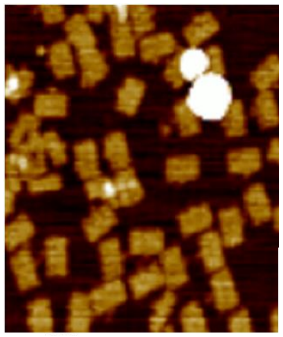
# Separation of monomer and dimer DNA Origami using SEC HPLC 4-5/16

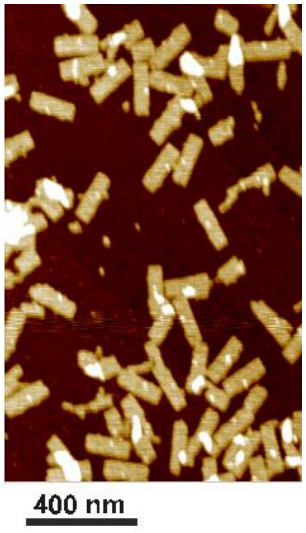
AFM images of origami monomer and origami dimers.

The size of the monomer is 90X60X2.5 nm.

The size of the dimer is 180X60X2.5 nm.



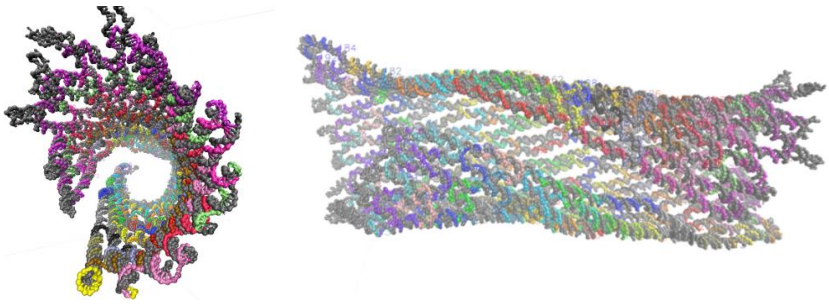
*Monomer under AFM*




*Dimer under AFM*

Simulation shows that origami monomer in solution maybe bend to the following structure (diameter ~ 14 nM). Meaning the dimer will be a roughly tube of the length180 nm and diameter ~14 nm.

**– but that is not certain**



## Results:

Sample preparation method:

- Add TEAA to 100uL in volume
- Pre-Assembly – 0.2uL  TE
- 'M13mp18 – 2uL TE
- Monomer – 10uL TAE 4mM Mg
- Dimer - 10uL TAE 250mM NaCl

**Pre Assembly** – **A mixture of 200 ssDNA at 32 & 24 bases long**. Kept in TE 1x (10mM Tris, 1mM EDTA)

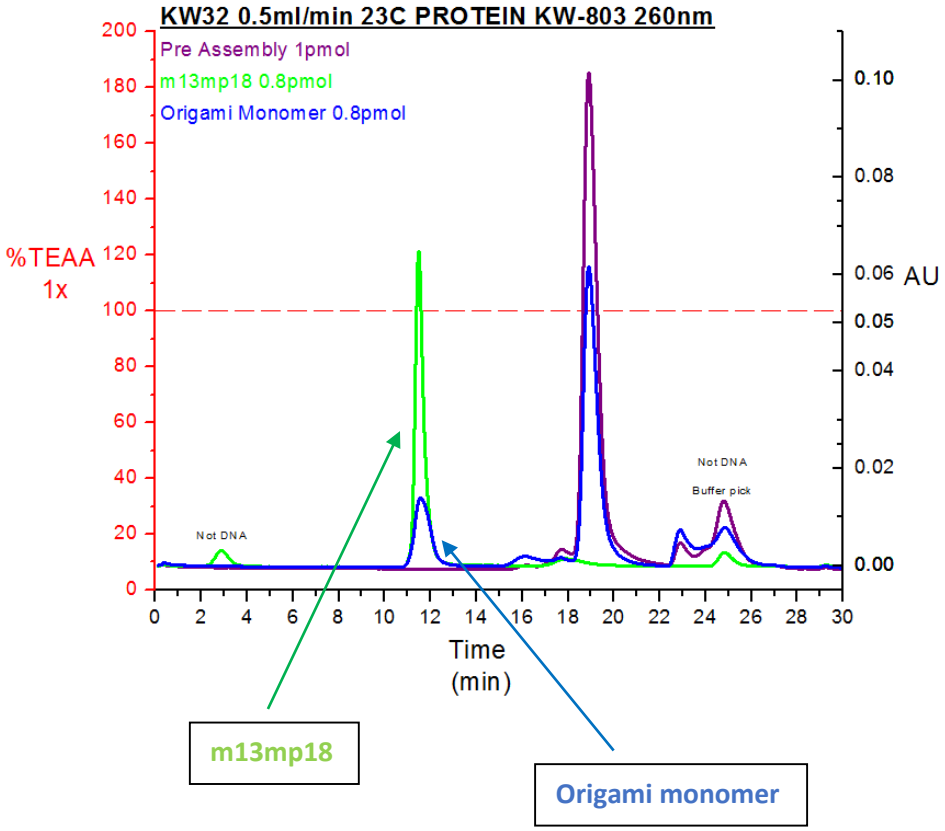
**m13mp18** – **ssDNA 7,249 bases**, 700kDa, 80% of molecules are circular. Kept in TE 1x

