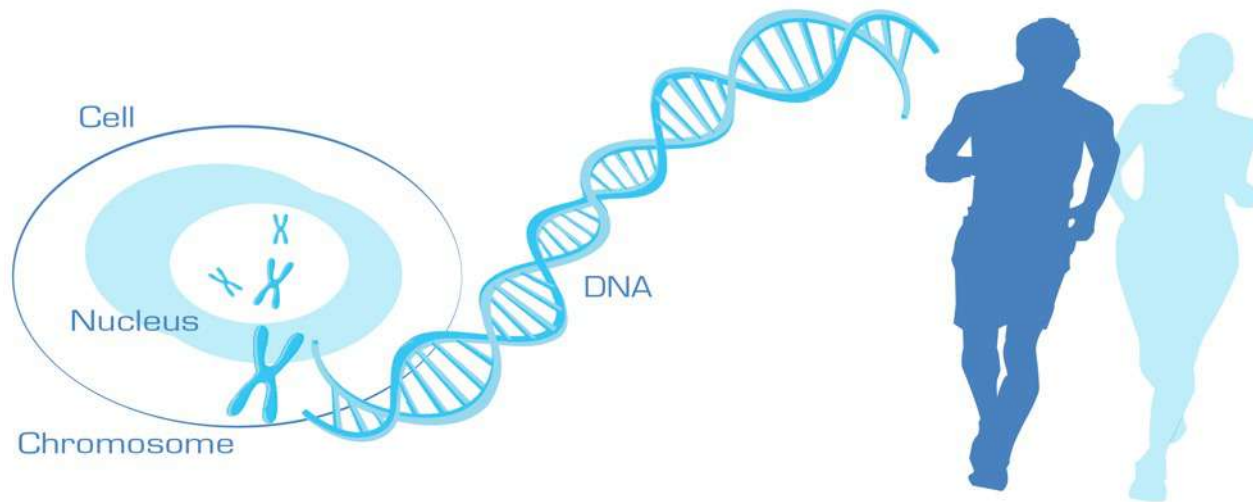


The RevoluGen vision is to deliver the purest form of unbroken DNA & revolutionize rapid diagnostics



