



UNIVERSITÄT
LEIPZIG

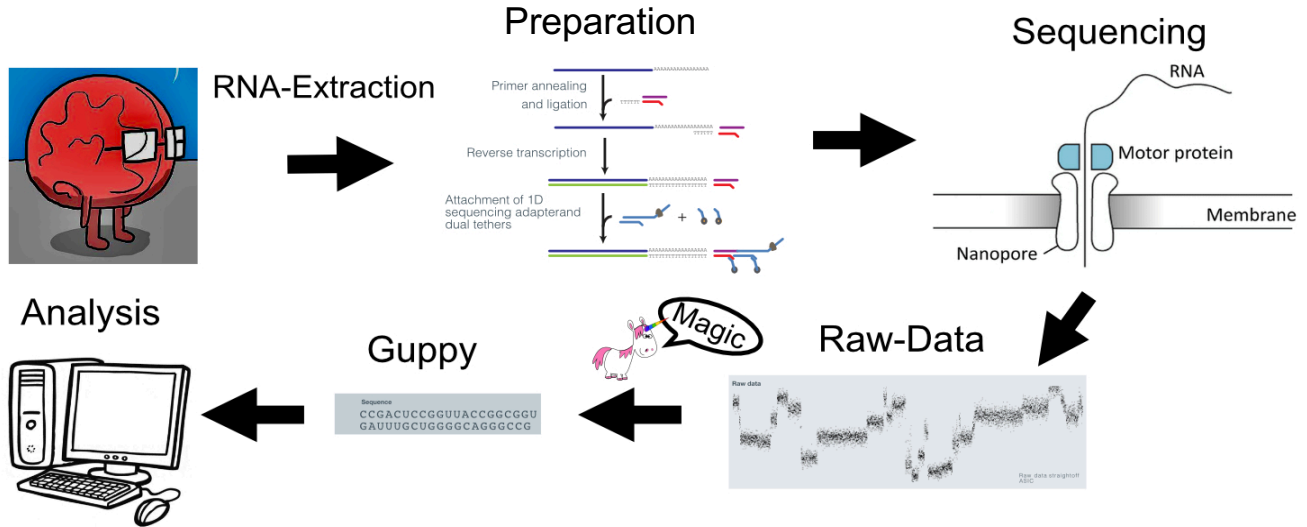
SlaPPy – The thing you want to do with Oxford Nanopore!

