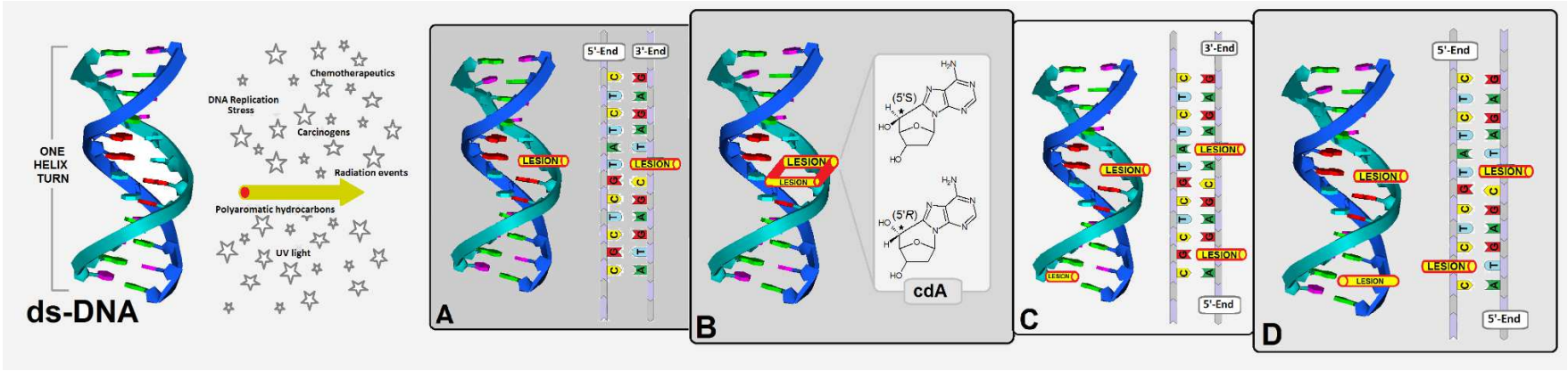



**Figure S1.** Types of DNA damage formed by the action of intercellular and environmental physical-chemical factors: **A**) isolated lesion - one per one or two helix turn, **B**) tandem lesions - is a particular type of clustered DNA damage consisting two contiguously damaged nucleosides or consisted of two adjacent modifications, e.g., sugar and base moieties, resulting from a single free radical initiating event, **C**) single-stranded DNA clustered lesion - two or more DNA damage located in the same oligonucleotide strand of ds-DNA per one or two double helix turn, **D**) double-stranded DNA clustered lesion - two or more DNA damage present in both ds-DNA complementary strands: matrix and complementary, per one or two double helix tur

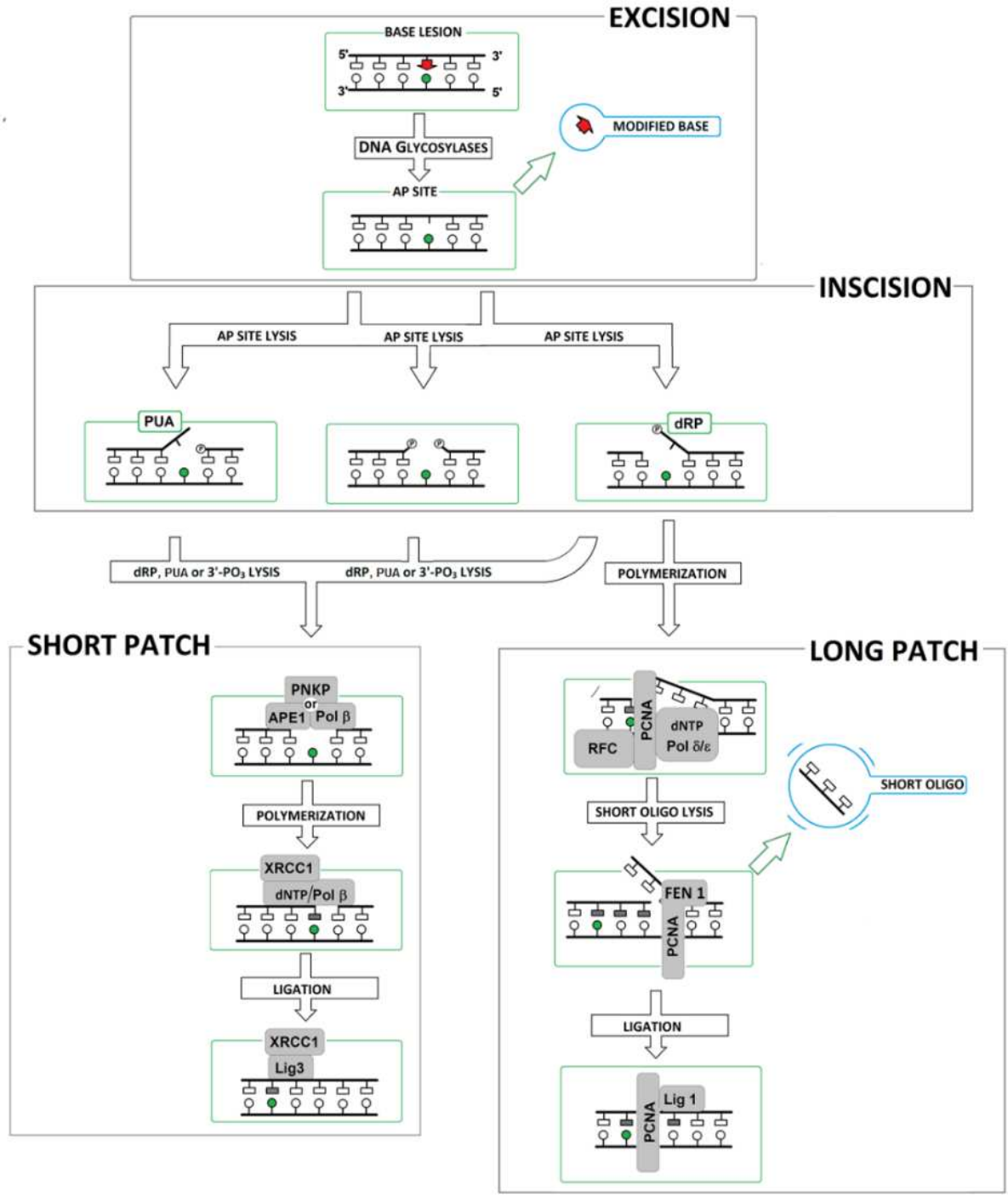



**Figure S2.** Graphical representation of the **B**ase **E**xcision **R**epair system divided to stages.

Apurinic/Apyrimidinic site (**AP-site**), 3′-Phospho-$\alpha$,$\beta$-Unsaturated Aldehyde (**PUA**), phosphate group (**P**), 5′-deoxyRibose Phosphate (**dRP**), PolyNucleotide Phosphatase/Kinase (**PNKP**), AP endonuclease one (**APE1**), polymerase beta (**Polβ**), deoxynucleotide triphosphates **(dNTP**), X-ray repair cross-complementing protein 1 (**XRCC1**), ligase one (**Lig1**), ligase three (**Lig3**), replication factor-C (**RFC**), polymerase delta (**Polδ),** polymerase epsilon (**Polε**), flap endonuclease one (**FEN1**), Proliferating Cell Nuclear Antigen (**PCNA**).

**Figure S3A.**

Radiograms of:

A) Purity of single-stranded oligonucleotides as follows: **1**–matrix, **2**–dU0, **3**–dU(-)5, **4**–dU(-)3, **5**–dU(+/-)3, **6**–dU(+/-)5, **7**–dU(+)3, **8**–dU(+)5; 20% polyacrylamide with 8M urea gel electrophoresis.

B) Purity of double-stranded oligonucleotides as follows: **1**–dU0, **2**–dU(-)5, **3**–dU(-)3, **4**–dU(+/-)3, **5**–dU(+/-)5, **6**–dU(+)3, **7**–dU(+)5; 20% polyacrylamide gel (native) electrophoresis.

C) Purity of double-stranded oligonucleotides after UDG and hAPE1 digestion with subsequent precipitation: **1**–matrix, **2**–dU(+)5, **3**–dU(+)3, **4**–dU(+/-)5, **5**–dU(+/-)3, **6**–dU(-)3, **7**–dU(-)5, **8**–dU0 20% polyacrylamide with 8M urea gel electrophoresis.

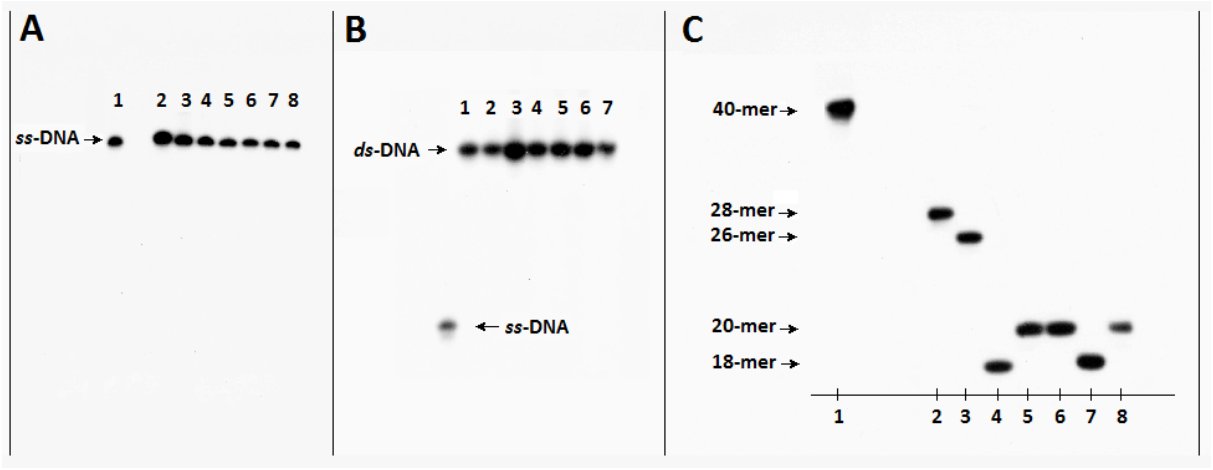
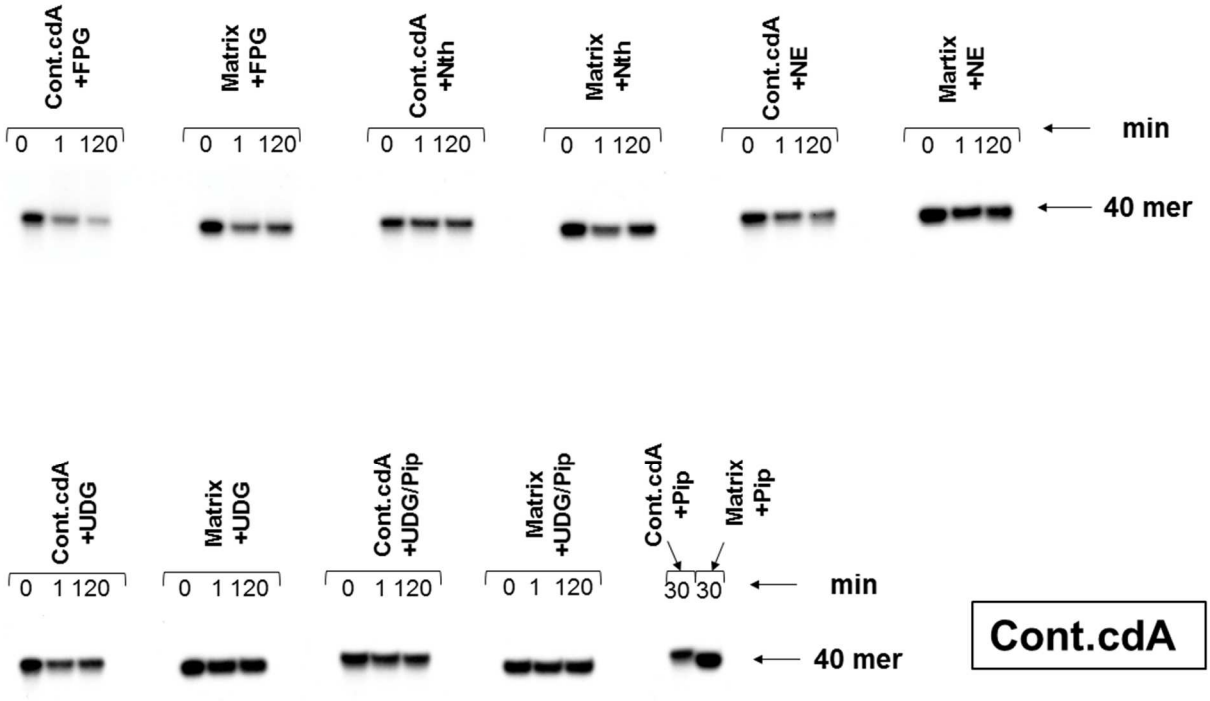


**Figure S3B.**

The stability of Cont. (5'*S*)cdA or Matrix (double-stranded mode) in the following conditions:




*1.1. Nuclear Extracts*

The shortcut cdA corresponding to (5'*S*) 5',8-cyclo-2'-deoxyadenosine.

10 μg of xrs5 **NE** was incubated with Cont.cdA or Matrix in 8 μL of repair buffer at 37° C for the following times (in minutes): 0, 1 and 120. After the required time, the reactions were stopped with 8 μL of loading buffer (denaturing) and the samples were examined on a 15% denaturing polyacrylamide gel.

*1.2. FGP, Nth, and UDG*

5U of **FPG** was incubated with Cont.cdA or Matrix in 5 μL of reaction buffer (10 mM Bis-Tris Propane-HCl (pH 7.0), 10 mM MgCl2, 1 mM DTT, and 100 μg/ml BSA) at 37 ° C for 0, 1 and 120 min.

5U of **Nth** was incubated with Cont.cdA or Matrix in 5 μL of reaction buffer (20 mM Tris-HCl (pH 8.0), 1 mM EDTA and 1mM DTT) at 37° C for 0, 1 and 120 minutes.