**Origami monomer** – 60x90nm, 1400kDa. Kept in TAE 1x (40mM Tris, 20mM acetic acid, 1mM EDTA) 4mM $Mg^{2+}$

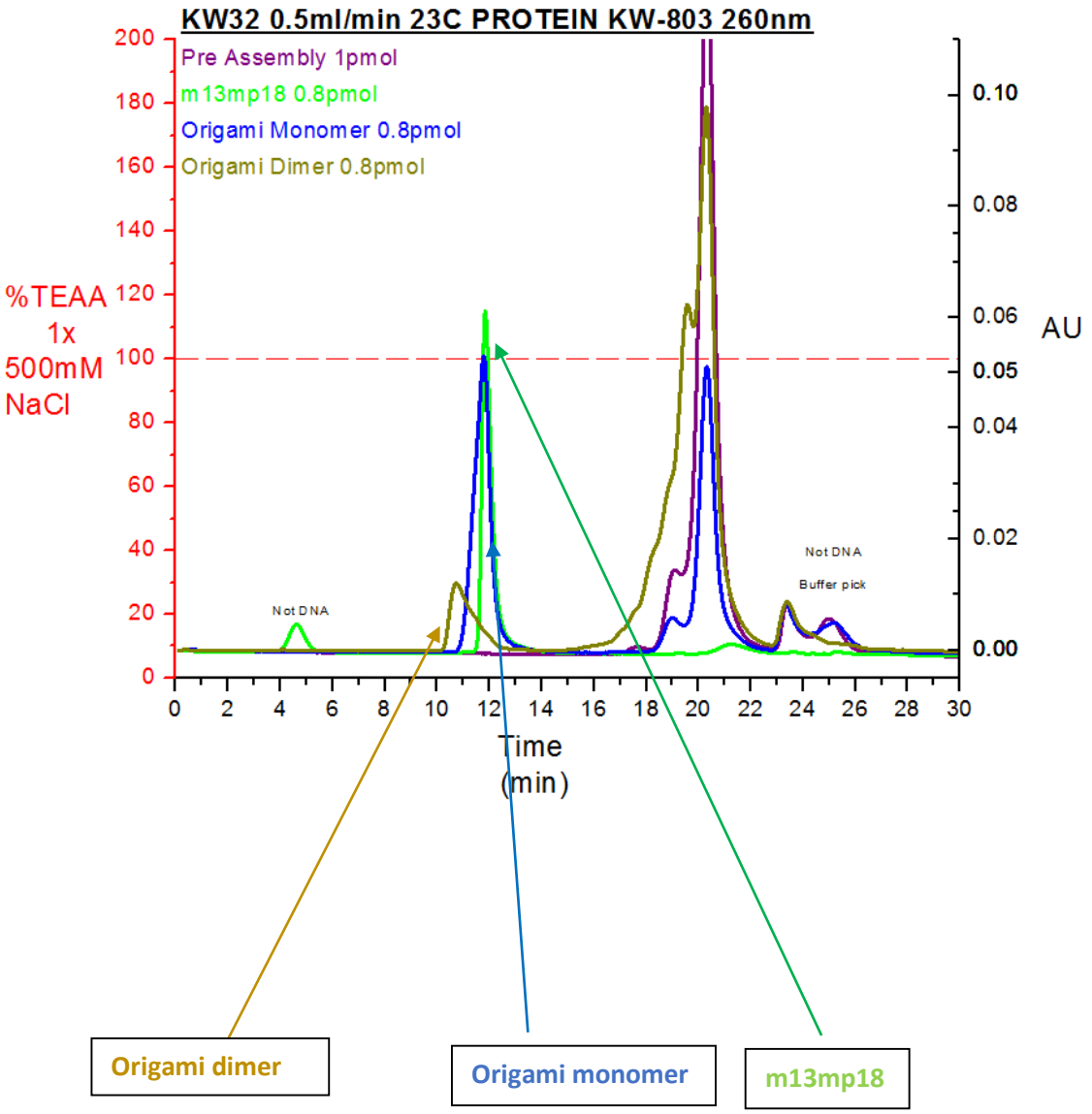
**Origami Dimer** – 60x180nm, 2800k Kept in TAE 1x 250mM NaCl