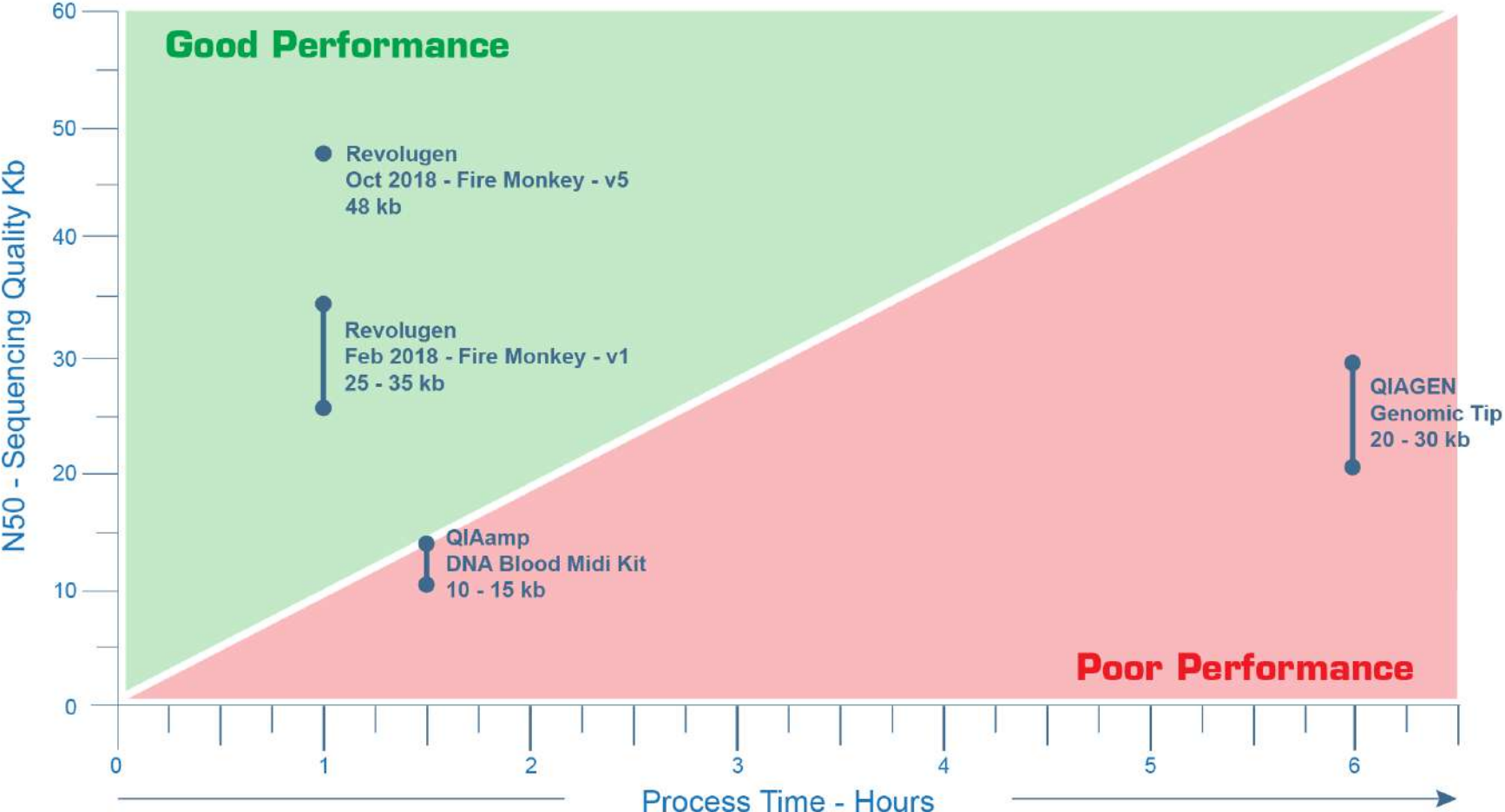
**Fire Monkey**

- Extracts long DNA fragments from cells (0.5m base pairs long)





# Comparison of sequencing results from different NAIP kits



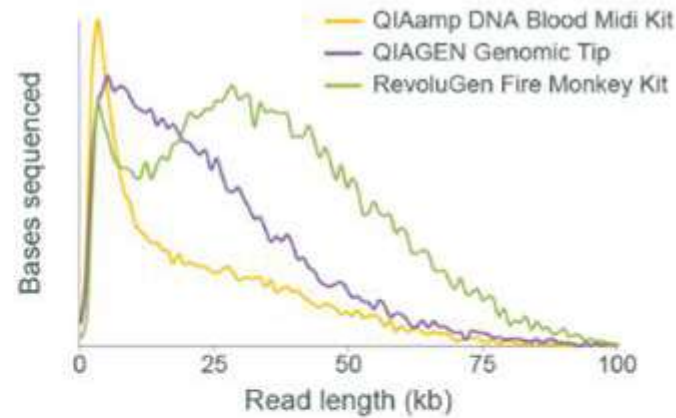
**Fire Monkey results in better and faster sequencing**



# Fire Monkey-v1 comparisons; external validation shows FM v1 is faster and better than Genomic Tip and QIAamp

## External validation

- ONT validated FM v1 vs QIAamp and Genomic Tip
- Sample was white blood cells from rabbit blood
- FM v1 out-performed both QIAamp and Genomic Tip



QIAamp DNA Blood Midi Kit		QIAGEN Genomic Tip		RevoluGen Fire Monkey Kit	
Difficulty	Easy/medium	Difficulty	Easy/medium	Difficulty	Easy/medium
Time taken	1.5 hours	Time taken	4-6 hours	Time taken	1 hour
Throughput	★ ★ ★	Throughput	★ ★ ★	Throughput	★ ★ ★
Input	1 ml whole blood	Input	10 ml whole blood	Input	1 ml whole blood
Yield	12 µg	Yield	75 µg	Yield	8 µg
Read N50 (with LSK)	10-15 kb	Read N50 (with LSK)	20-30 kb	Read N50 (with LSK)	25-35 kb

We have tested the three extraction methods with the Rapid and Ligation sequencing chemistry; all three give a ★ ★ ★ performance with the Ligation Sequencing Kit (2-3 Gb in 6 h, and 8+ Gb in 48 h). The QIAamp DNA Blood Midi Kit also gives a ★ ★ ★ performance with the Rapid Sequencing Kit, while the remaining two give a ★ ★ performance (1-2 Gb in 6 hours):





## Fire Monkey-v1 already has commercial appeal

- **Fire Monkey-v1** has been validated by ONT and was chosen as the best option kit to build historical data for an one year long study.
- **Fire Monkey-v1** trial results are released by ONT to their customers and as a result RevluGen is receiving requests for Fire Monkey kits from US and EU labs.