Bled, 11.02.2020

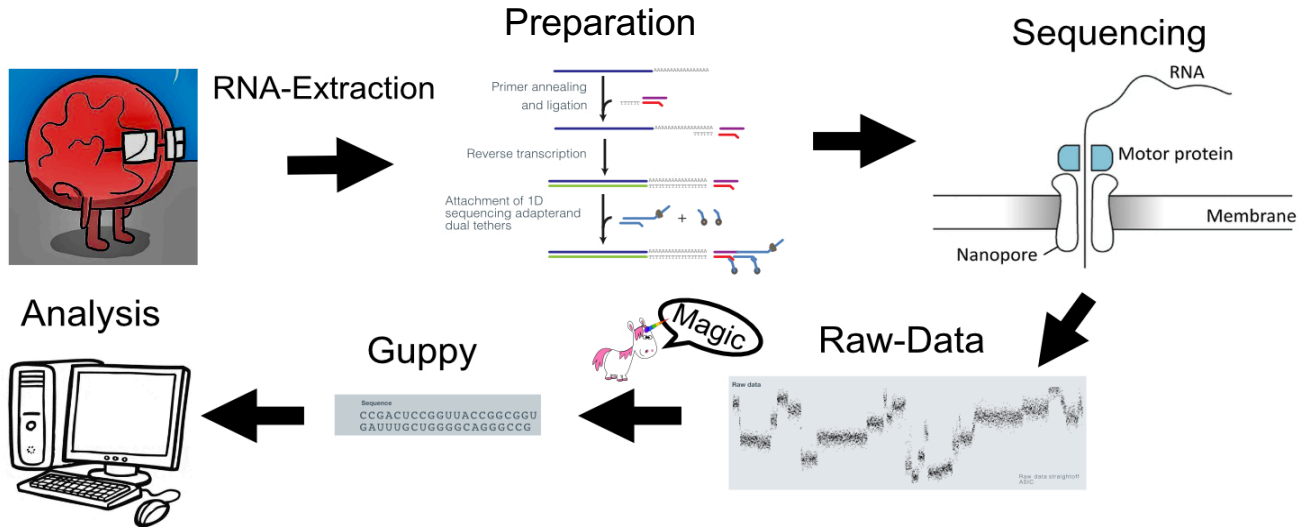
Christiane Gärtner

Bioinformatics Leipzig

MOTIVATION



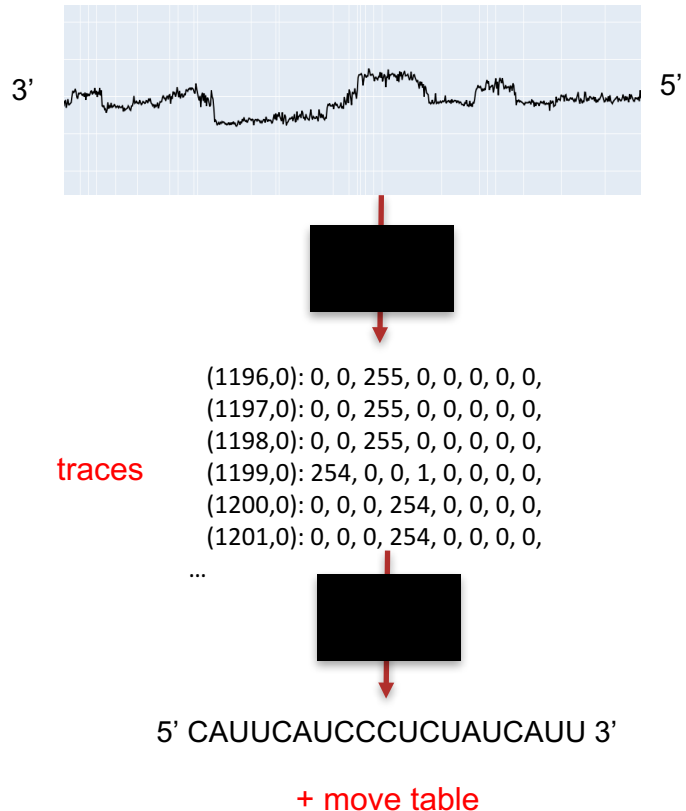
MOTIVATION



How to get insights into Guppy's magic?

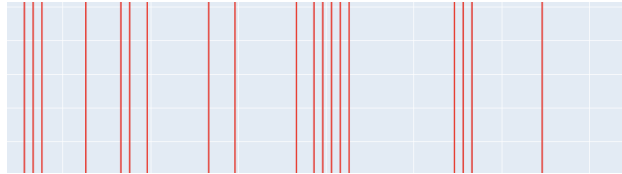
BASECALL WITH GUPPY

- two states for each base: flip and flop
- output = Transition between single states
- → Probabilities for single bases at each move



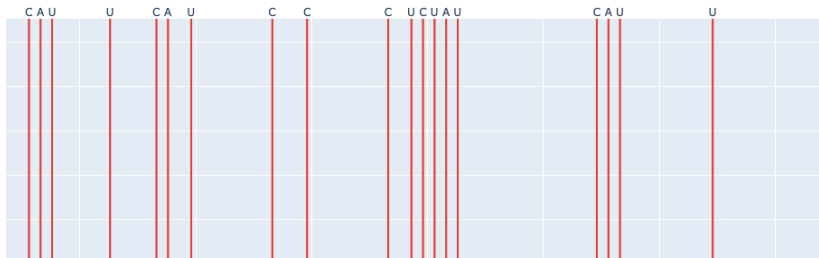
REVERSE ENGINEERING

Move '1'