## Protein KW-803 pore size 100nm – No Salt in the Running Buffer

*Running Buffer: TEAA 1x (Triethylammonium acetate 0.1M) 0.5ml/min*

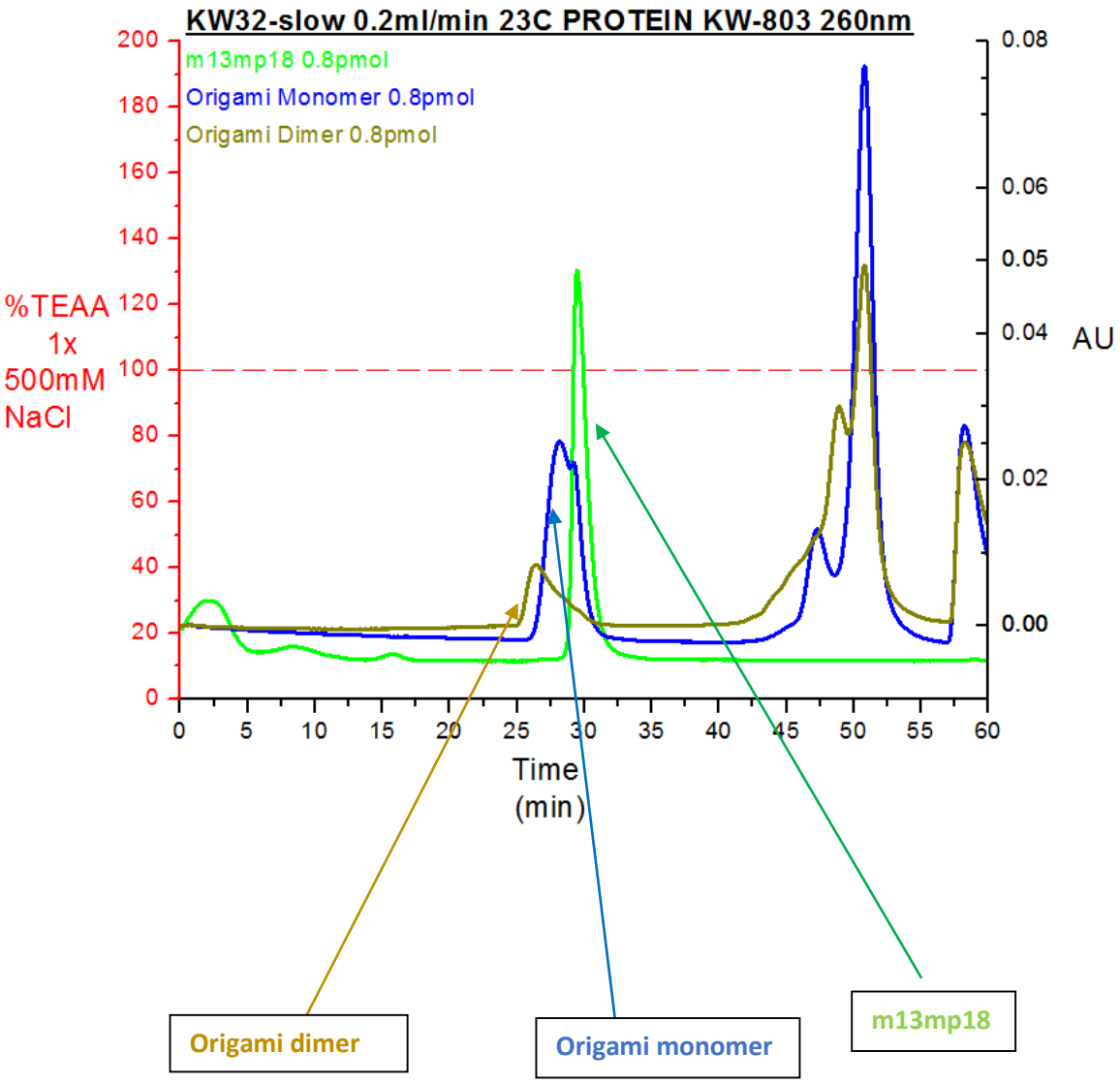


## Protein KW-803 pore size 100nm – TEAA 1x 500 mM NaCl 0.5ml/min



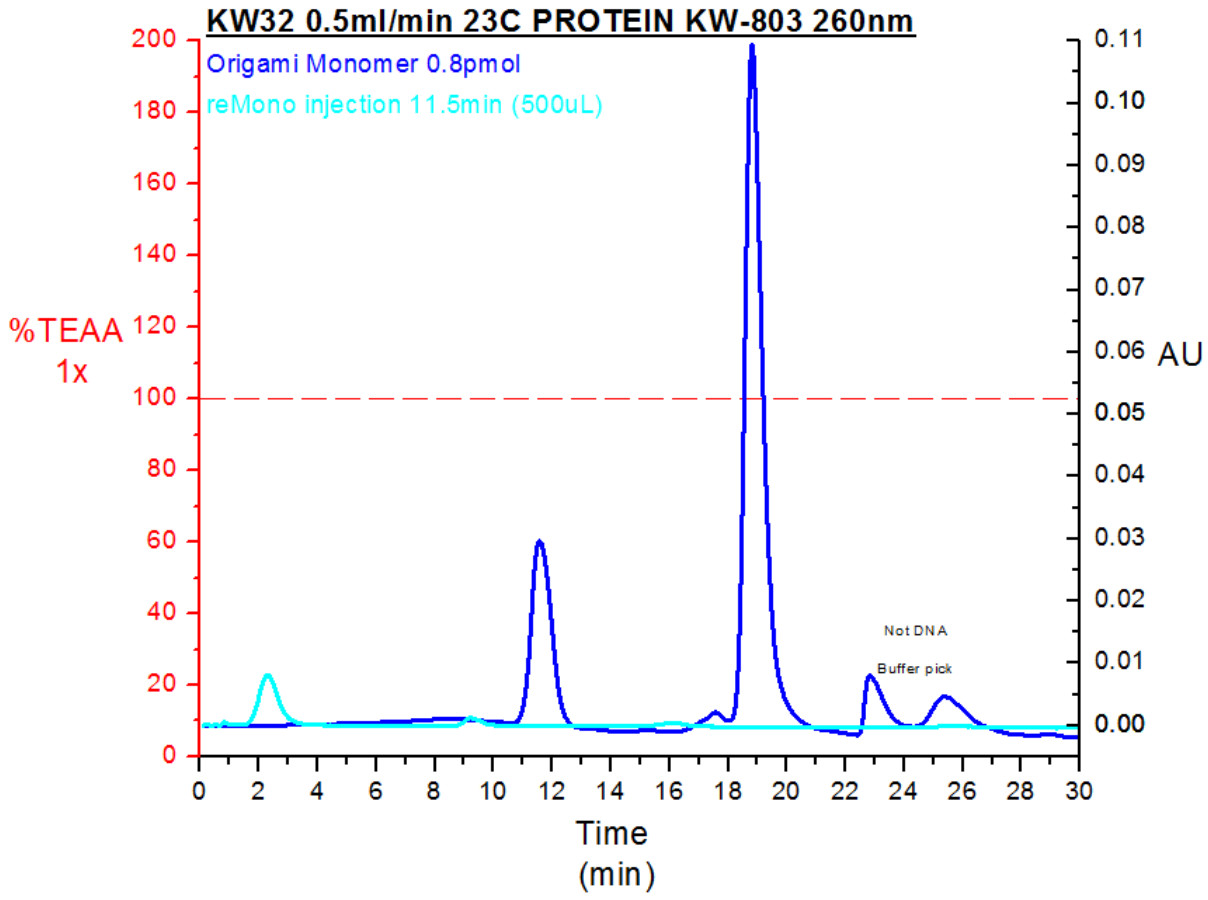
## Slower flow rate – 803 (with 500 mM NaCl)

