FUJIFILM
Value from Innovation

Wako

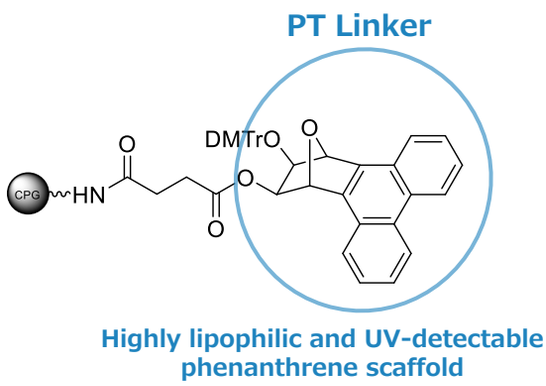
Phenanthrene-type Universal Linker

PT Linker Support

The Phenanthrene-type Linker (PT Linker) is a universal linker for oligonucleotide synthesis. This linker consists of a bicyclic 1,2-diol structure containing a phenanthrene moiety and a succinyl unit that connects the solid support to the phenanthrene via an amide bond. Its high lipophilicity and UV-detectable phenanthrene scaffold facilitate easy separation of the targeted oligonucleotide from linker-derived impurities.[1)]

【Features】

- Easy detection and separation of the targeted product from PT-derived components
- Usable under the same reaction conditions as conventional universal linkers
- Prevents ring-opening reactions typical of maleimide (MI)-type universal linkers



Product Number	Product Name	Solid Support	Loading Amount	Package Size
169-29721	PT Linker CPG 1000 Å	CPG	10～100 μmol/g	1 g
169-29841	PT Linker PS 1000 Å	PS	20～60 μmol/g	1 g

<Mechanism of Oligonucleotide Cleavage from the Universal Support>

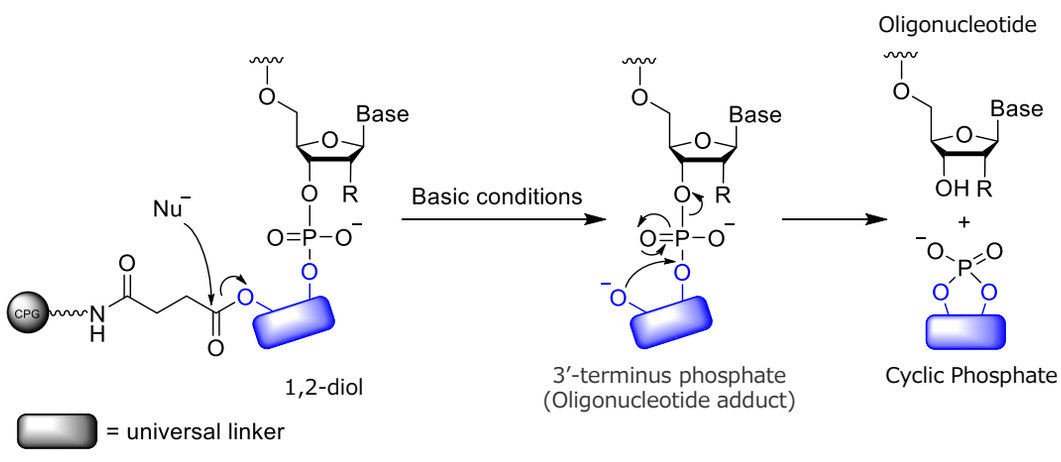
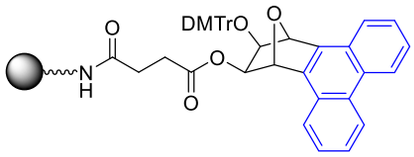


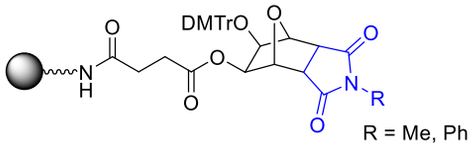
Figure 1 The mechanism for the removal of the 3′-phosphate group by the 1,2-diol in the universal linker.