5U of **UDG** was incubated with Cont.cdA or Matrix in 5 μL of reaction buffer (20 mM Tris-HCl (pH 8.0), 1 mM EDTA and 1mM DTT) at 37° C for 0, 1 and 120 minutes.

After the required time, the reactions were stopped with 5 μL of loading buffer and the samples were examined on a 15% denaturing polyacrylamide gel.

*1.3. Hot 1M piperidine*

Cont.cdA or Matrix was incubated with 100 μL of **1M piperidine** at 80° C for 30 min. After the required time, the samples were precipitated with 250 μL of cold ethanol and 2 μL of glycogen (placed on dry ice, 30 minutes), centrifuged (13,000 rpm, 4° C, 30 minutes) and dried under reduced pressure at room temperature. The residues were resuspended in 5 μL of loading buffer and the samples were examined on a 15% denaturing polyacrylamide gel.

*1.4. UDG and 1M piperidine*

5U of **UDG** was incubated with Cont.cdA or Matrix in 5 μL of reaction buffer (20 mM Tris-HCl (pH 8.0), 1 mM EDTA and 1mM DTT) at 37° C for 0, 1 and 120 minutes. After the required time, the reactions were stopped by placing samples on ice (4° C) and subsequently incubated with 100 μL of **1M piperidine** at 80° C for 30 minutes. After this time, the samples were precipitated with 250 μL of cold ethanol and 2 μL of glycogen (placed on dry ice, 30 min), centrifuged (13,000 rpm, 4° C, 30 min) and dried under reduced pressure at room temperature. The residues were resuspended in 5 μL of loading buffer and the samples were examined on a 15% denaturing polyacrylamide gel.

**Figure S4.** Graphical representations of the SSB and (5′*S*)cdA mutual positions in a *ds*-DNA structure during Polβ action, and theoretical Polβ XRCC1 position/interaction, based on work of London and Pelletire **[**Cuneo, M.J.; London, R.E. (2010). The oxidation state of the XRCC1 N-terminal domain regulates DNA polymerase β binding affinity. PNAS., **107**, 6805–6810; Sawaya M.R., Prasad R., Wilson S.H., Kraut J., Pelletier H. (1997) Crystal Structures of human DNA polymerase β complexed with gapped and Nicked DNA: evidence for an induced fit mechanism. Biochemistry, **36**, 11205-11215].

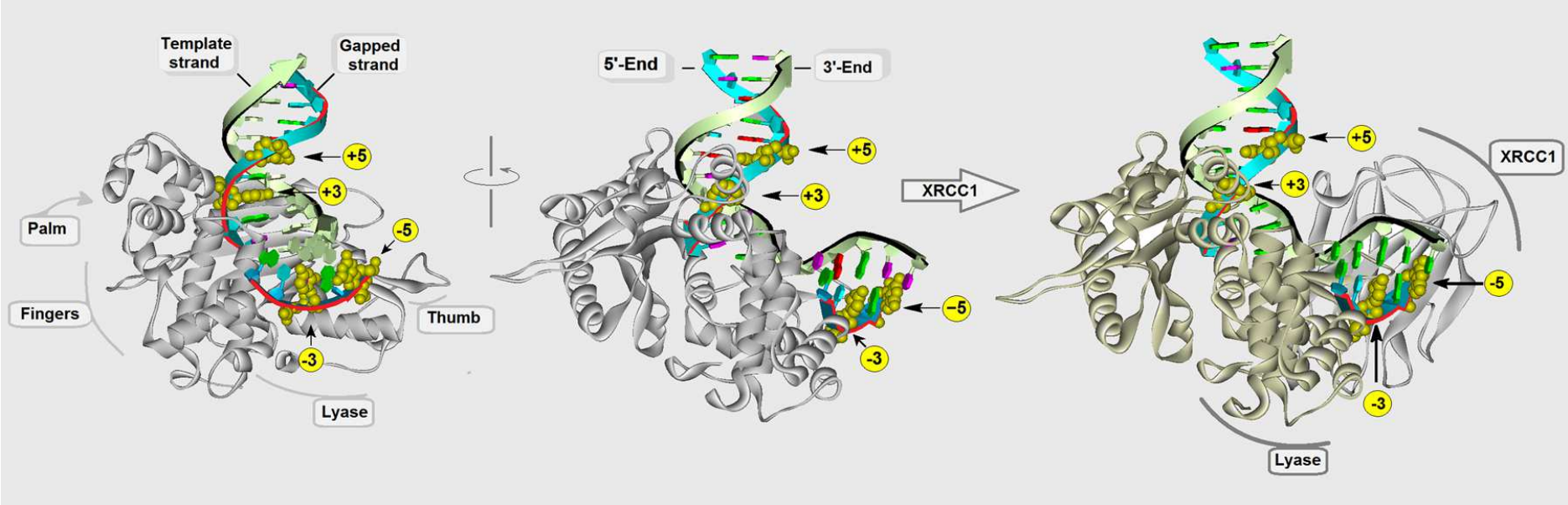


**Figure S5A.** Activity of Lig3 in the presence of XRCC1 and Polβ on cluster lesioned *ds*-DNA strand ligation. For each lane/sample (8 μl): 3.63 pmol of suitable *ds*-oligonucleotide with SSB (**Table 1**), 0.26 pmol of Polβ, 0.21 pmol of XRCC1 and 0.51 pmol of Lig3 were used in the reaction buffer (70 mM Tris-HCl (pH 7.5), 10 mM $MgCl_2$, 10 mM DTT, 4 mM ATP, 40 mM phosphocreatine, 1.6 μg $ml^{-1}$ phosphocreatine kinase together with dATP, dCTP, dGTP, and dTTP (0.1 mM each).

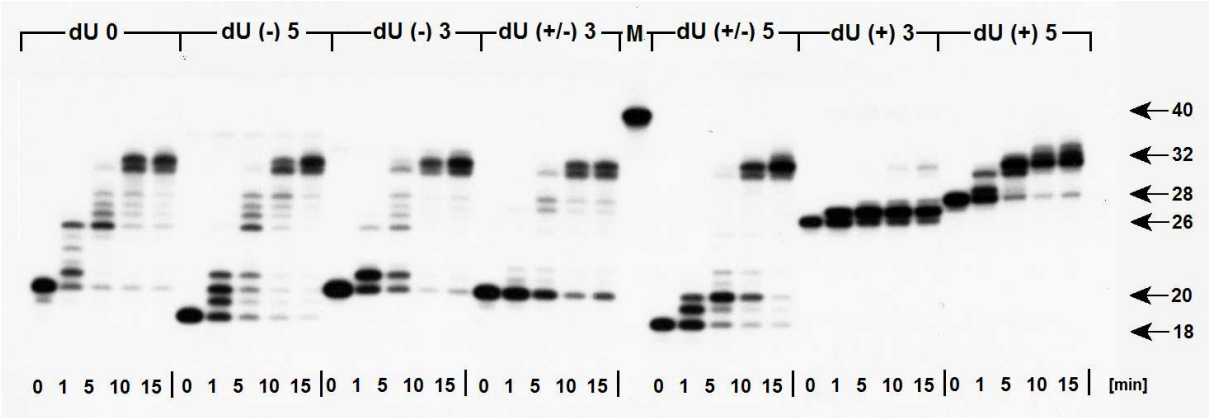



**Figure S5B.** Activity of Lig1 in the presence of XRCC1 and Polβ on cluster lesioned *ds*-DNA strand ligation. For each lane/sample (8 μl): 3.63 pmol of suitable *ds*-oligonucleotide with SSB (**Table 1**), 0.26 pmol of Polβ, 0.21pmol of XRCC1 and 0.56 pmol of Lig1 were used in the reaction buffer (70 mM Tris-HCl (pH 7.5), 10 mM $MgCl_2$, 10 mM DTT, 4 mM ATP, 40 mM phosphocreatine, 1.6 μg $ml^{-1}$ phosphocreatine kinase together with dATP, dCTP, dGTP, and dTTP (0.1 mM each).

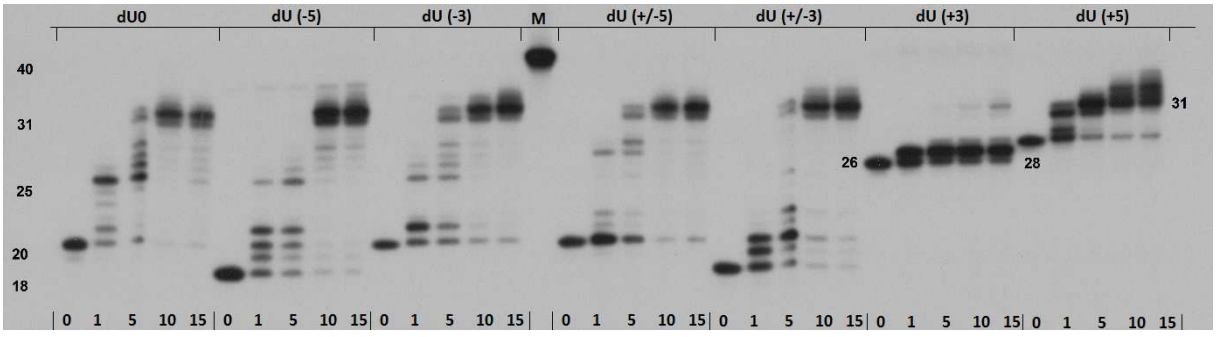


**Figure S5C.** Activity of Lig1 in the presence of PCNA and Polβ on cluster lesioned *ds*-DNA strand ligation. For each lane/sample (8 μl): 3.63 pmol of suitable *ds*-oligonucleotide with SSB (Table 1), 0.26 pmol of Polβ, 0.32 pmol of PCNA and 0.56 pmol of Lig1 were used in the reaction buffer (70 mM Tris-HCl (pH 7.5), 10 mM $MgCl_2$, 10 mM DTT, 4 mM ATP, 40 mM phosphocreatine, 1.6 μg $ml^{-1}$ phosphocreatine kinase together with dATP, dCTP, dGTP, and dTTP (0.1 mM each).

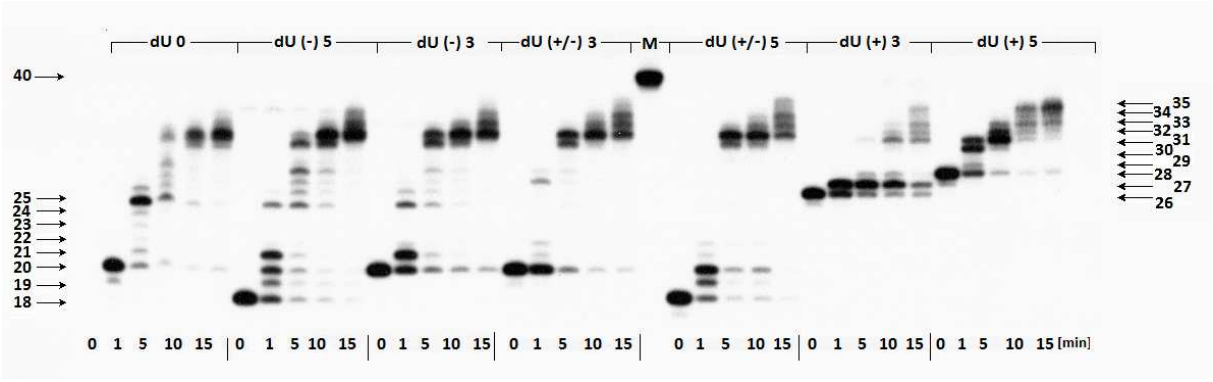
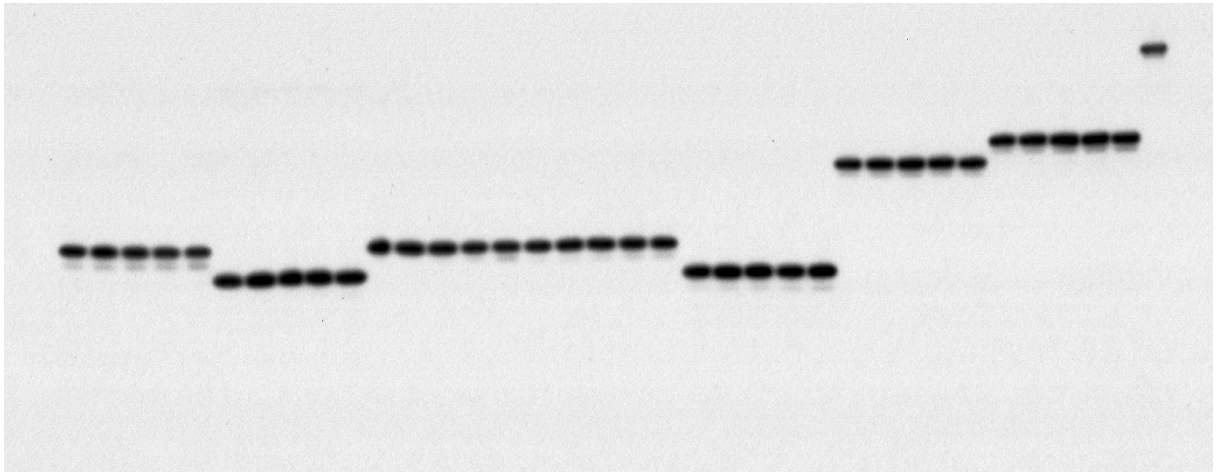
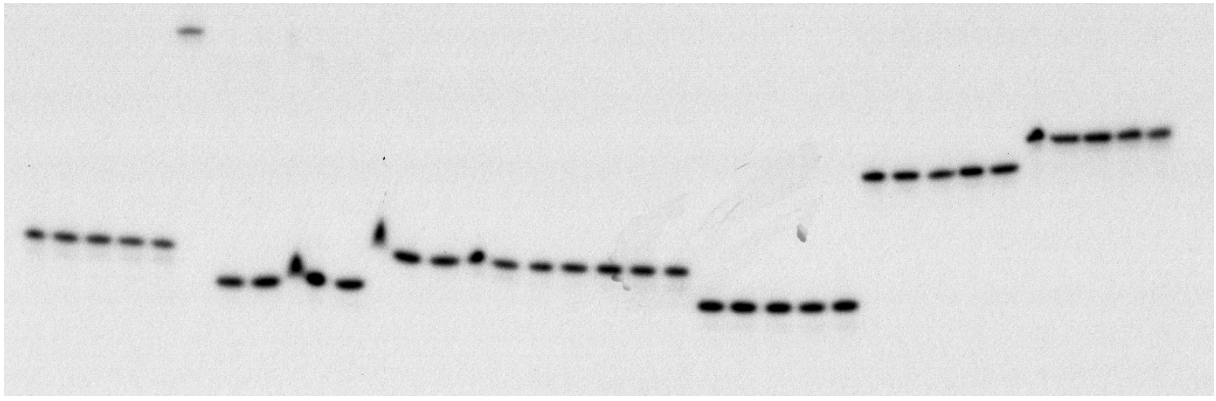


**Figure S6A.** Three independent experiments of oligonucleotide stability radiograms presented in **Figure 2A** and fully described (ibid.).