*Running Buffer: TEAA 1x 500mM NaCl 0.2ml/min*

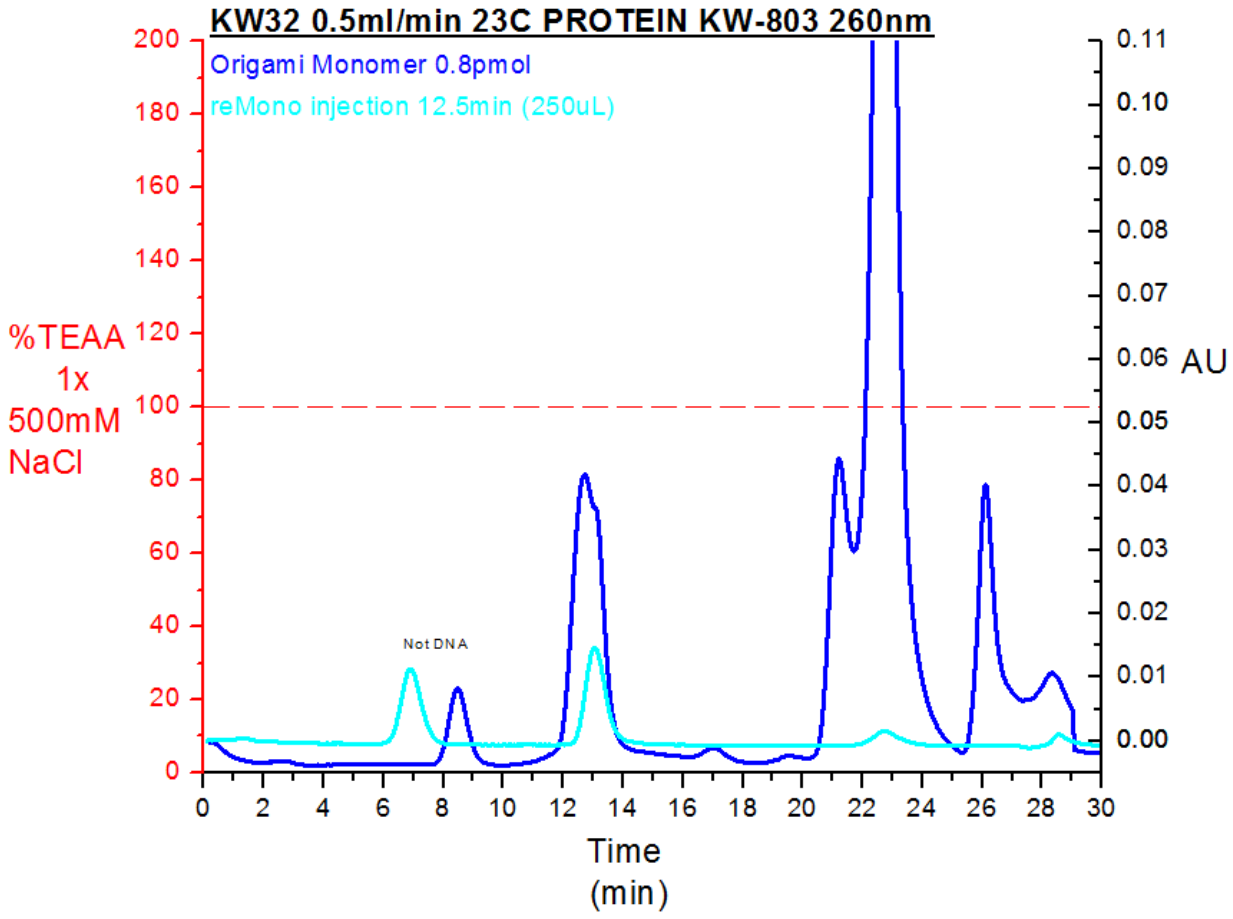


## Reinjection of Monomer

*Running Buffer: TEAA 1x 0.5ml/min*