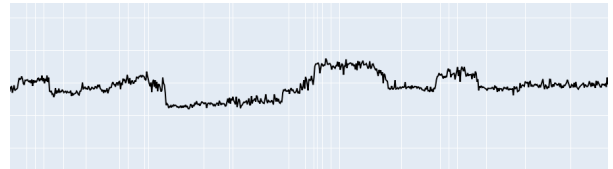
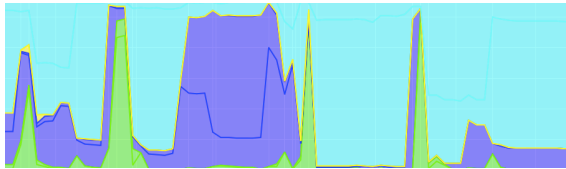
Length

+
5' CAUUCAUCCUCUAUCAU 3'

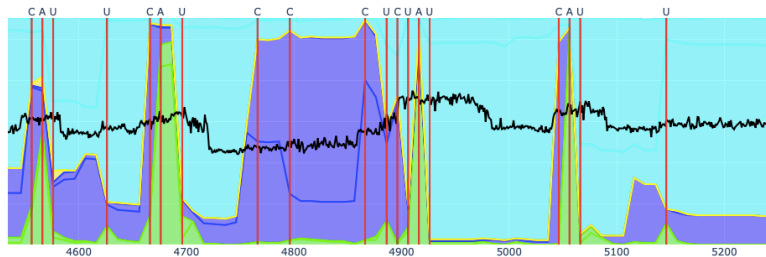


REVERSE ENGINEERING

Start traces: first sample template

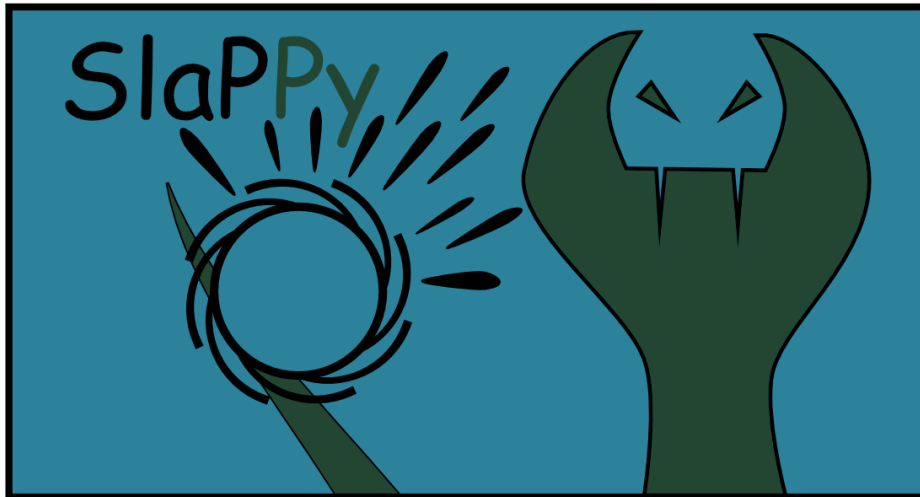


Block stride