**Experiment 1**



**Experiment 2**



**Experiment 3**

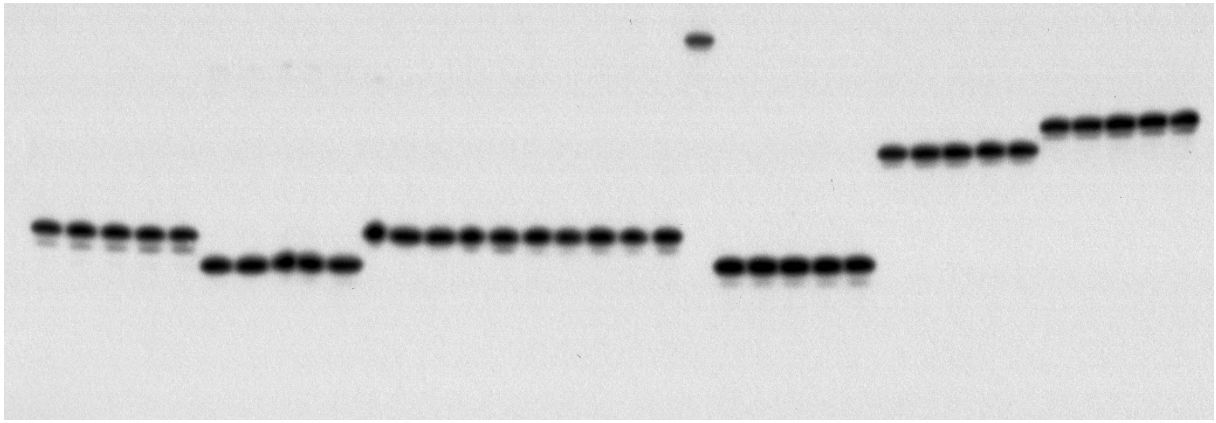
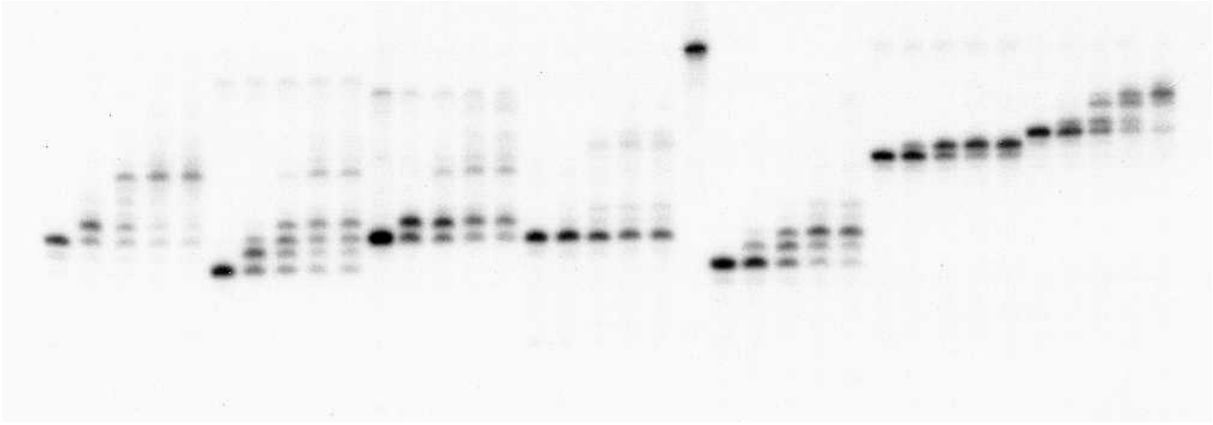
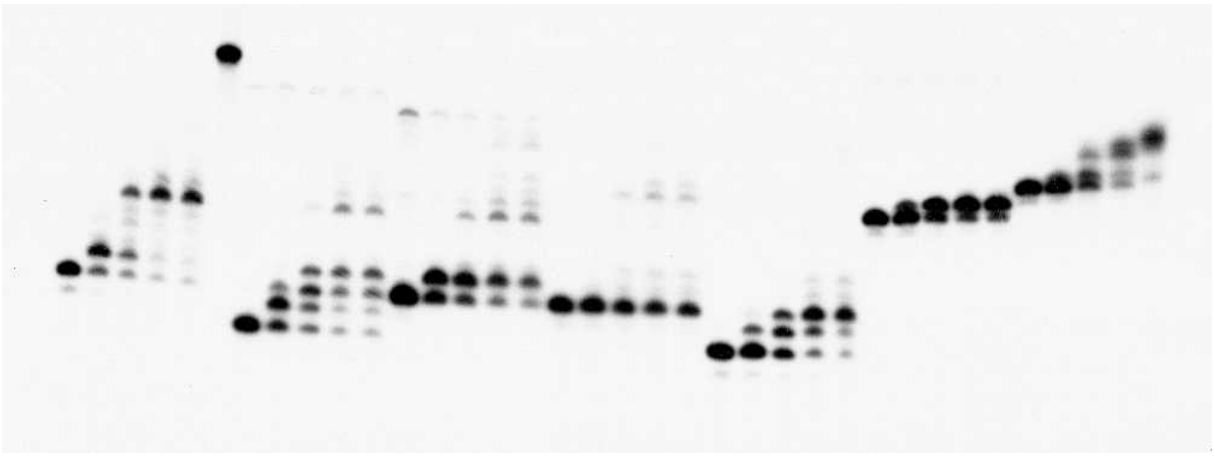


**Figure S6B.** Three independent experiments on the influence of a clustered lesion on Polβ strand-displacement presented in **Figure 2B** and fully described (ibid.).

**Experiment 1**



**Experiment 2**



**Experiment 3**

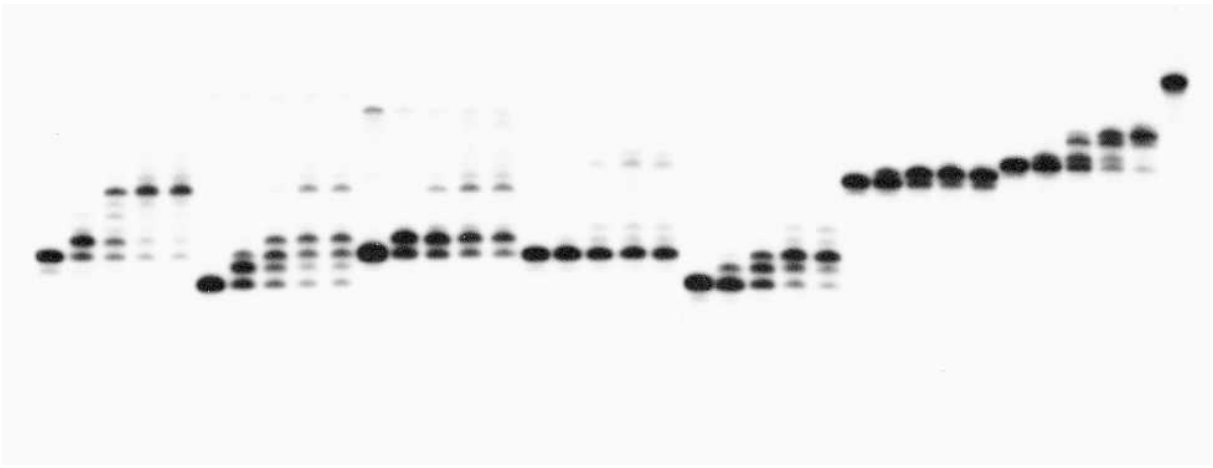
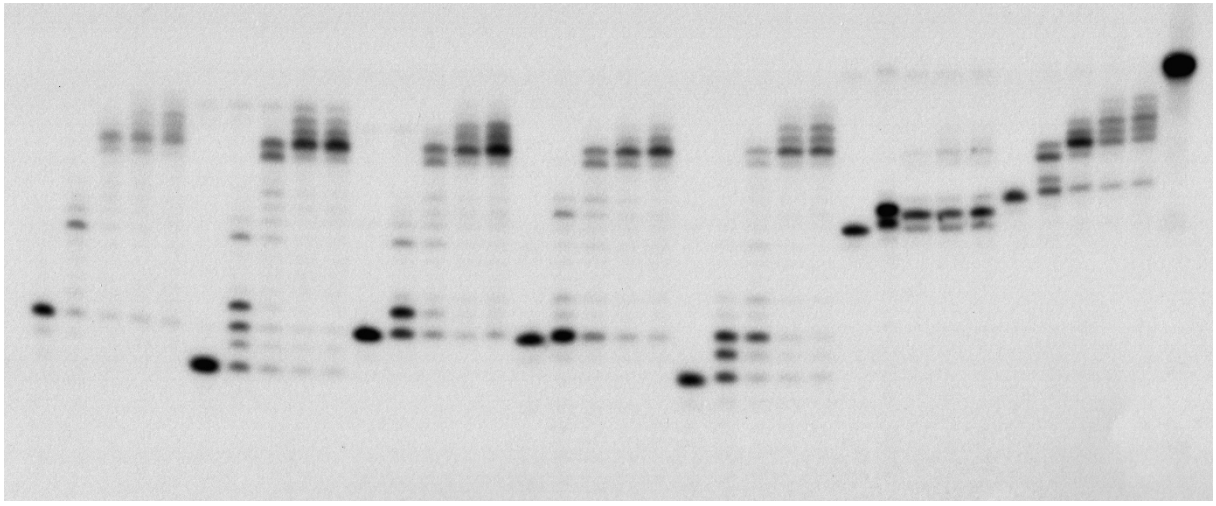
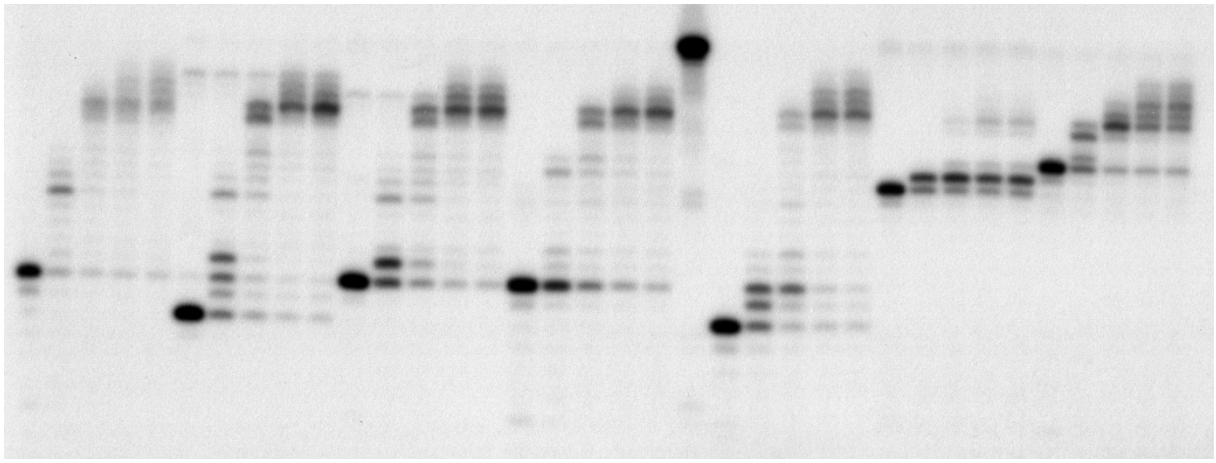


**Figure S6C.** Three independent experiments on the influence of XRCC1 on strand displacement by Polβ presented in **Figure 2C** and fully described (ibid.).

**Experiment 1**



**Experiment 2**



**Experiment 3**

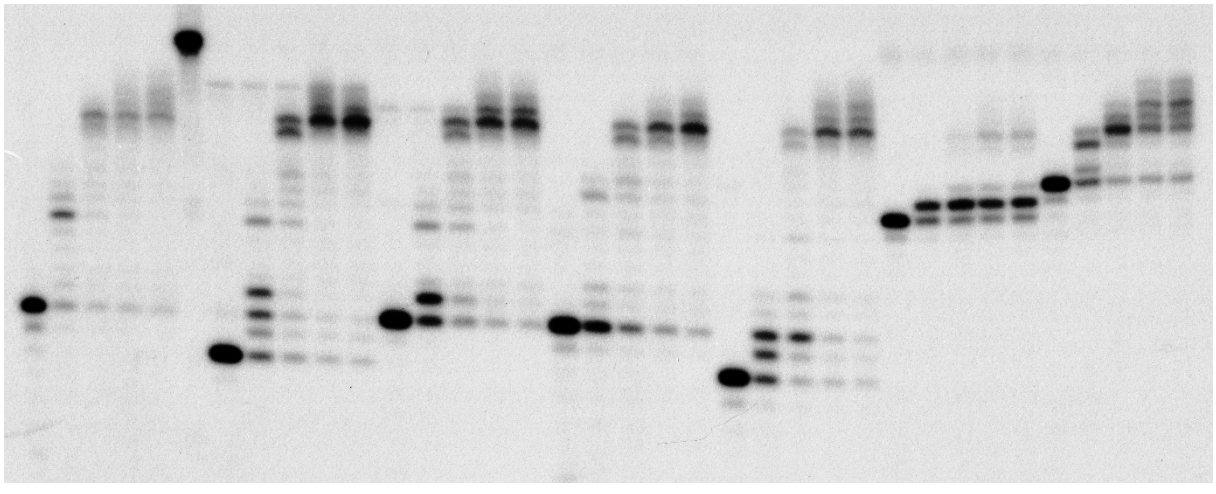


**Figure S6D.** Three independent experiments on the influence of PCNA on strand displacement by Polβ presented in **Figure 2D** and fully described (ibid.).