### Extracted quotes from ONT customer requests:

*"...I have performed some initial DNA extractions with this kit and we have both been very pleased with the quality of the extracted DNA.... is there any way we could purchase the whole kit...."*

*"...Recently we have had training with Oxford Nanopore on their PromethION instrument and they recommended using your Fire Monkey extraction kit...."*

*"...I would like to order one Fire Monkey kit to isolate Human DNA for nanopore sequencing...."*

*"...my lab is running PacBio and ONT systems. These systems require HMW DNA. Is your product available for purchase?..."*

### Fire Monkey-v1



High Molecular Weight DNA in under an hour



### MinION sequencing



Sequencing



# Fire Monkey-v5 is better than FM v1



## FM v5 advantages

- ONT recommends the use of a SPRI bead step post-extraction to remove strands smaller than 2kb
- This a manual process that can break DNA and it has a very low selection threshold
- FM v5 extracts very few strands under 10kb (sample-dependent) and the SPRI step is not needed
- FM v5 produces much better N50s with a simpler sequencing workflow
- FM v5 can accept 2x the number of mammalian cells and 5x number of bacterial cells that FM v1 does
- FM v5 can be used to extract total nucleic acid (both DNA and RNA in one pot) with a protocol alteration

Comparison	FM v1	FM v5
Time to DNA	≤ 1hr	≤ 1hr
N50 (bp) after 6hrs	25 to 35kb	48kb
Mammalian cell top input	WBCs from 1ml of blood	WBCs from 2ml of blood
Bacterial cell top input	200 million E coli	1 billion E coli
Need for post-extraction SPRI step	YES	NO
Total nucleic acid extracted	YES	YES

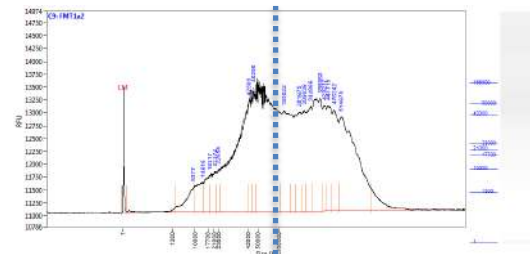


# Fire Monkey has competitive advantages

## The key is rapid Nucleic Acid Isolation & Purification (NAIP) of longer DNA



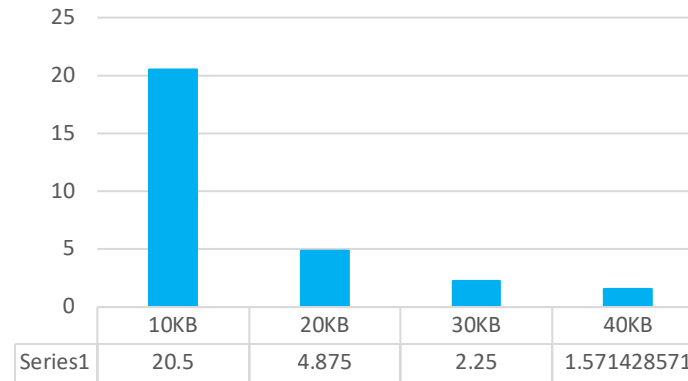
**Fast protocols**  
 Fire Monkey is a one hour protocol compared to several hours for Genomic tip comparator.



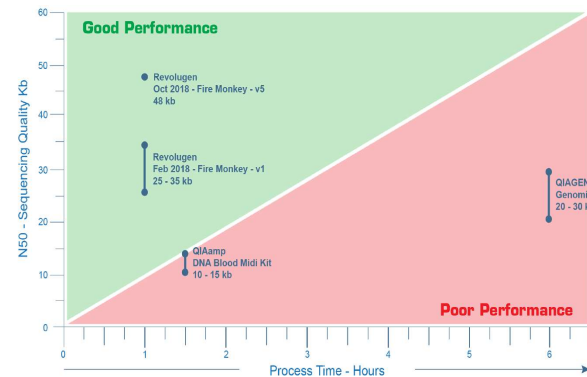
**Longer intact DNA**  
 Fire Monkey yields DNA fragments of over 165,000 up to 500,000 base pairs in length.