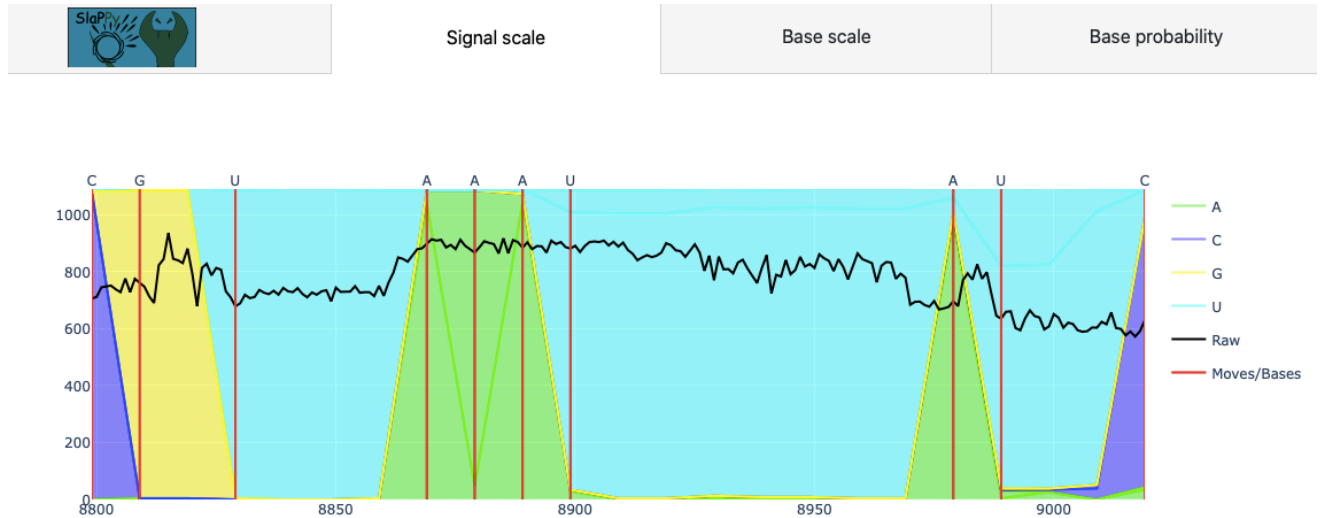
SLAPPY

- SlaPPy = **S**quiggle and Sequence **P**lotter in **P**ython



SIGNAL SCALE

- Distance between the bases depends on distance in raw signal



BASE SCALE

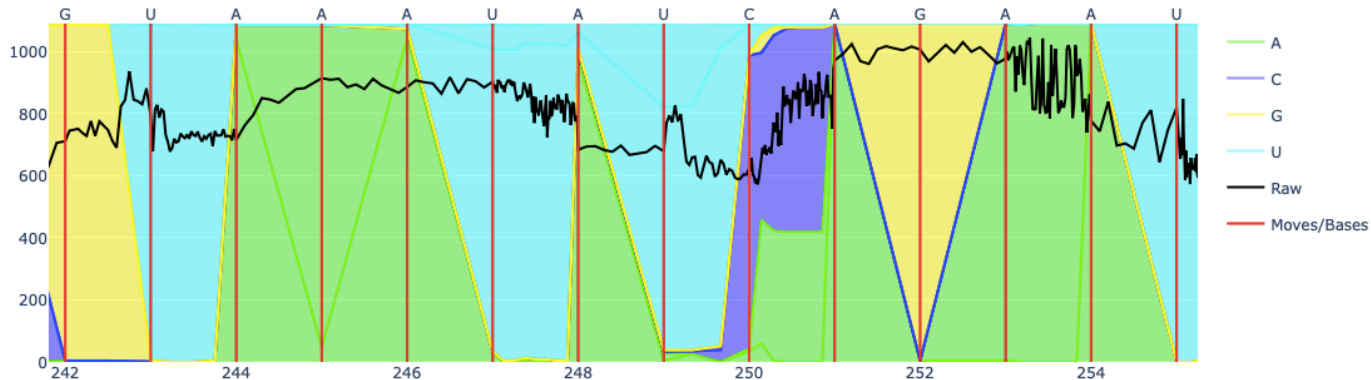
- Equal distance between called bases