**Experiment 1**



**Experiment 2**



**Experiment 3**

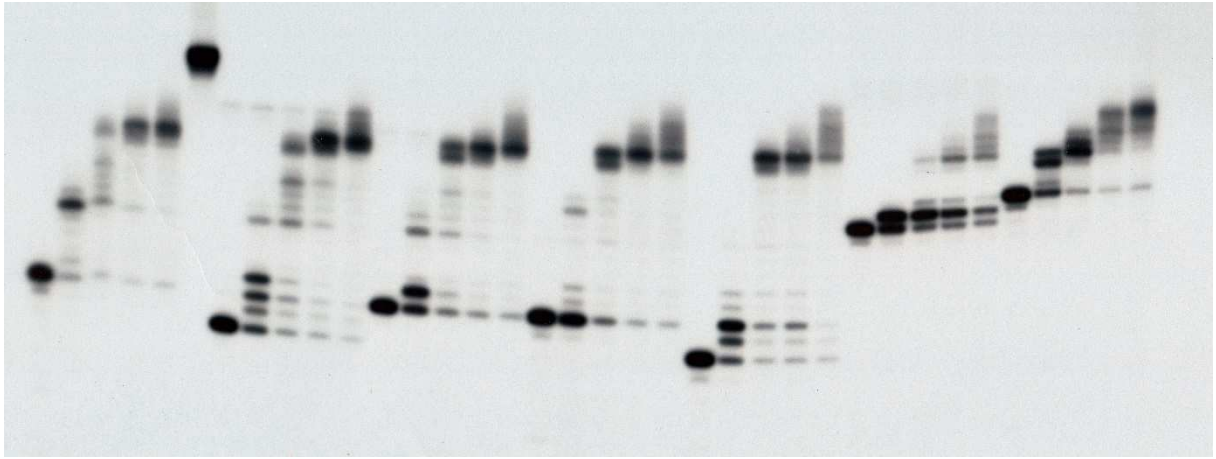
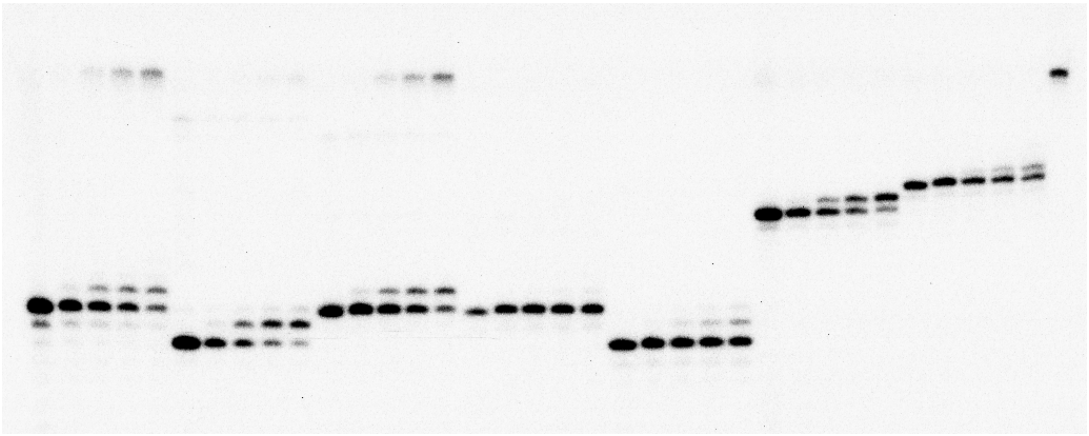
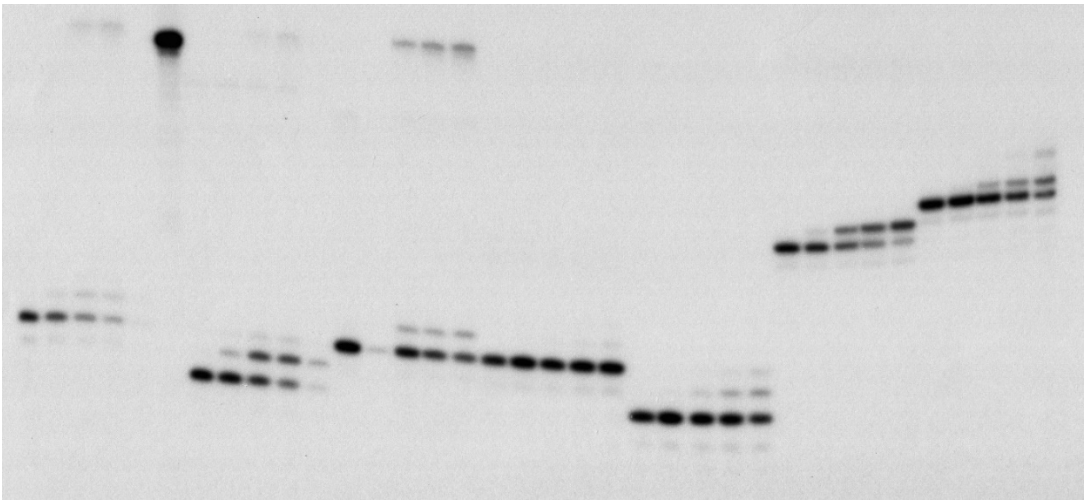


**Figure S7A.** Three independent experiments of SSB rejoining, formed from *ds*-oligonucleotide presented in **Table 1**, after UDG and HAPE1 digestion, by nuclear extract of xrs5 cells.

**Experiment 1**



**Experiment 2**



**Experiment 3**

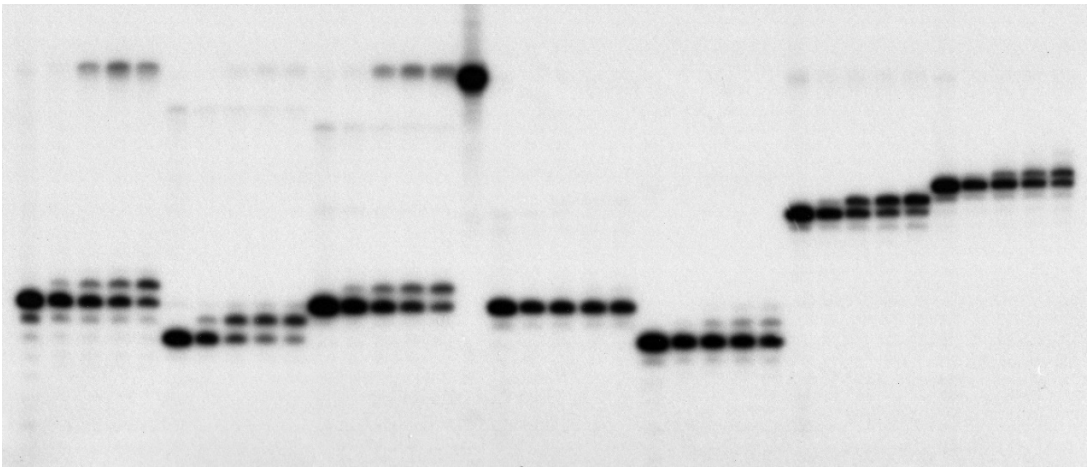
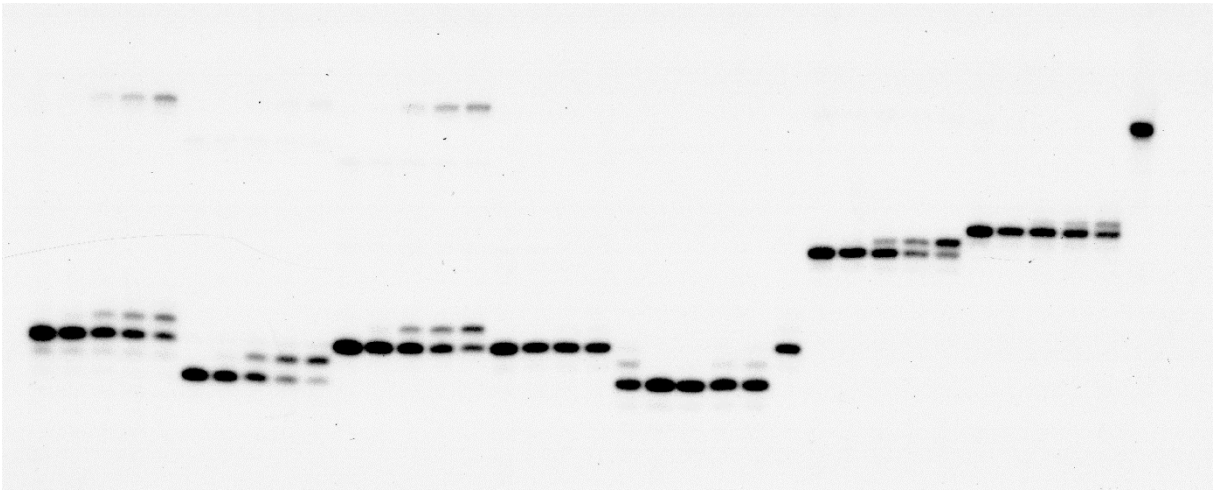
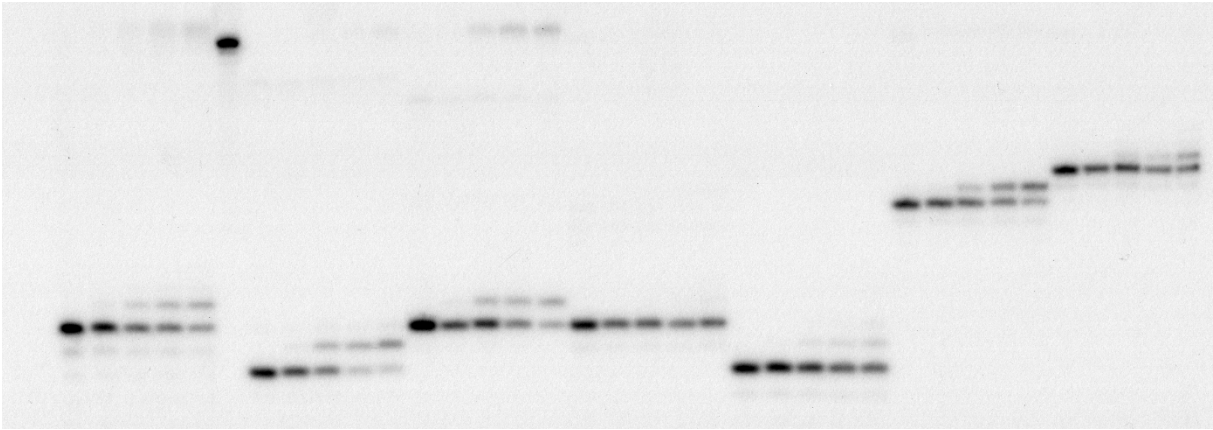


**Figure S7B.** Three independent experiments of SSB rejoining, formed from *ds*-oligonucleotide presented in **Table 1**, after UDG and hAPE1 digestion, by nuclear extract of xrs5 cells in the PCNA presence of an external source.