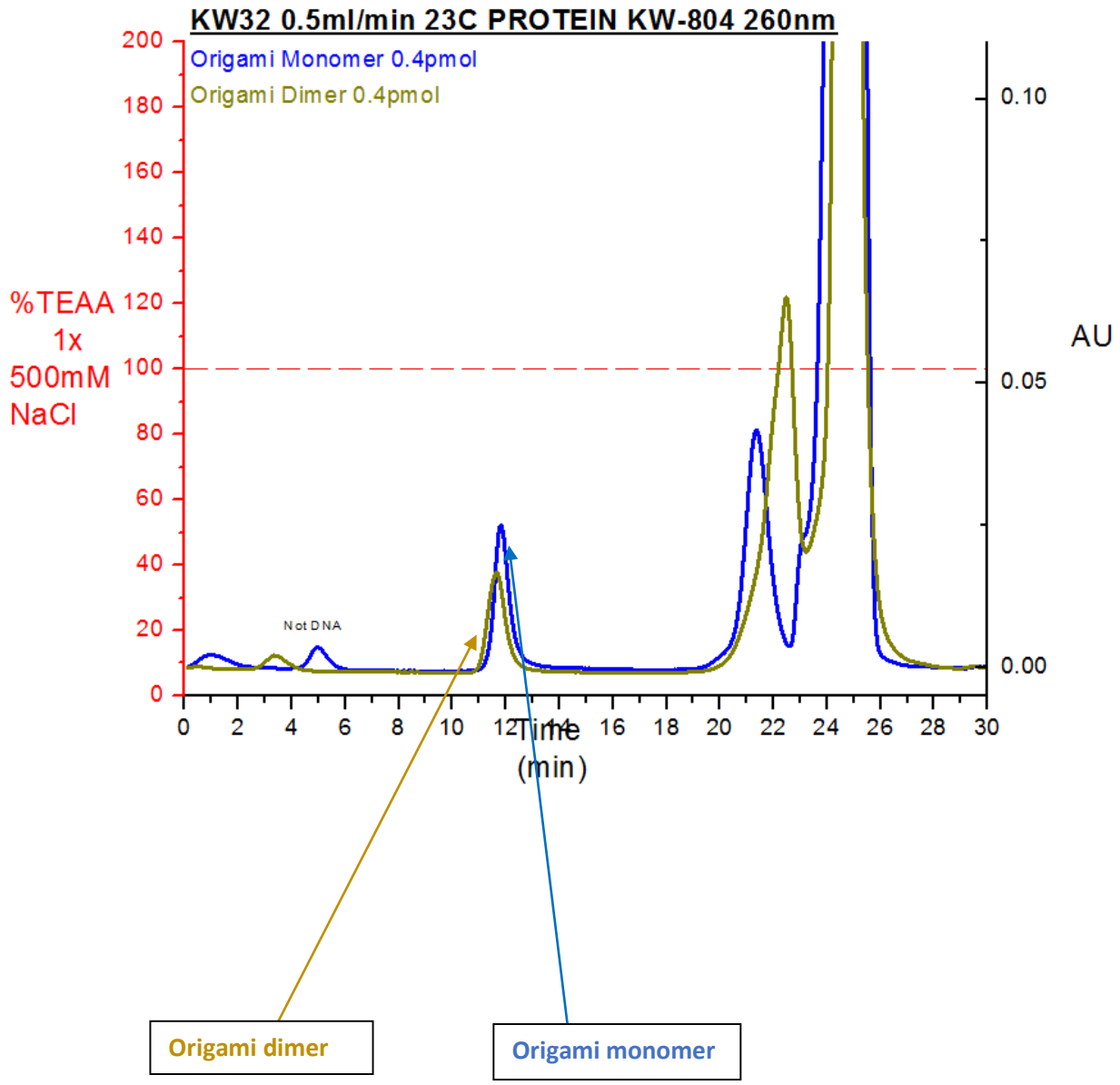


*Running Buffer: TEAA 1x **500mM NaCl** 0.5ml/min*



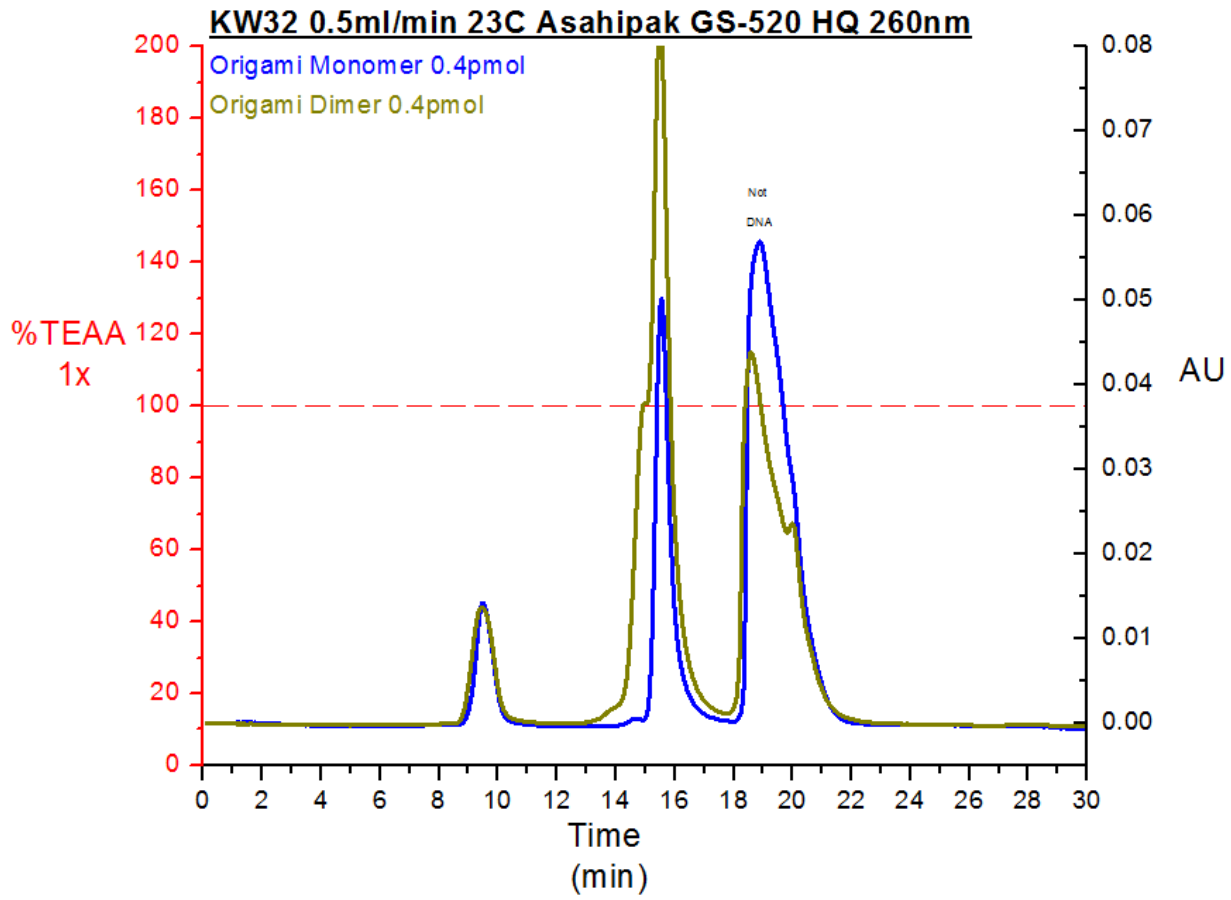
## KW-804, pore size 150nm, (with 500 mM NaCl)