Signal scale

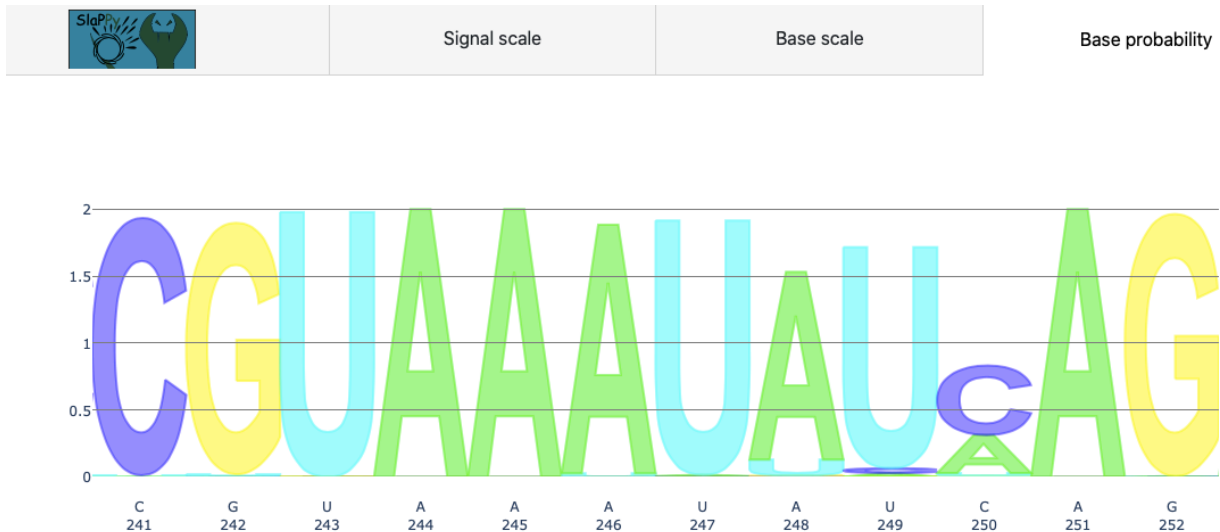
Base scale

Base probability



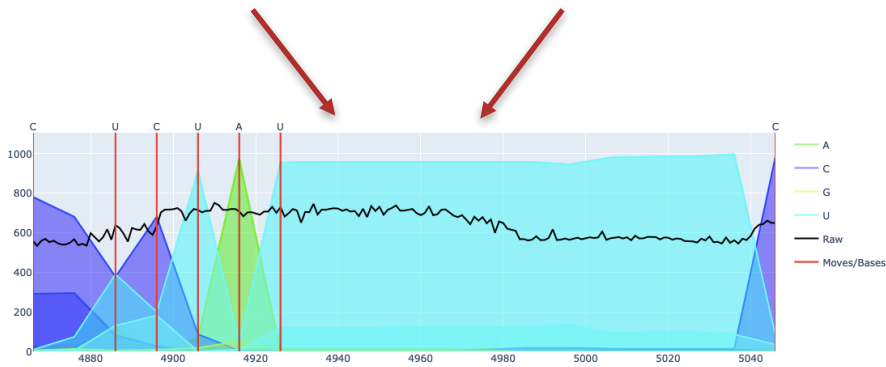
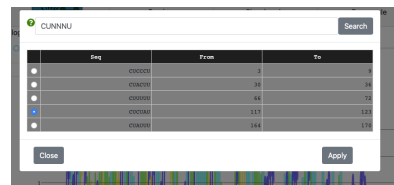
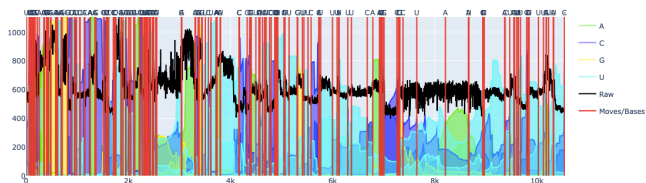
PROBABILITY LOGO

- Options: "at call" and "up next"