Comparison of Universal Supports

<Type of Universal Supports>

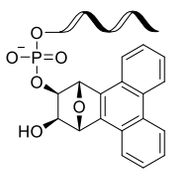


Phenanthrene-type (PT) Linker

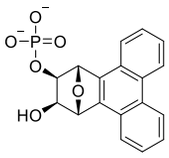


Maleimide-type (MI) Linker

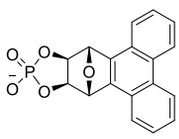
<Expected Products Derived from the PT Linker under Base Treatment Condition>



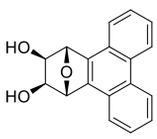
Oligonucleotide-PT
(Oligonucleotide adduct)



p-PT



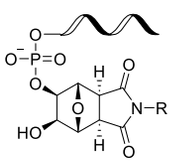
cp-PT

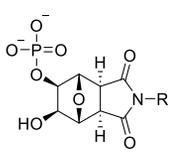


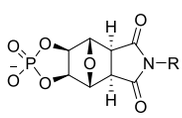
PT

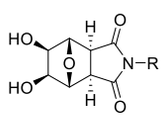
<Products Derived from MI-type Linkers under Base Treatment Condition>

Closed ring products

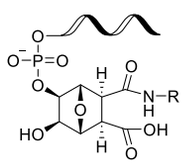




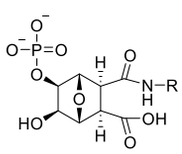




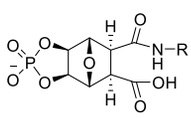
Open ring products



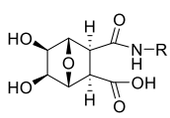
Oligonucleotide-MI
(Oligonucleotide adduct)



p-MI

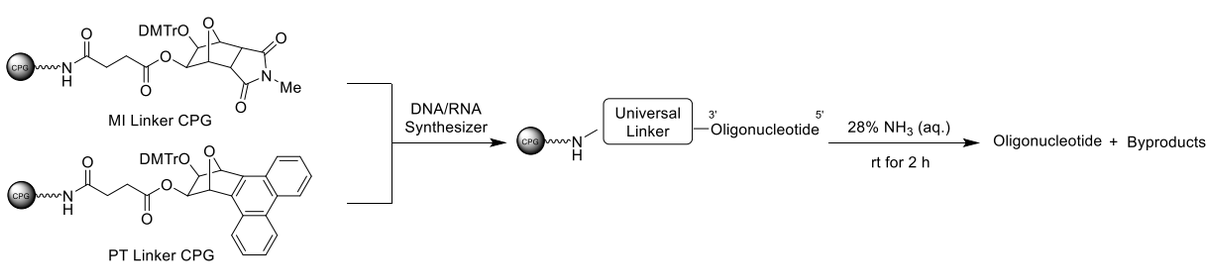


cp-MI



MI

<Oligonucleotide Synthesis in DMTr-off Mode>



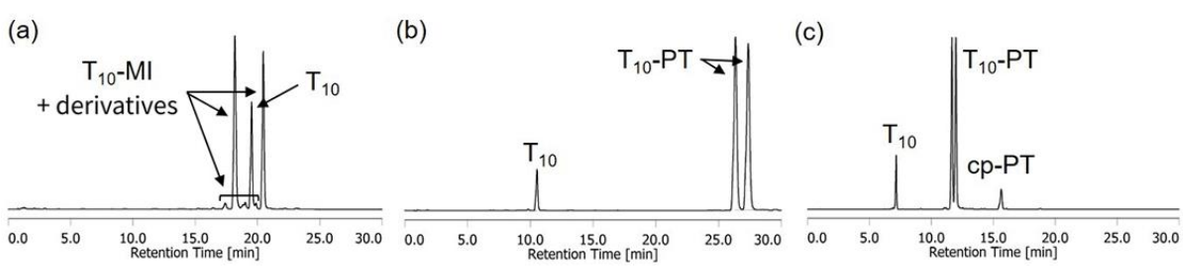
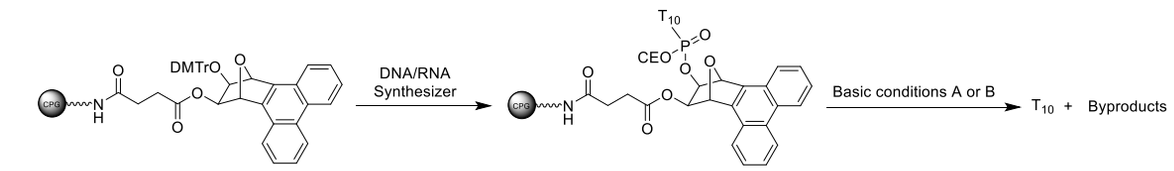


Figure 2 HPLC analysis of ONs released from T_{10}-loaded (a) MI Linker CPG (R=Me) and (b)(c) PT Linker CPG after treatment with 28% NH_3 (aq.) at rt for 2 h. HPLC analytical conditions: (a) 5-15% (b) 8-18% (c) 5-50% Acetonitrile in 0.1 M TEAA (pH 7.0) over a linear gradient for 30 min.