*Running Buffer: TEAA 1x 500mM NaCl 0.5ml/min*



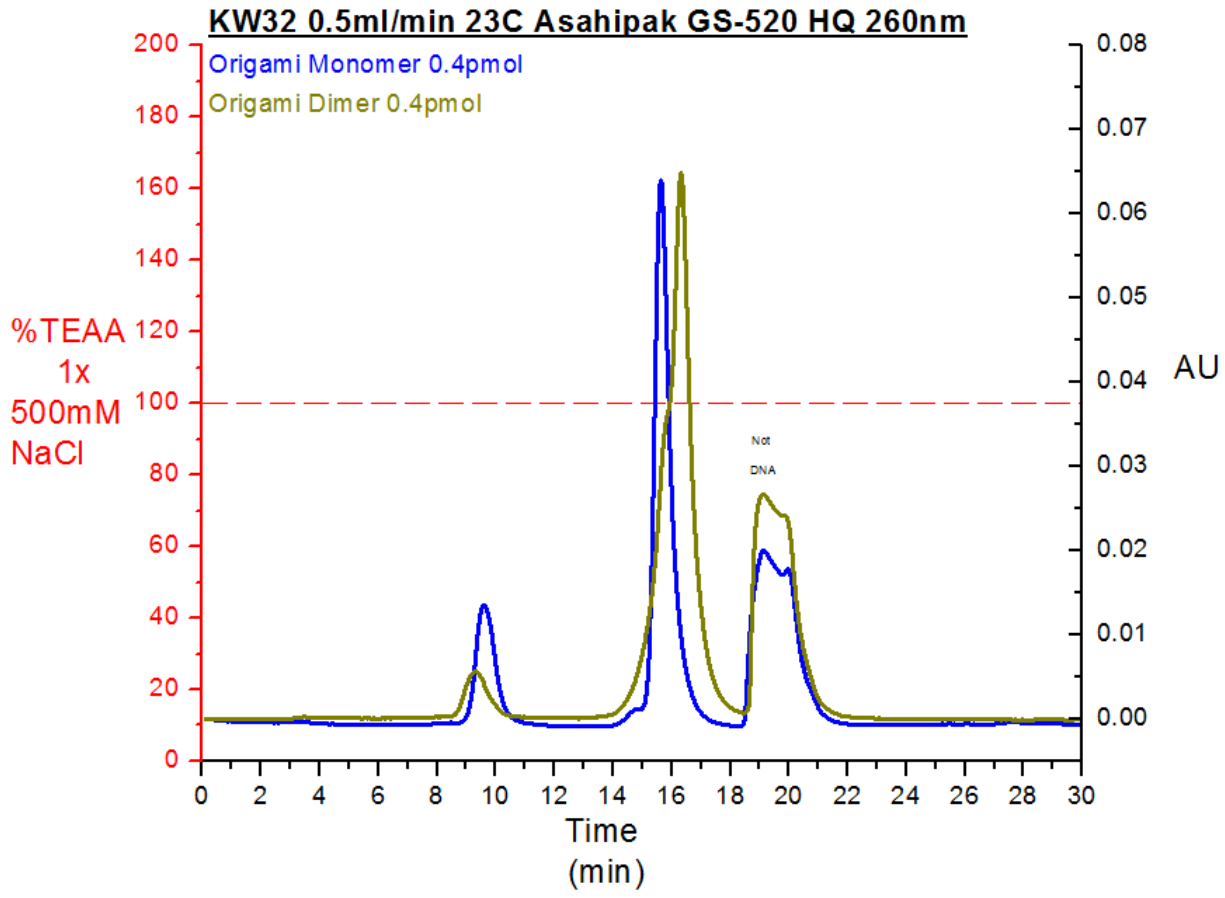
## Asahipak GS-520 HQ pore size 200 nm (ION EXCHANGE) – No Salt