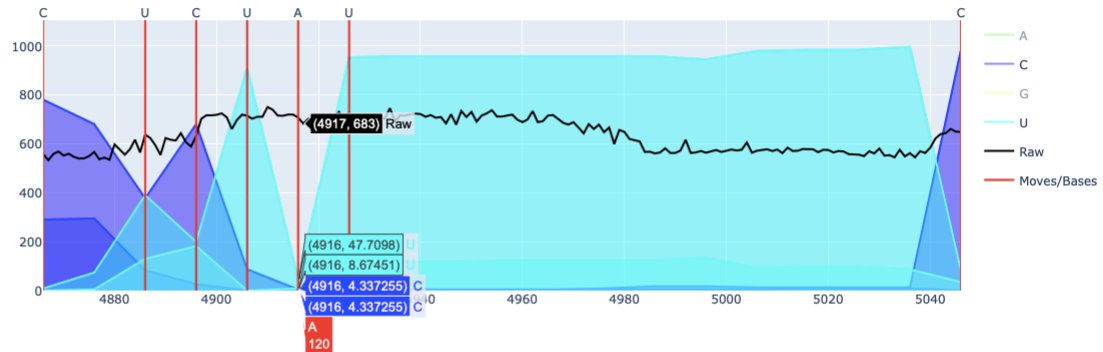
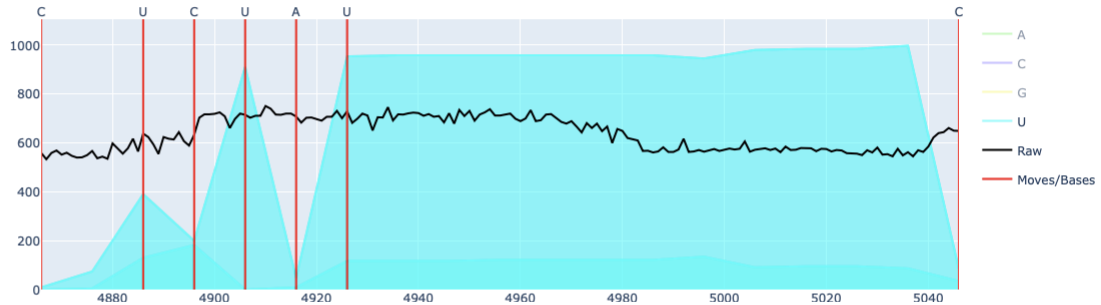


SUBSEQUENCE SEARCH

- One letter code or using regex



SHOW SINGLE TRACES AND VALUES





BASE MODIFICATIONS - PREVIEW

../DNA.fast5 Open

Read

filter data...