**Experiment 1**



**Experiment 2**



**Experiment 3**

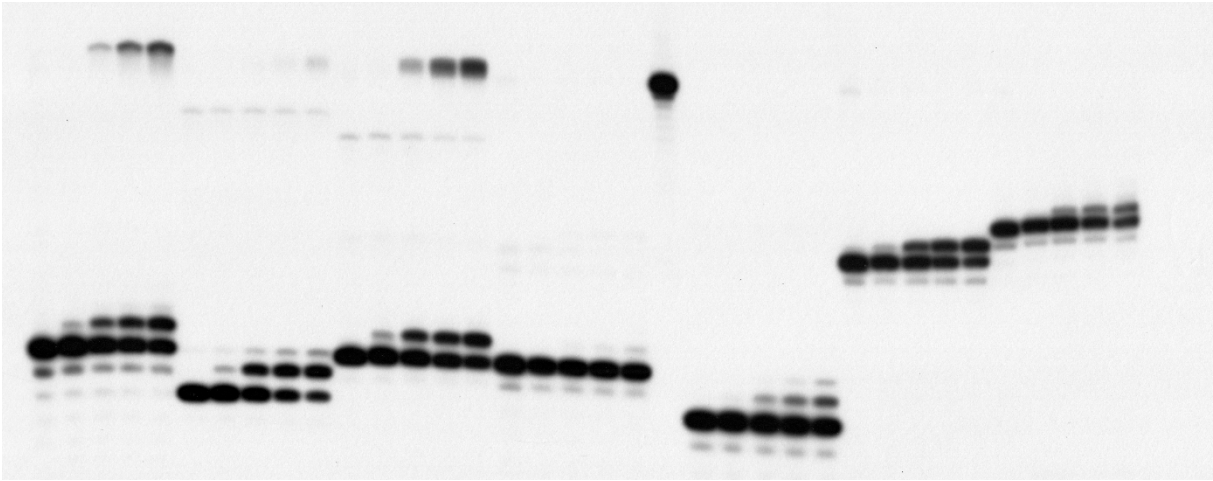
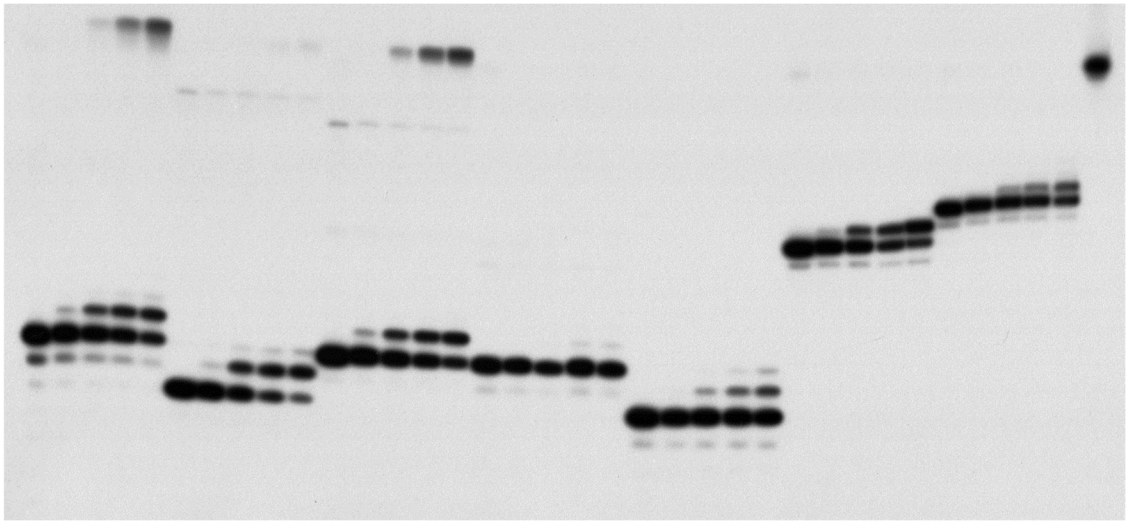
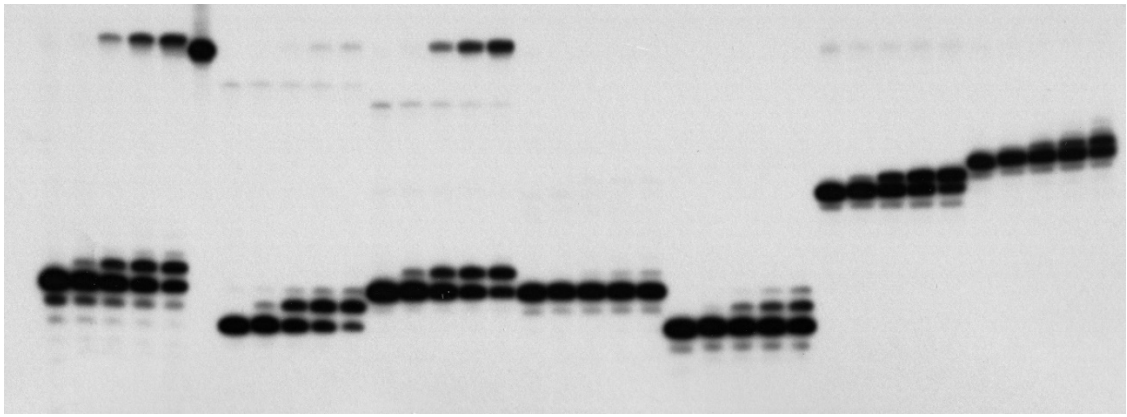


**Figure S7C.** Three independent experiments of SSB rejoining, formed from *ds*-oligonucleotide presented in **Table 1**, after UDG and hAPE1 digestion, by nuclear extract of xrs5 cells in the XRCC1 presence of an external source.

**Experiment 1**



**Experiment 2**



**Experiment 3**

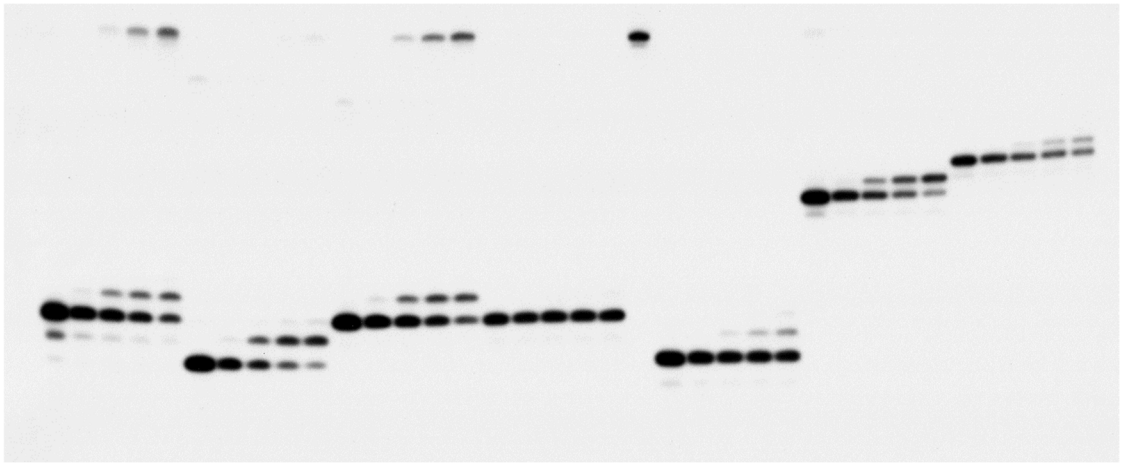
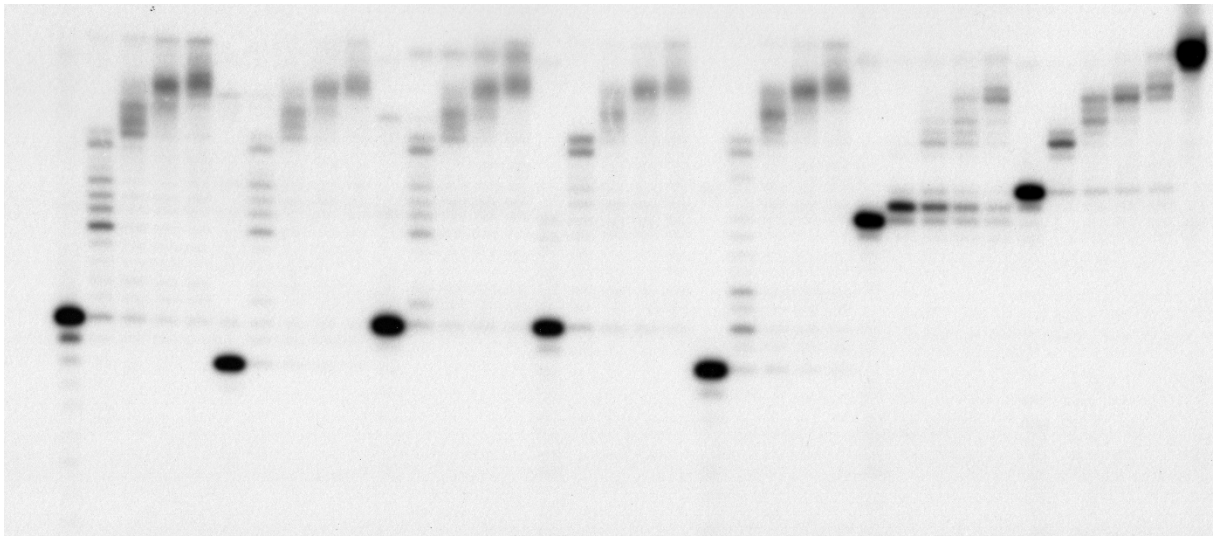
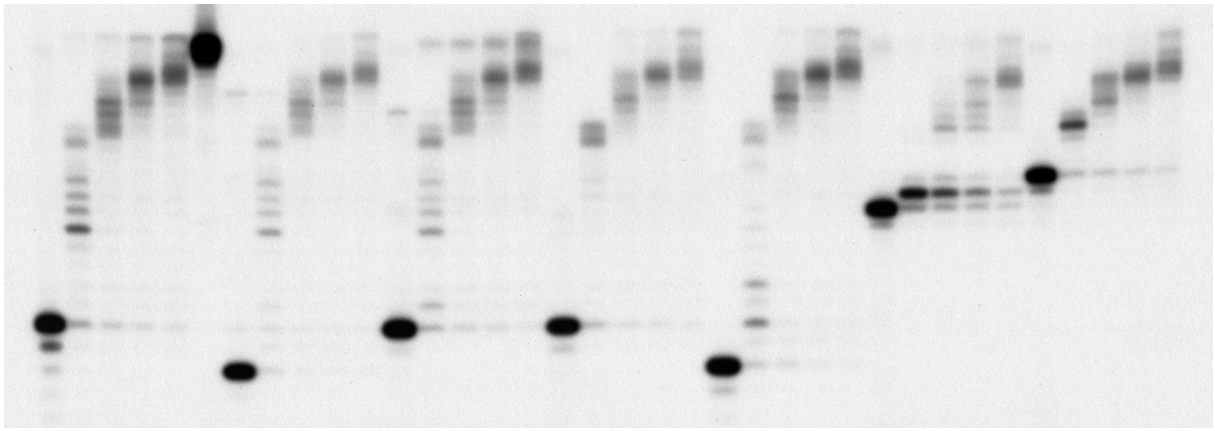


**Figure S7D.** Three independent experiments of SSB rejoining, formed from *ds*-oligonucleotide presented in Table 1, after UDG and hAPE1 digestion, by nuclear extract of xrs5 cells in the Polβ presence of an external source.

**Experiment 1**



**Experiment 2**



**Experiment 3**

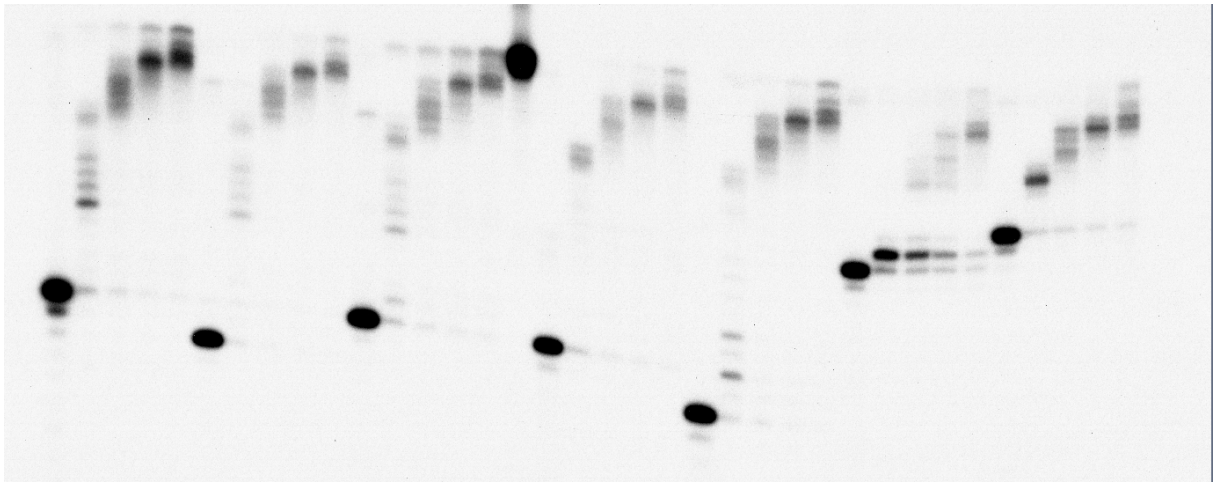


**Table S1.** The raw data presented by graphs in **Fig. 3**. Average and corresponding standard deviations values.

Time scale of strand elongation contained in primer or descending strand clustered lesion hybridized to non-damaged template of *ds*-DNA, after UDG and hAPE1 digestion, by:

**A) exclusively Polβ**

| Time [min] | dU"0" | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+)3 | dU(+)5 |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 64.97 | 68.51 | 50.48 | 0 | 41.80 | 39.17 | 68.49 |
| 5 | 82.96 | 80.09 | 61.83 | 15.66 | 67.79 | 53.043 | 68.52 |
| 10 | 86.81 | 85.35 | 73.74 | 16.19 | 81.80 | 59.00 | 79.68 |
| 15 | 87.55 | 86.65 | 74.63 | 17.60 | 86.89 | 54.32 | 90.20 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 72.867 | 65.69 | 52.53 | 0 | 44.30 | 35.59 | 58.59 |
| 5 | 82.63 | 79.27 | 63.57 | 18.85 | 71.16 | 52.42 | 70.24 |
| 10 | 85.43 | 83.44 | 77.22 | 20.50 | 82.55 | 59.58 | 78.75 |
| 15 | 84.68 | 84.72 | 78.15 | 23.14 | 84.96 | 60.86 | 82.88 |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 66.97 | 63.67 | 51.92 | 0.00 | 45.31 | 54.28 | 65.11 |
| 5 | 81.50 | 78.70 | 60.10 | 25.14 | 68.69 | 54.00 | 60.74 |
| 10 | 86.04 | 85.71 | 71.40 | 36.60 | 81.90 | 57.39 | 73.96 |
| 15 | 86.36 | 87.62 | 74.21 | 33.92 | 86.58 | 53.57 | 79.73 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 68.27 | 65.96 | 51.64 | 0.00 | 43.80 | 43.01 | 64.06 |
| 5 | 82.37 | 79.35 | 61.83 | 19.88 | 69.21 | 53.15 | 66.50 |
| 10 | 86.09 | 84.83 | 74.12 | 24.43 | 82.08 | 58.65 | 77.46 |
| 15 | 86.20 | 86.33 | 75.67 | 24.89 | 86.15 | 56.25 | 84.27 |
| **Standard Deviation** | | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 4.11 | 2.43 | 1.05 | 0.00 | 1.81 | 9.92 | 5.03 |
| 5 | 0.77 | 0.70 | 1.73 | 4.83 | 1.74 | 0.79 | 5.06 |
| 10 | 0.70 | 1.22 | 2.93 | 10.76 | 0.40 | 1.13 | 3.07 |
| 15 | 1.44 | 1.48 | 2.16 | 8.30 | 1.04 | 4.01 | 5.37 |