*Running Buffer: TEAA 1x 0.5ml/min*



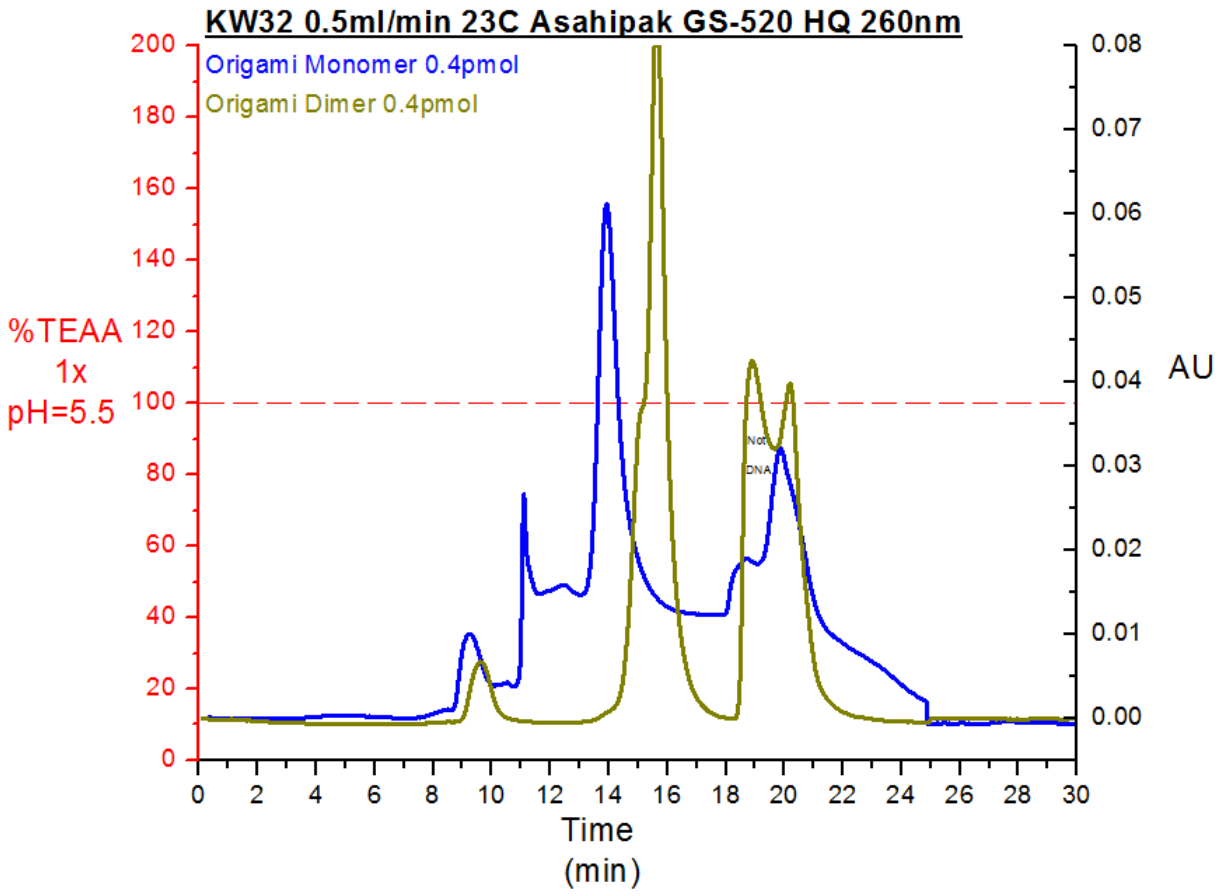
## Asahipak GS-520 HQ pore size 200 nm (ION EXCHANGE) – 500 Mm fixed