001a47c2-f53b-4038-be58-bbf8d11-

00621bfd-2c1d-4220-ab07-e8a7c9-

00730d43-81f8-4699-acd4-16a861c-

0079c222-75ba-4df2-9791-2c548d4-

01419503-de0a-477c-b4fd-2ccca09-

017e56df-3b1a-4a12-85d4-069d29b-

01a72857-3540-44ed-bab5-bede855-

01d79b87-daab-41bf-a568-85881a4-

01e41101-e72-4727-b26e-b1baf17-

01ee7c88-b790-4e80-b177-af6c00-

01fa661-727e-49ef-8a2e-43da530-

02085db3-1a03-4bf9-bb45-4dd8b24-

02183f70-d2ae-4a9f-8fee-1f91cab-

022539ca-7c3d-430b-b720-79eaa45-

023c3ab8-744c-47c4-a4cc-bf7c9d4-

Preview
Signal scale
Base scale
Base probability
Sequence

Search in sequence.. (Regex supported)

```

1  CTTGTATT CTTTCATCGA GAAGATTGG TGTTTTAA CTTTTTTG CCGATTAT CCGAAAGCT TTCCGTTT
81  COTCGCCGC TTACGGAGG ATCTTTTGA CATAGTGAA GAAATAACA ATCTAAAACA GTATTGAAA AACCGTTTC
161  TTTAAAAAT ATCACCAGA ACTACAAAT CATCATATG ACTCCATTA TGAATAATC GAAGGAAAA EAAGTCAGT
241  CTTCAAAAT TTTAAAATG TTTAAATGAC CACCTAGGG AAAATAGAA ATTAATCAA AACCTAAACA ACGCAGTAG
321  TCGCTTATT AATAAAGAA TGGATTATT CGAACCAAG AGACTTAAAT GCGAAAATTC GTTCTCTT GATAAATAG
401  TCGCATCGA TCAATAGCA ATTTATATAT AAGATCGCA CGAATCTEA GAATTAAGG CTACAGTTA AAGCAATTA
481  CTAATTTTA ATCAATTAAT CTATTTTCT CATCAAGCG SAAGCGAAA GAATCGAAA GAATCTCTA TTTTCTTA
561  AAAAGAAA GAGAAATTA ATGATTAAT TAAEAATTG GTTGCAAC AEAATAAT TTAAAGAAAT ATCGAGATT
641  CAATCGCTC AACCTACCT CATATAACA ATGTAGACT TTACGATC AGTGAAAAA TAATGAAGA TTTCGATTA
721  ATTAATAGA CGGAAAGCT CCAAAAATG AGATGATGA TAACTCTTA AAGGAAATC CAAGCTTAG TAAAGAAAT
801  AACCGTTC AACTCAACT CAAATGGGA TTACGCGAA AATATAAT CCCCAAAAA AAACATCAA TTGATGACG
881  AAAAATCT CTTCCAAAT TACAGACGA AGAAGCAGG ZAAAACTA AGCCAAAAA CTAGCTCTA GTTAAATATG
961  TATTAATAT CAAGCCGAG TACAATGCT TCACAGAAA CATGAGTTC ACTTACAAA TTGCAAGCA GAATGAAGC
1041  AGCAATAC CAAGAAATTA CTAAAAACC TCAAGAAAT CTCGACAGC TACCTATATA CATATGAGG GTTGTATTA
1121  TTTTCTTTC TCAAGAAATA GTTCTAATG TAAAAAAAC AAAGAAAAC AACAACAAT TCAATGACA ATATTCTTA
1201  GTTTCTCTA ATAGAGCA TATTTTATE AATTTTAG CACTTTTAC TGAATTTTE ACTATTTTT TCTGAATCA
1281  TCGATTTCG GTATCTTATA TTACAGTTC CCAAGAAAT TCTCTATT TCAACCAAT ACTTTCAC TTTTGTITA
1361  TCGATTTCG GTATCTTATA TTACAGTTC CCAAGAAAT TCTCTATT TCAACCAAT ACTTTCAC TTTTGTITA
1441  TCGATTTCG GATTATGAT TCTCTCTG TTTTACAGC CACTGCGCA GAGGATCA TTATATATG TTTTGTG
1521  TAAATTCG TAAATTCG ATTTTTCG AGTAAATGCT GATTTTCT TTGTATGAG TAAGCGACA TOTAGATTA
1601  TCGAAAGGG TAGCATCT ATATGATAT TTTTCTAG CAAAGGTTA TAGGAACTG CCTCTAATG TTTTTTTT
                    
```

● A ● C ● G ● T ● Y ● Z

6mA Y A

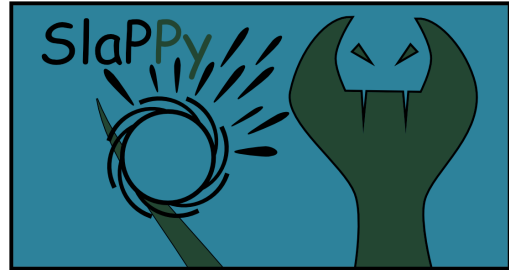
5mC Z C

Set Modification



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THANKS!



Thank you for your attention!

github.com/Fabianexe/SlaPPy