Synthesis of Oligonucleotide (T_{10}) in DMTr-off Mode



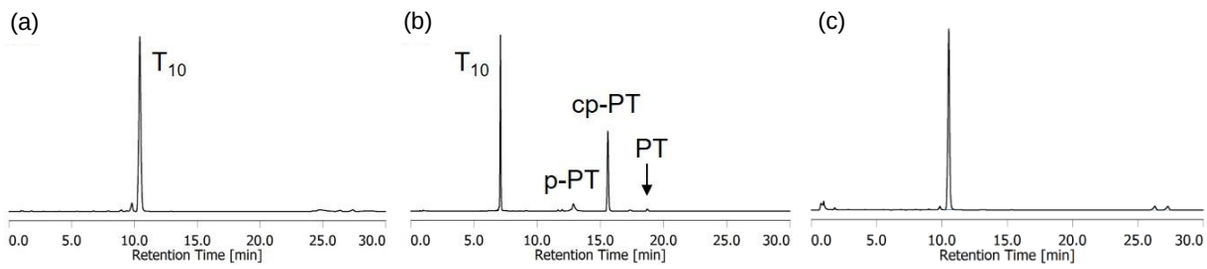
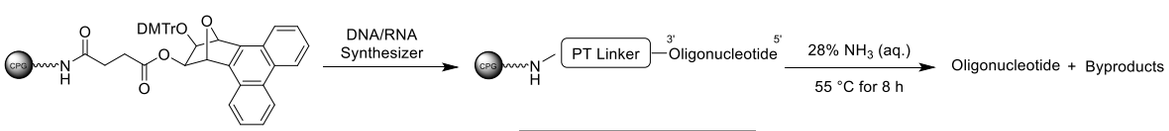


Figure 3 HPLC analysis of ONs released from T_{10}-loaded PT Linker CPG under Basic conditions A and B. Basic condition A: (a),(b) 28% NH_3 (aq.) at 55 ℃ for 8 h; Basic condition B: (c) AMA at 65 ℃ for 1 h. HPLC analytical conditions: (a),(c) 8-18% (b) 5-50% Acetonitrile in 0.1 M TEAA (pH 7.0) over a linear gradient for 30 min.

Synthesis of Oligonucleotides containing Various Nucleoside at the 3'-Terminus (DMTr-off Mode)



	Sequence (5' to 3')
CPG 1	TTT TTT TTT C
CPG 2	TTT TTT TTT A
CPG 3	TTT TTT TTT G
CPG 4	TTT TTT TTT $U^{2'\text{-}O\text{-}Me}$
CPG 5	TTT TTT TTT ^{LNA}T