*Running Buffer: TEAA 1x 500mM NaCl 0.5ml/min pH=7*

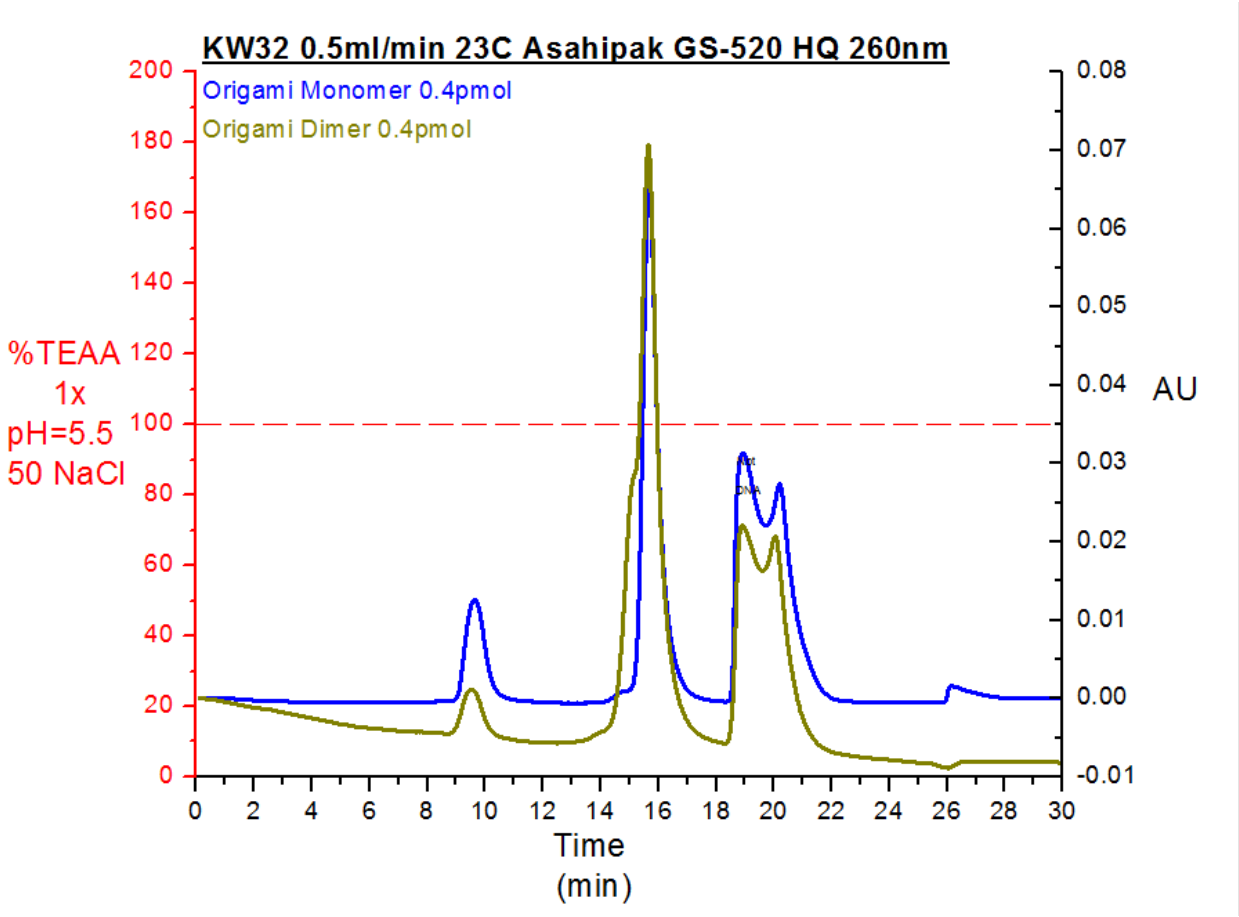


Different pH and salt measurements

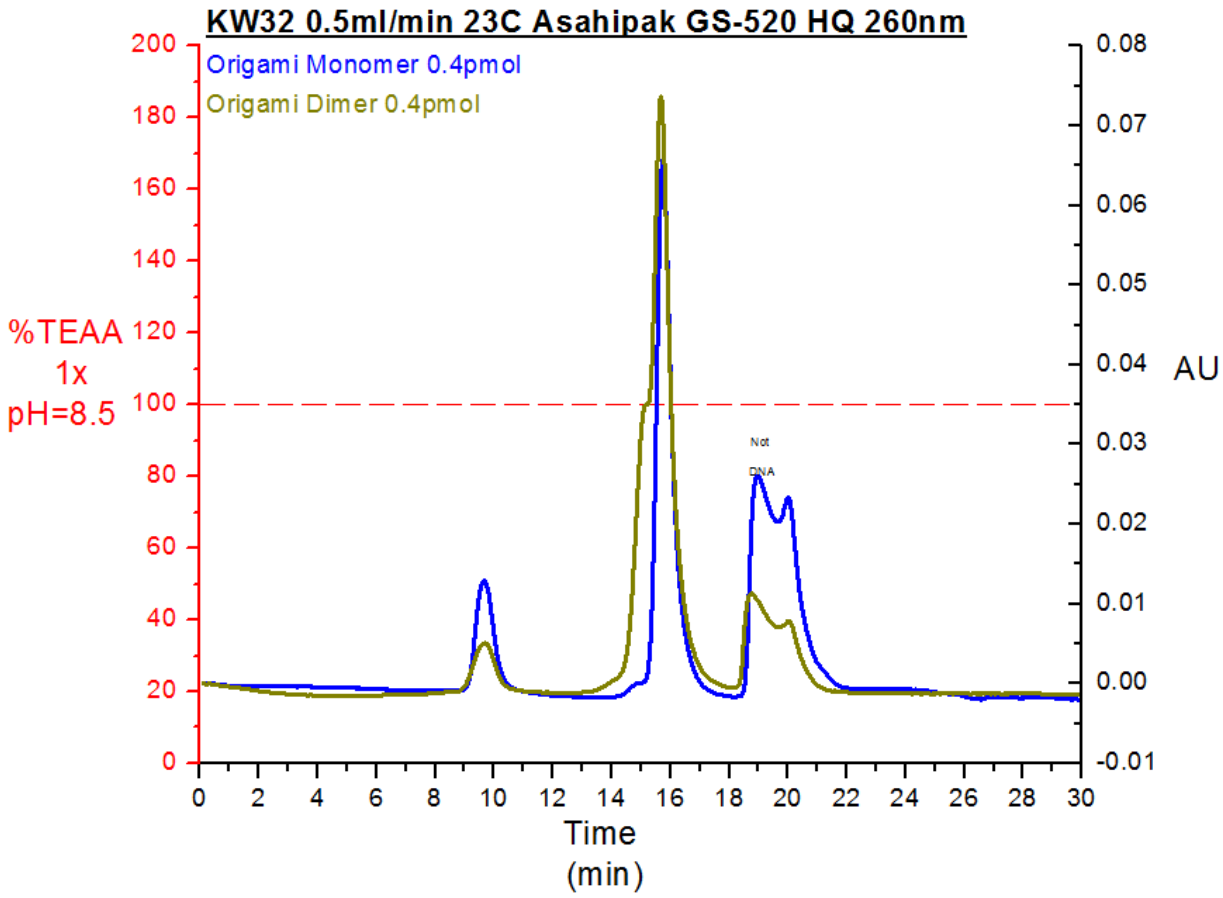
*Running Buffer: TEAA 1x 0.5ml/min pH=5.5*



*Running Buffer: TEAA 1x 0.5ml/min pH=5.5 50mM NaCl*



*Running Buffer: TEAA 1x 0.5ml/min pH=8.5*



*Running Buffer: TEAA 1x 0.5ml/min pH=8.5 50mM NaCl*