>165,000 base pairs

### Long/short molecular ratio at different cut-offs



**Long/short ratio**  
 FM extracts have positive long/short ratios all the way up to a 40kb cut-off without SPRI treatment

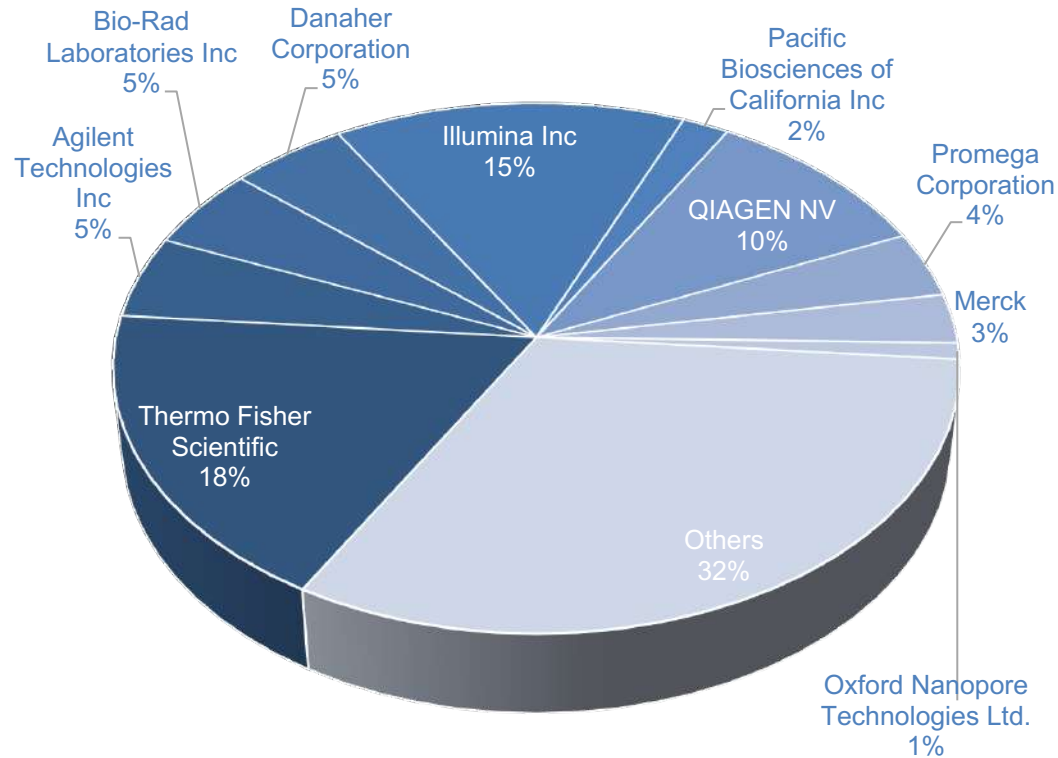


**Improved sequencing**  
 Fire Monkey's yield and long /short fragment ratio improves the N50 sequencing results.

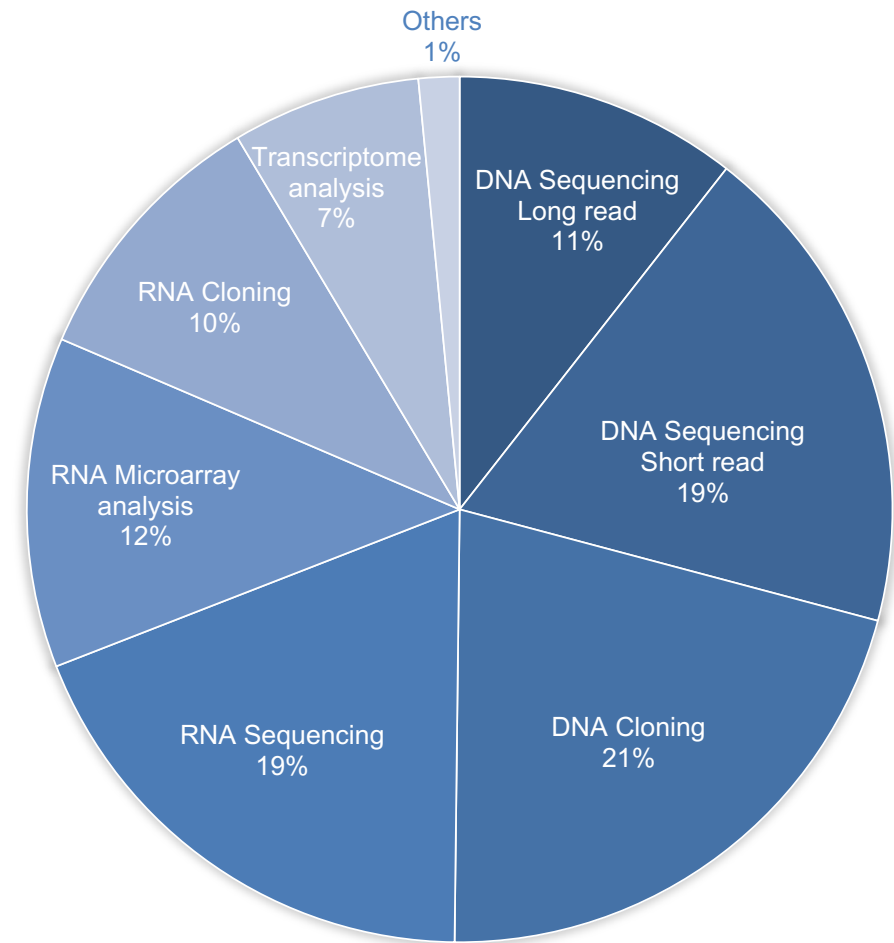


## Global NAIP Market was \$3bn in 2017

### Global NAIP Market \$3bn in 2017 by Share



### Global NAIP Market \$3bn in 2017 by Application

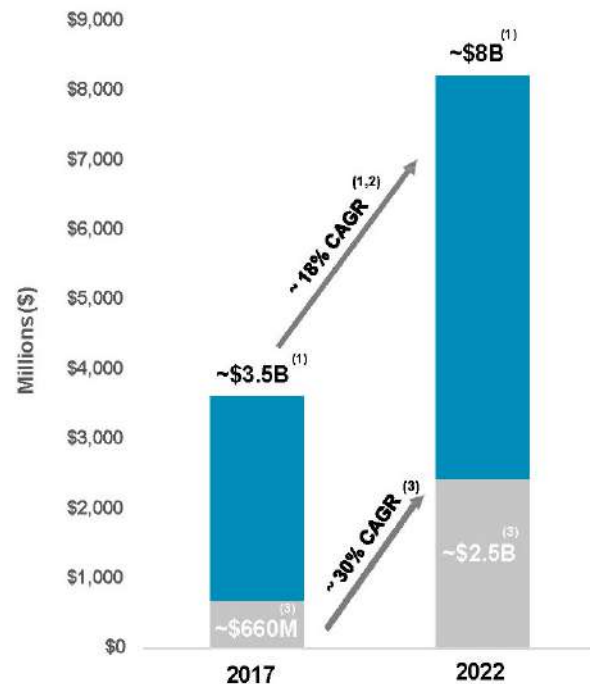


The NAIP market is large and growing at about 10% per annum. The long read sequencing segment is around \$300m per annum. Illumina expects the long-read market to grow from \$600 million today to \$2.5 billion in 2021.



The Illumina purchase of PacBio for \$1.2bn highlights the growth potential for long-read sequencing.

## TOTAL SEQUENCING & PACBIO ACCESSIBLE NGS MARKETS



- Total Sequencing Market
- Sequencing Market Accessible to PacBio Technology

### Current Market (2017)

- ~\$3.5B growing at ~18% annually
- PacBio accessible market is ~\$660M
  - Sequel consumable limits size of accessible market

### Future Estimated Market (2022)

- NGS market grows to ~\$8B
- PacBio accessible market grows to ~\$2.5B
  - Throughput and cost are now competitive in larger market segments

**A \$660m market expected to grow at a 30% CAGR**

Sources:

(1) Life Science Tools Kit — Ninth Edition: Overview of Life Science Tools Markets and Technologies (Cowen and Company, 2017).

(2) Next-Generation Sequencing (NGS) Market: Global Forecasts to 2022 (Markets and Markets, 2016).

(3) Company Data and Forecasts.