## B) Polβ in the presence of XRCC1

| Time [min] | dU(0) | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+)3 | dU(+)5 |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 86.26 | 80.71 | 61.68 | 22.24 | 71.52 | 63.57 | 72.51 |
| 5 | 98.69 | 94.51 | 87.12 | 76.81 | 95.66 | 74.44 | 91.28 |
| 15 | 96.03 | 99.35 | 98.64 | 93.75 | 99.81 | 68.54 | 94.83 |
| 30 | 97.59 | 100.00 | 96.79 | 97.31 | 100.54 | 76.28 | 94.62 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 83.81 | 80.93 | 72.15 | 54.81 | 75.39 | 62.20 | 75.87 |
| 5 | 93.10 | 93.20 | 89.20 | 84.42 | 92.76 | 75.72 | 89.56 |
| 15 | 94.08 | 97.29 | 93.95 | 91.66 | 95.94 | 82.53 | 91.39 |
| 30 | 94.02 | 97.98 | 94.43 | 94.13 | 97.10 | 81.79 | 92.20 |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 90.01 | 92.88 | 92.06 | 90.80 | 84.42 | 62.56 | 82.86 |
| 5 | 93.87 | 95.34 | 93.65 | 94.86 | 95.49 | 89.92 | 88.12 |
| 15 | 94.90 | 94.69 | 94.80 | 92.27 | 95.76 | 88.68 | 88.02 |
| 30 | 94.07 | 96.59 | 94.92 | 93.02 | 94.36 | 83.15 | 87.48 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 86.69 | 84.84 | 75.30 | 55.95 | 77.11 | 62.78 | 77.08 |
| 5 | 95.22 | 94.35 | 89.99 | 85.36 | 94.64 | 80.03 | 89.65 |
| 15 | 95.00 | 97.11 | 95.80 | 92.56 | 97.17 | 79.92 | 91.41 |
| 30 | 95.22 | 98.22 | 95.38 | 94.82 | 97.34 | 80.41 | 91.43 |
| | **Standard Deviation** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 3.10 | 6.09 | 10.70 | 20.46 | 4.80 | 0.29 | 3.74 |
| 5 | 1.07 | 1.07 | 2.38 | 5.77 | 1.40 | 7.28 | 0.86 |
| 15 | 0.51 | 1.45 | 0.93 | 0.46 | 0.77 | 4.50 | 1.95 |
| 30 | 0.68 | 0.88 | 0.47 | 0.91 | 1.65 | 1.37 | 2.54 |

## C) Polβ in the presence of PCNA

| Time [min] | dU(0) | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+3) | dU(+)5 |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 84.91 | 78.90 | 69.85 | 45.30 | 79.49 | 59.14 | 76.27 |
| 5 | 94.33 | 93.93 | 87.47 | 85.53 | 95.9 | 73.76 | 92.65 |
| 10 | 94.72 | 96.85 | 92.43 | 95.15 | 96.63 | 81.77 | 92.99 |
| 15 | 96.69 | 98.04 | 93.50 | 96.61 | 97.77 | 87.16 | 95.48 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 85.01 | 79.47 | 71.03 | 41.41 | 81.02 | 58.31 | 77.95 |
| 5 | 96.40 | 94.36 | 87.82 | 85.52 | 97.12 | 76.80 | 93.45 |
| 10 | 97.91 | 96.97 | 91.66 | 96.28 | 97.26 | 85.95 | 96.49 |
| 15 | 97.52 | 98.90 | 94.27 | 97.84 | 99.70 | 88.67 | |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 86.84 | 79.92 | 73.76 | 47.46 | 80.13 | 55.18 | 78.41 |
| 5 | 96.44 | 93.73 | 88.52 | 85.83 | 96.07 | 74.15 | 92.36 |
| 10 | 98.21 | 96.92 | 92.72 | 96.12 | 96.38 | 80.43 | 95.49 |
| 15 | 97.65 | 98.75 | 91.50 | 97.02 | 98.16 | 86.81 | 95.28 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 85.59 | 79.43 | 71.54 | 44.72 | 80.21 | 57.54 | 77.54 |
| 5 | 95.72 | 94.00 | 87.94 | 85.63 | 96.40 | 74.90 | 92.82 |
| 10 | 96.94 | 96.91 | 92.27 | 95.85 | 96.75 | 82.72 | 94.99 |
| 15 | 97.29 | 98.56 | 93.09 | 97.16 | 98.55 | 87.55 | 98.20 |
| | **Standard Deviation** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 1.09 | 0.51 | 2.00 | 3.07 | 0.77 | 2.09 | 1.13 |
| 5 | 1.20 | 0.31 | 0.53 | 0.18 | 0.63 | 1.65 | 0.57 |
| 10 | 1.93 | 0.06 | 0.55 | 0.62 | 0.46 | 2.88 | 1.80 |
| 15 | 0.52 | 0.46 | 1.43 | 0.63 | 1.02 | 0.99 | 4.89 |

## D) nuclear extract of xrs5 cells

| Time [min] | dU0 | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+3) | dU(+5) |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 | 0 |
| 5 | 27.05 | 29.60 | 21.56 | 0.00 | 0.00 | 11.99 | 0 |
| 30 | 49.79 | 53.14 | 51.09 | 0.00 | 0.11 | 44.95 | 21.23 |
| 60 | 60.45 | 63.61 | 64.40 | 0.00 | 7.16 | 60.99 | 40.42 |
| 120 | 72.59 | 78.06 | 72.85 | 0.91 | 14.75 | 73.06 | 60.11 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 18.43 | 53.57 | 19.85 | 5.44 | 8.69 | 18.46 | 12.98 |
| 30 | 28.60 | 67.33 | 40.42 | 11.48 | 16.12 | 34.85 | 28.78 |
| 60 | 55.93 | 83.72 | 59.46 | 12.79 | 29.32 | 52.85 | 35.27 |
| 120 | 78.51 | 90.30 | 71.78 | 17.11 | 34.75 | 65.49 | 41.66 |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 25.37 | 24.71 | 31.13 | 5.42 | 7.23 | 25.53 | 13.42 |
| 30 | 43.54 | 49.01 | 48.35 | 10.11 | 14.02 | 46.24 | 33.23 |
| 60 | 58.38 | 60.40 | 62.72 | 11.22 | 24.87 | 57.91 | 37.35 |
| 120 | 69.06 | 70.98 | 70.69 | 13.96 | 33.15 | 67.25 | 58.81 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 23.62 | 35.96 | 24.18 | 2.72 | 3.74 | 18.66 | 8.80 |
| 30 | 40.64 | 56.50 | 46.62 | 6.23 | 10.09 | 42.01 | 27.75 |
| 60 | 58.25 | 69.24 | 62.19 | 7.63 | 20.45 | 57.25 | 37.68 |
| 120 | 73.39 | 79.78 | 71.77 | 10.66 | 27.55 | 68.60 | 53.52 |
| | **Standard Deviation** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 4.57 | 15.45 | 6.08 | 4.69 | 7.34 | 6.77 | 7.63 |
| 30 | 10.89 | 9.61 | 5.54 | 7.94 | 8.70 | 6.24 | 6.06 |
| 60 | 2.27 | 12.64 | 2.51 | 7.62 | 11.72 | 4.11 | 2.59 |
| 120 | 4.77 | 9.77 | 1.08 | 8.59 | 11.11 | 3.96 | 10.30 |

## E) nuclear extract of xrs5 cells in the PCNA presence of external source

| Time [min] | dU0 | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+3) | dU(+5) |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 13.42 | 10.16 | 22.24 | 0.00 | 7.97 | 10.94 | 1.80 |
| 30 | 38.47 | 37.32 | 45.32 | 0.00 | 20.44 | 29.86 | 23.41 |
| 60 | 53.95 | 50.09 | 57.06 | 4.20 | 28.14 | 38.39 | 29.11 |
| 120 | 59.38 | 64.36 | 61.63 | 14.04 | 31.36 | 50.54 | 35.00 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 8.28 | 8.43 | 8.21 | 2.17 | 1.41 | 9.69 | 13.25 |
| 30 | 20.86 | 31.91 | 23.55 | 3.33 | 1.67 | 20.21 | 12.88 |
| 60 | 35.14 | 54.94 | 39.43 | 4.39 | 6.85 | 40.18 | 18.97 |
| 120 | 52.80 | 71.45 | 54.22 | 8.66 | 11.11 | 61.93 | 29.00 |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 13.71 | 17.09 | 22.35 | 0.00 | 1.13 | 7.61 | 0.00 |
| 30 | 39.35 | 40.34 | 49.90 | 0.00 | 18.40 | 18.71 | 14.18 |
| 60 | 55.65 | 48.00 | 55.96 | 9.50 | 25.87 | 38.93 | 18.76 |
| 120 | 59.88 | 61.09 | 56.45 | 14.40 | 26.70 | 41.19 | 19.97 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 11.80 | 11.89 | 17.60 | 0.00 | 3.50 | 9.41 | 3.10 |
| 30 | 32.89 | 36.52 | 39.59 | 0.00 | 13.50 | 22.93 | 16.82 |
| 60 | 48.25 | 51.01 | 50.82 | 6.03 | 20.29 | 39.17 | 22.28 |
| 120 | 57.35 | 65.64 | 57.44 | 12.37 | 23.05 | 51.22 | 27.99 |
| | **Standard Deviation** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 3.06 | 4.58 | 8.13 | 2.73 | 3.87 | 1.68 | 9.56 |
| 30 | 10.43 | 4.27 | 14.07 | 6.75 | 10.30 | 6.05 | 5.74 |
| 60 | 11.38 | 3.56 | 9.88 | 3.01 | 11.69 | 0.92 | 5.92 |
| 120 | 3.95 | 5.30 | 3.80 | 3.22 | 10.61 | 10.39 | 7.57 |

## F) nuclear extract of xrs5 cells in the XRCC1 presence of external source

| Time [min] | dU0 | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+3) | dU(+5) |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 10.23 | 6.27 | 12.36 | 0.00 | 0.79 | 13.72 | 6.06 |
| 30 | 34.83 | 36.63 | 40.15 | 0.27 | 10.40 | 32.74 | 24.46 |
| 60 | 50.89 | 49.09 | 54.71 | 3.39 | 21.96 | 44.25 | 34.41 |
| 120 | 65.11 | 62.39 | 64.75 | 3.84 | 29.13 | 52.48 | 44.20 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 30.03 | 21.29 | 31.50 | 6.56 | 11.13 | 18.80 | 17.69 |
| 30 | 46.99 | 38.92 | 50.80 | 8.70 | 24.21 | 33.53 | 29.29 |
| 60 | 57.92 | 48.80 | 60.35 | 12.36 | 36.77 | 38.17 | 35.19 |
| 120 | 66.92 | 60.27 | 64.22 | 14.63 | 47.14 | 52.66 | 46.93 |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 6.45 | 7.49 | 8.01 | 4.42 | 6.97 | 9.86 | 10.29 |
| 30 | 28.55 | 37.79 | 30.26 | 5.66 | 13.20 | 36.48 | 17.32 |
| 60 | 43.81 | 61.86 | 47.95 | 5.93 | 15.80 | 51.61 | 29.15 |
| 120 | 61.51 | 77.49 | 64.20 | 11.72 | 22.79 | 66.49 | 44.16 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 15.57 | 11.68 | 17.29 | 3.61 | 6.30 | 14.12 | 11.35 |
| 30 | 36.79 | 37.78 | 40.40 | 4.88 | 15.94 | 34.25 | 23.69 |
| 60 | 50.88 | 53.25 | 54.34 | 7.23 | 24.84 | 44.68 | 32.92 |
| 120 | 64.51 | 66.72 | 64.39 | 10.06 | 33.02 | 57.21 | 45.09 |
| | **Standard Deviation** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 12.66 | 8.34 | 12.50 | 3.43 | 5.20 | 4.48 | 5.88 |
| 30 | 9.38 | 1.14 | 10.27 | 4.27 | 7.30 | 1.97 | 6.02 |
| 60 | 7.05 | 7.46 | 6.21 | 4.62 | 10.78 | 6.73 | 3.28 |
| 120 | 2.76 | 9.39 | 0.31 | 5.58 | 12.63 | 8.04 | 1.59 |

## G) nuclear extract of xrs5 cells in the Polβ presence of external source

| Time [min] | dU0 | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+3) | dU(+5) |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 90.23 | 90.82 | 90.59 | 85.99 | 91.99 | 77.88 | 92.45 |
| 30 | 97.58 | 100.00 | 99.12 | 99.82 | 98.37 | 87.39 | 95.08 |
| 60 | 99.00 | 100.00 | 100.00 | 100.00 | 99.74 | 93.36 | 95.85 |
| 120 | 99.51 | 100.00 | 100.00 | 100.00 | 100.00 | 94.09 | 95.93 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 91.72 | 96.65 | 86.31 | 92.49 | 90.94 | 74.98 | 89.89 |
| 30 | 97.68 | 100.00 | 98.25 | 98.43 | 98.50 | 83.78 | 93.73 |
| 60 | 99.11 | 100.00 | 98.84 | 98.90 | 99.86 | 85.58 | 94.79 |
| 120 | 99.28 | 100.00 | 96.09 | 99.26 | 99.98 | 90.25 | 95.92 |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15 | 91.61 | 95.08 | 92.44 | 90.13 | 93.09 | 51.07 | 92.03 |
| 30 | 96.11 | 99.06 | 96.90 | 97.05 | 97.92 | 36.43 | 90.49 |
| 60 | 97.89 | 99.31 | 97.77 | 97.84 | 99.08 | 64.40 | 91.49 |
| 120 | 98.72 | 99.61 | 97.81 | 98.51 | 99.49 | 82.60 | 93.76 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15 | 91.19 | 94.19 | 89.78 | 89.54 | 92.01 | 67.98 | 91.46 |
| 30 | 97.12 | 99.81 | 98.09 | 98.43 | 98.26 | 69.20 | 93.10 |
| 60 | 98.67 | 100.00 | 98.87 | 99.03 | 99.56 | 81.11 | 94.04 |
| 120 | 99.17 | 100.00 | 98.02 | 99.35 | 100.00 | 88.98 | 95.20 |
| | **Standard Deviation** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15 | 0.83 | 3.01 | 3.15 | 3.29 | 1.08 | 14.71 | 1.38 |
| 30 | 0.88 | 0.67 | 1.12 | 1.39 | 0.31 | 28.44 | 2.36 |
| 60 | 0.68 | 0.76 | 1.12 | 1.27 | 0.42 | 14.99 | 2.28 |
| 120 | 0.41 | 0.55 | 2.04 | 0.90 | 0.57 | 5.85 | 1.25 |