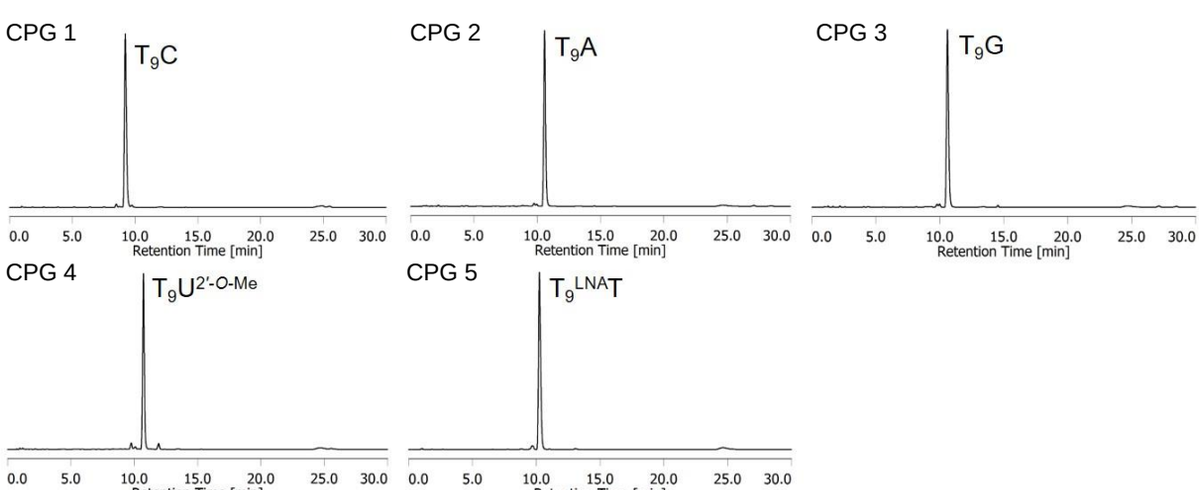
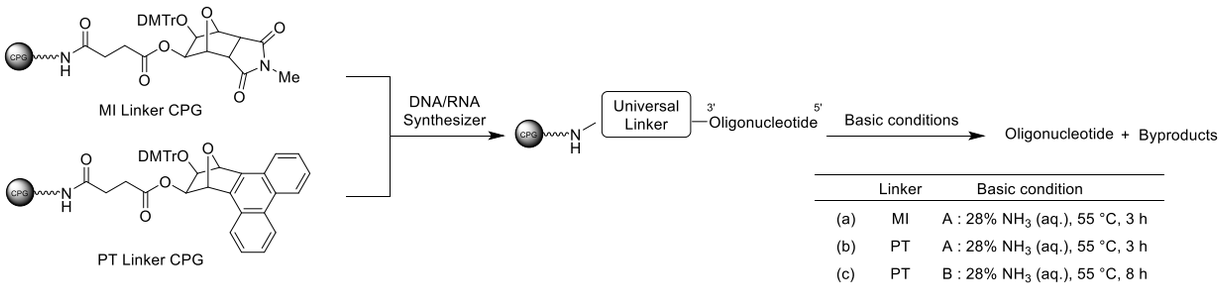


Figure 4 HPLC analysis of ONs released from CPG 1-5 after treatment with 28% NH_3 (aq.) at 55 ℃ for 8 h. HPLC analytical conditions: 8-18% Acetonitrile in 0.1 M TEAA (pH 7.0) over a linear gradient for 30 min.

Synthesis of Oligonucleotide (s-oligo) in DMTr-off Mode



	Linker	Basic condition
(a)	MI	A : 28% NH_3 (aq.), 55 °C, 3 h
(b)	PT	A : 28% NH_3 (aq.), 55 °C, 3 h
(c)	PT	B : 28% NH_3 (aq.), 55 °C, 8 h

Sequence : 5'-GsGsAsTsGsTsTsCsTsCsGsT-3'
(s = phosphorothioate linkage)

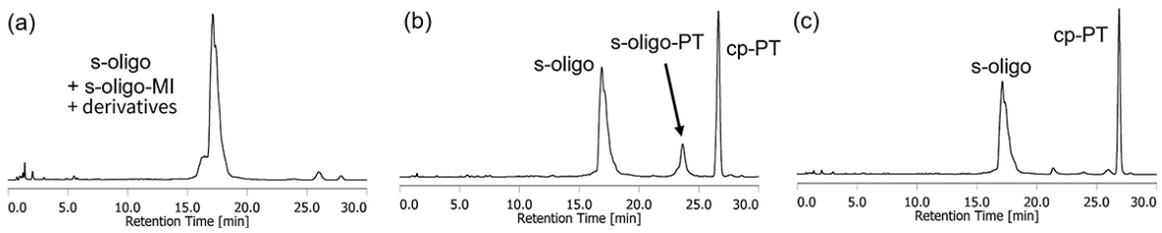


Figure 5 HPLC analysis of ONs released from s-oligo-loaded (a) MI Linker CPG (R=Me) and (b)(c) PT Linker CPG under Basic conditions A and B. Basic condition A: (a),(b) 28% NH_3 (aq.) at 55 ℃ for 3 h; Basic condition B: (c) 28% NH_3 (aq.) at 55 ℃ for 8 h. HPLC analytical conditions: 5-25% Acetonitrile in 0.1 M TEAA (pH 7.0) over a linear gradient for 30 min.

References

1) Fuchi, Y., Yamamoto, K., Ito, Y. and Hari, Y. : *Synthesis*, **55**, 1112 (2023).

Bulk supply

Bulk supply of PT Linker is available. Contact from our website.

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