The repair assay of oligonucleotides after UDG and HAPE1 digestion, by:

**H) nuclear extract of xrs5 cells**

| Time [min] | dU0 | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+3) | dU(+5) |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 2.20 | 1.46 | 2.18 | 1.81 | 0.00 | 0.00 | 0.00 |
| 30 | 12.75 | 1.55 | 16.85 | 1.76 | 0.00 | 0.00 | 0.00 |
| 60 | 28.02 | 3.24 | 25.67 | 1.91 | 0.00 | 0.00 | 0.00 |
| 120 | 38.57 | 6.48 | 34.16 | 1.18 | 0.00 | 0.00 | 0.00 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 4.30 | 1.45 | 4.16 | 2.38 | 0.00 | 0.00 | 0.00 |
| 30 | 10.59 | 2.22 | 11.54 | 1.63 | 0.00 | 0.00 | 0.00 |
| 60 | 18.67 | 3.26 | 20.78 | 2.11 | 0.00 | 0.00 | 0.00 |
| 120 | 21.74 | 4.35 | 31.38 | 2.28 | 0.00 | 0.00 | 0.00 |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1.49 | 1.34 | 1.77 | 1.18 | 0.00 | 0.00 | 0.00 |
| 30 | 7.63 | 1.39 | 14.78 | 1.14 | 0.00 | 0.00 | 0.00 |
| 60 | 25.34 | 3.16 | 28.43 | 1.51 | 0.00 | 0.00 | 0.00 |
| 120 | 35.66 | 5.75 | 34.64 | 0.83 | 0.00 | 0.00 | 0.00 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 0.00 | 1.42 | 2.70 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 10.32 | 1.72 | 14.39 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 24.01 | 3.22 | 24.96 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 31.99 | 5.53 | 33.39 | 0.00 | 0.00 | 0.00 | 0.00 |
| | **Standard Deviation** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1.46 | 0.06 | 1.28 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 2.57 | 0.44 | 2.68 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 4.82 | 0.05 | 3.87 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 9.00 | 1.08 | 1.76 | 0.00 | 0.00 | 0.00 | 0.00 |

## I) nuclear extract of xrs5 cells in the PCNA presence of external source.

| Time [min] | dU0 | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+3) | dU(+5) |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 0.00 | 0.19 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 6.11 | 0.00 | 10.48 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 20.54 | 2.29 | 25.34 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 30.22 | 11.07 | 31.95 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1.49 | 1.08 | 1.15 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 5.54 | 2.37 | 5.63 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 13.26 | 3.60 | 14.70 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 24.93 | 5.71 | 19.43 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | -4.48 | 0.64 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 11.76 | 0.49 | 19.34 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 24.10 | 3.19 | 24.37 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 30.48 | 9.25 | 25.85 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 0.00 | 0.64 | 0.47 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 7.80 | 0.95 | 11.82 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 19.30 | 3.03 | 21.47 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 28.55 | 8.68 | 25.74 | 0.00 | 0.00 | 0.00 | 0.00 |
| | **Standard Deviation** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 3.11 | 0.45 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 3.44 | 1.25 | 6.95 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 5.53 | 0.67 | 5.89 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 3.13 | 2.73 | 6.26 | 0.00 | 0.00 | 0.00 | 0.00 |

## J) nuclear extract of xrs5 cells in the XRCC1 presence of external source

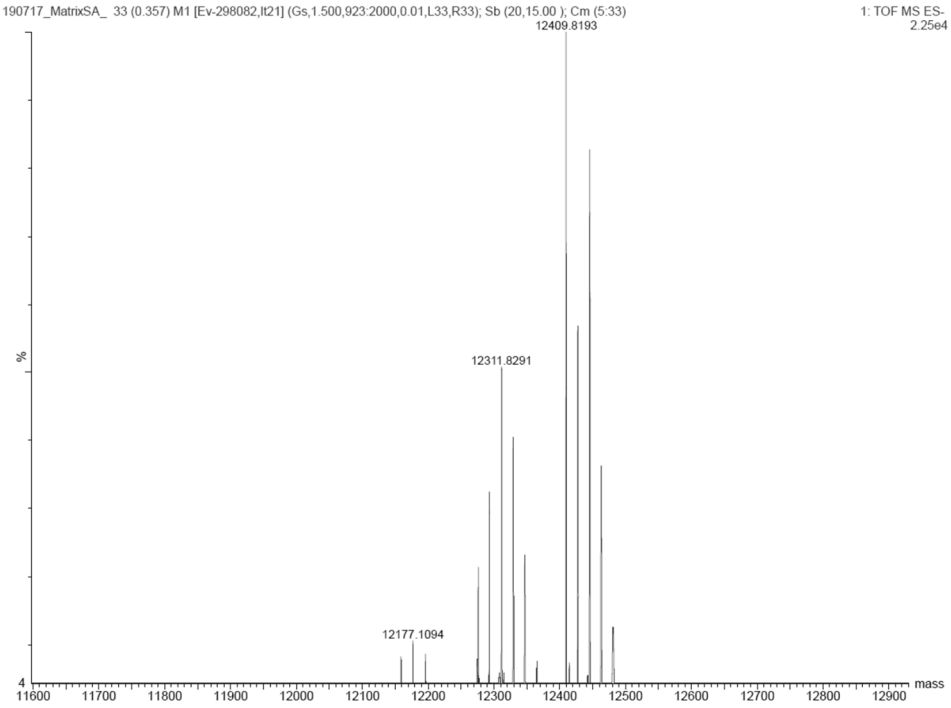
| Time [min] | dU0 | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+3) | dU(+5) |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 0.92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 7.11 | 0.00 | 10.90 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 22.15 | 0.37 | 25.39 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 37.83 | 3.03 | 33.88 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 2.40 | 0.88 | 1.67 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 14.94 | 1.47 | 18.14 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 28.08 | 3.91 | 29.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 40.84 | 5.77 | 35.88 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 6.66 | 0.75 | 6.23 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 16.02 | 3.69 | 14.75 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 28.61 | 5.40 | 22.49 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 0.99 | 0.00 | 0.28 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 9.57 | 0.74 | 11.76 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 22.08 | 2.66 | 23.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 35.76 | 4.73 | 30.75 | 0.00 | 0.00 | 0.00 | 0.00 |
| | **Standard Deviation** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | 1.38 | 0.90 | 1.27 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 4.65 | 0.73 | 6.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 6.03 | 1.98 | 7.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| 120 | 6.38 | 1.49 | 7.22 | 0.00 | 0.00 | 0.00 | 0.00 |

## K) nuclear extract of xrs5 cells in the Polβ presence of external source

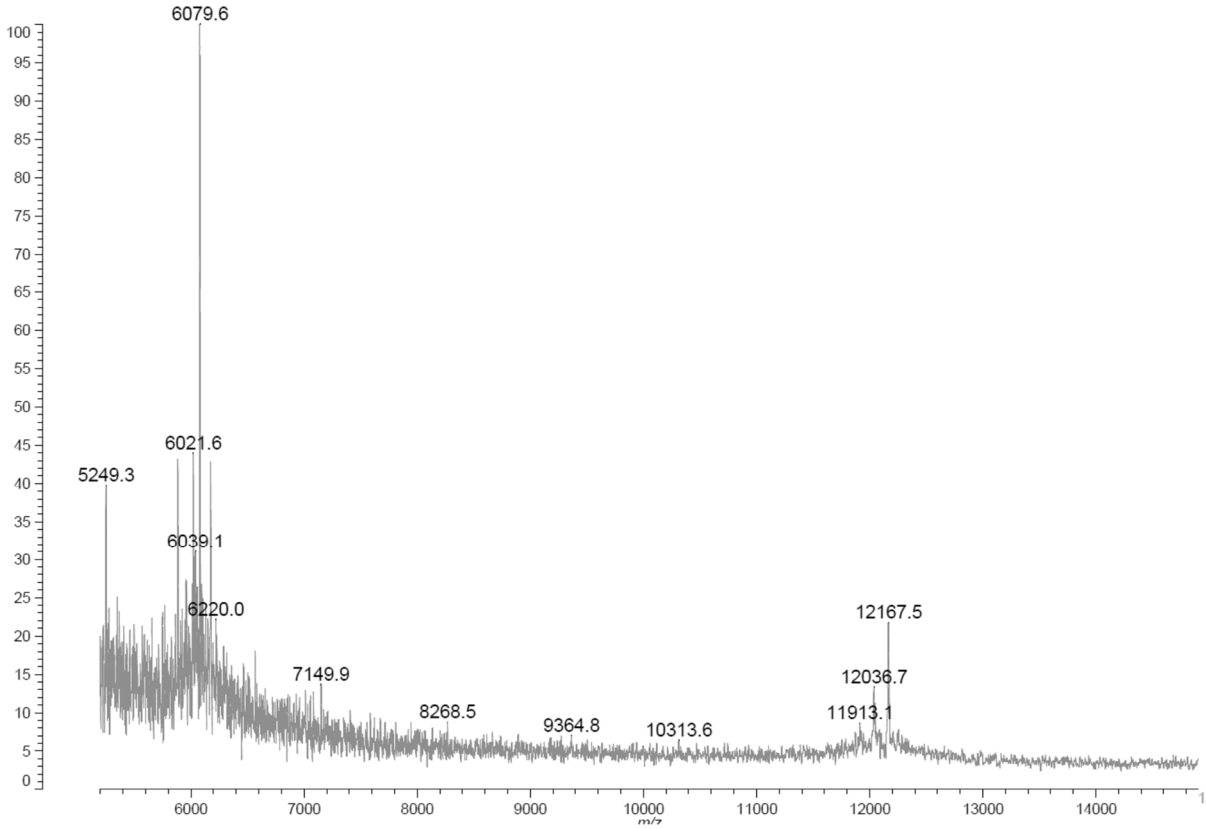
| Time [min] | dU0 | dU(-5) | dU(-3) | dU(+/-)3 | dU(+/-)5 | dU(+3) | dU(+5) |
|---|---|---|---|---|---|---|---|
| **Experiment 1** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15 | 1.56 | 0.00 | 4.73 | 0.00 | 0.00 | 2.40 | 0.90 |
| 30 | 4.03 | 1.72 | 8.20 | 1.34 | 1.36 | 2.22 | 1.43 |
| 60 | 5.90 | 4.11 | 13.88 | 3.52 | 3.90 | 2.85 | 3.26 |
| 120 | 11.89 | 12.01 | 26.80 | 11.94 | 25.83 | 7.24 | 11.49 |
| **Experiment 2** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15 | 0.92 | 0.90 | 2.73 | 0.88 | 1.08 | 0.68 | -0.35 |
| 30 | 2.75 | 0.78 | 3.65 | 1.55 | 1.28 | 1.13 | 0.15 |
| 60 | 10.68 | 2.25 | 7.17 | 3.64 | 2.44 | 2.06 | 1.03 |
| 120 | 32.45 | 3.62 | 18.24 | 6.64 | 7.70 | 4.82 | 11.55 |
| **Experiment 3** | **Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15 | 3.19 | 0.00 | 2.26 | 0.00 | 0.00 | 0.00 | 0.00 |
| 30 | 6.19 | 0.13 | 6.43 | 0.91 | 0.09 | 1.08 | 0.22 |
| 60 | 12.21 | 0.94 | 10.30 | 2.99 | 1.81 | 5.08 | 4.27 |
| 120 | 19.59 | 5.56 | 27.01 | 18.08 | 8.66 | 16.65 | 24.76 |
| **Time [min]** | **Average Percentage of Digestion [%]** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15 | 1.89 | 0.00 | 3.24 | 0.00 | 0.02 | 0.89 | 0.00 |
| 30 | 4.32 | 0.88 | 6.09 | 1.27 | 0.91 | 1.47 | 0.60 |
| 60 | 9.60 | 2.43 | 10.45 | 3.38 | 2.71 | 3.33 | 2.85 |
| 120 | 21.31 | 7.07 | 24.02 | 12.22 | 14.06 | 9.57 | 15.93 |
| | **Standard Deviation** | | | | | | |
| 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15 | 1.17 | 1.05 | 1.31 | 1.41 | 1.00 | 1.42 | 1.06 |
| 30 | 1.74 | 0.80 | 2.30 | 0.33 | 0.71 | 0.65 | 0.72 |
| 60 | 3.29 | 1.59 | 3.36 | 0.35 | 1.07 | 1.57 | 1.66 |
| 120 | 10.39 | 4.39 | 5.01 | 5.72 | 10.20 | 6.25 | 7.64 |

# Spectra of Oligonucleotide Mass Spectrometry Analysis

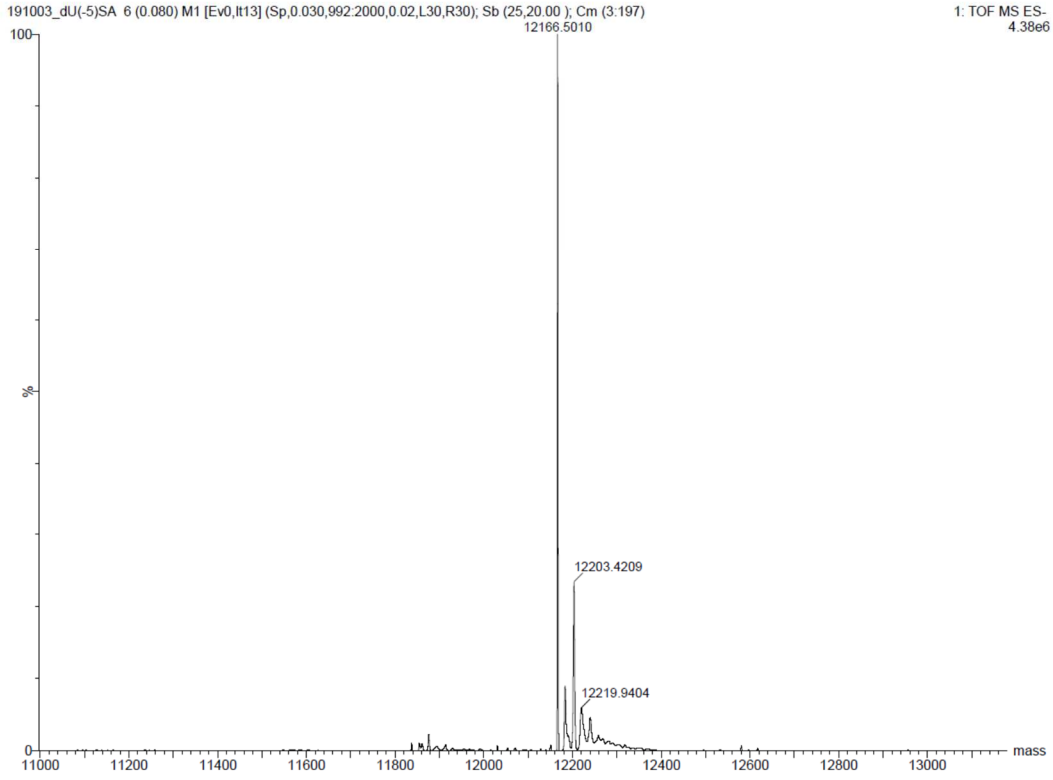
**Matrix** (mass calculated: 12409.14)



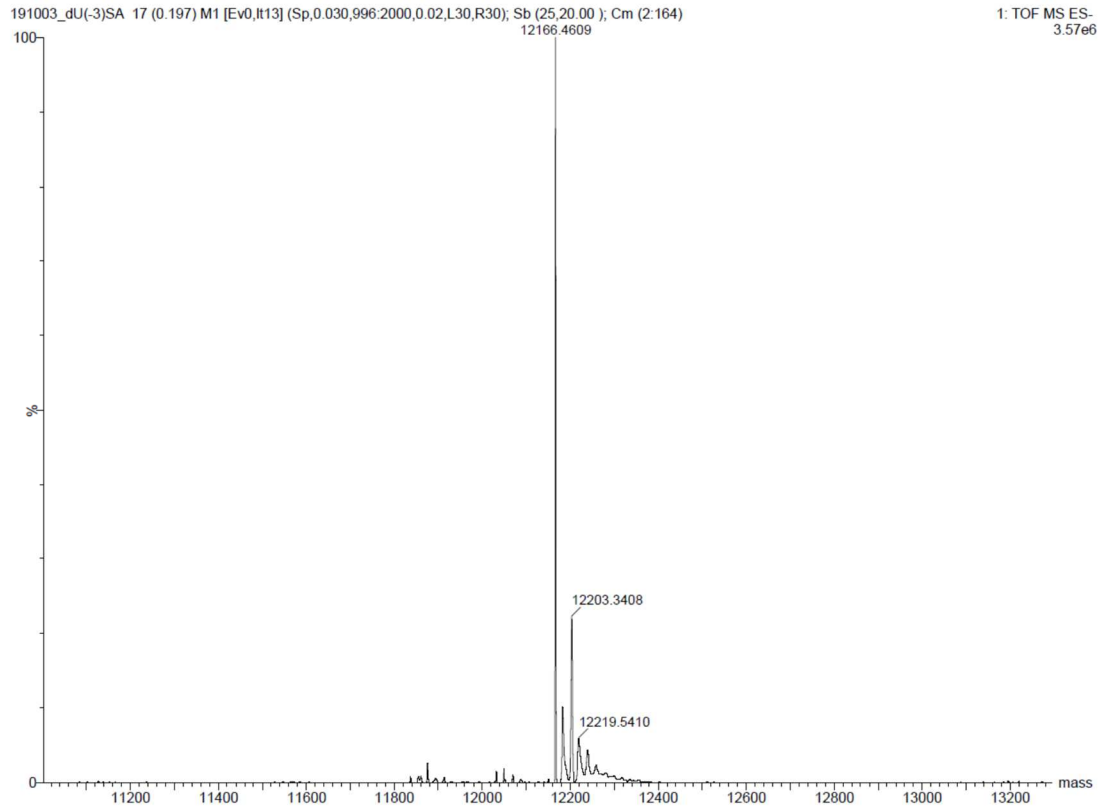

**Cont.dU(0)** (mass calculated: 12167.90)



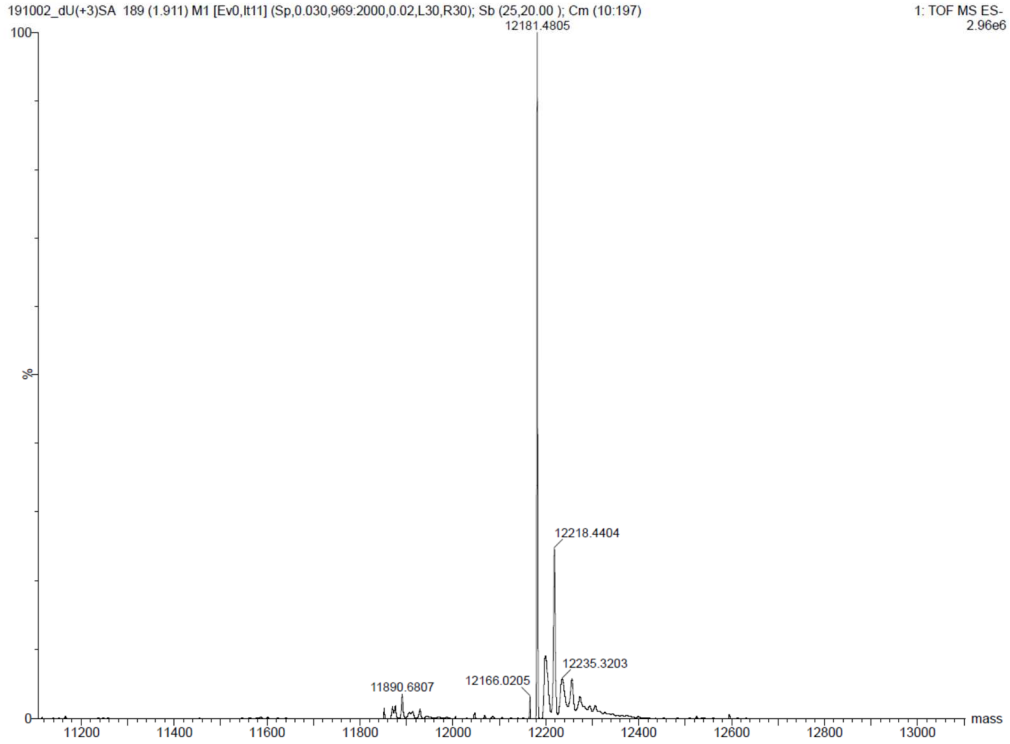
**dU(-5)** (mass calculated: 12165.90)



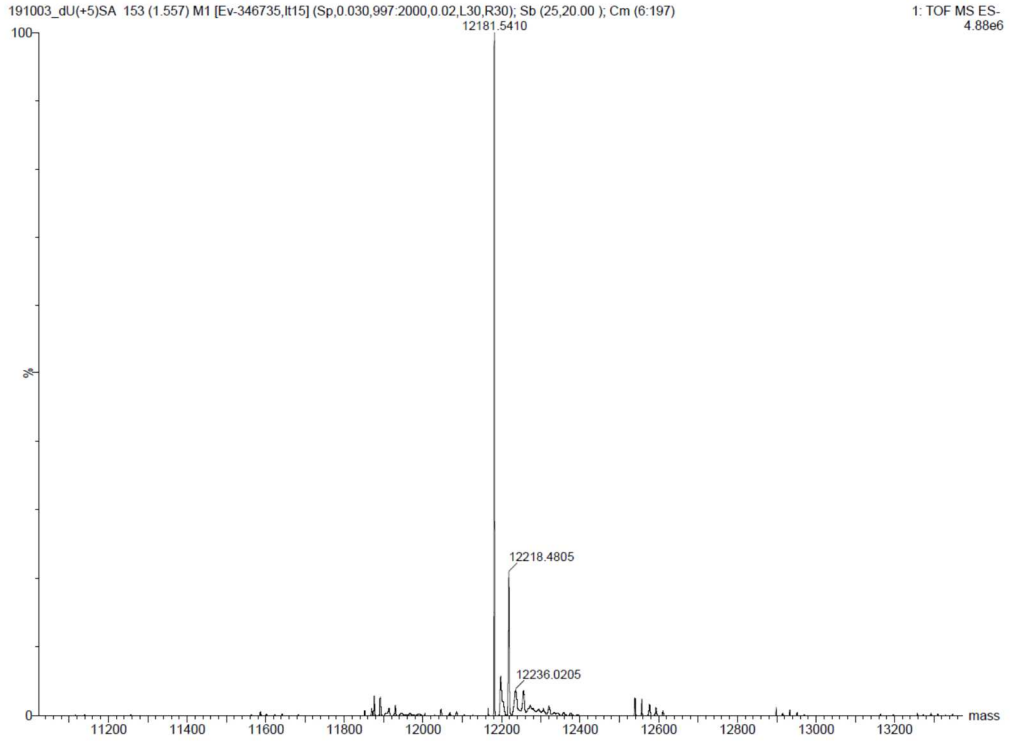

**dU(-3)** (mass calculated: 12165.90)



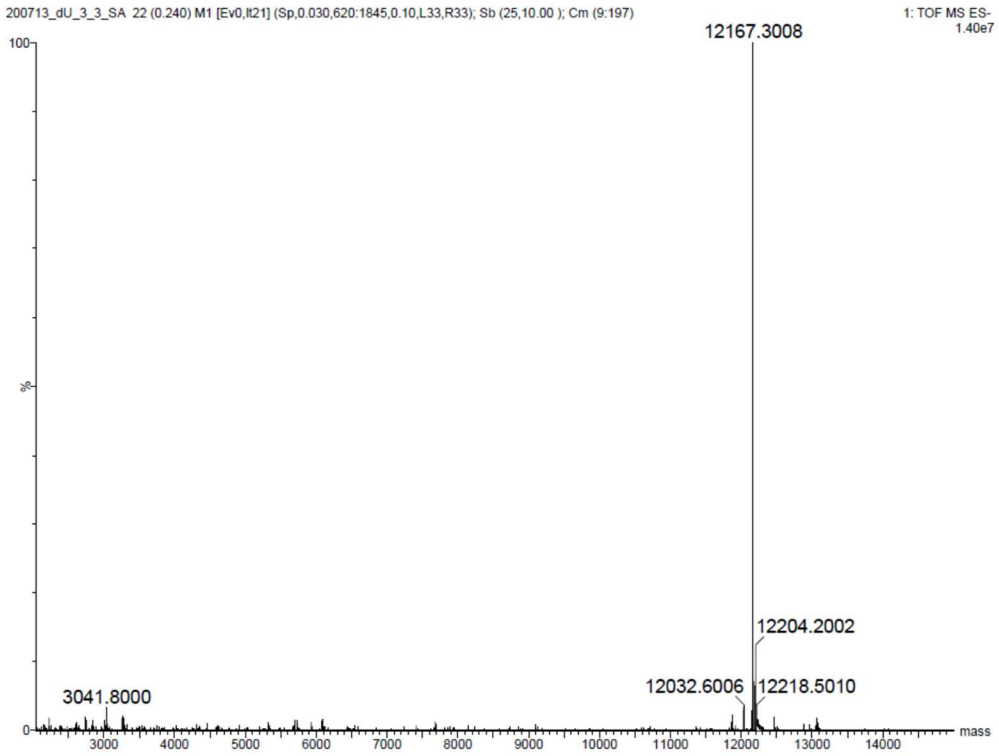
**dU(+3)** (mass calculated: 12180.90)



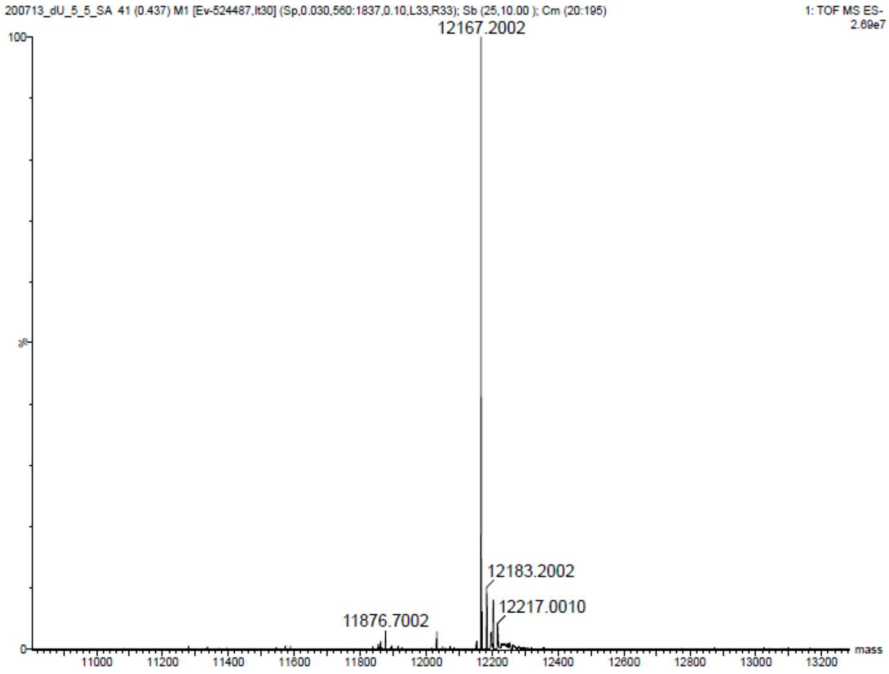

**dU(+5)** (mass calculated: 12180.90)



**dU(+/-)3** (mass calculated: 12166.89)




**dU(+/-)5** (mass calculated: 12166.89)



**Cont.cdA** (mass calculated: 12407.16)

