Next-Gen Sequencing Trends 2011

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Conditions Under Which This Market Report Is Sold

Executive Summary

- This market report summarizes the results of HTStec's 2nd industry-wide global web-based benchmarking survey on next-generation sequencing (NGS) carried out in March 2011.
- The study was initiated by HTStec as part of its ongoing tracking of emerging life science technologies and marketplaces. The main objectives were to comprehensively document current end-user experiences, practices, preferences, future requirements and assay metrics obtained using NGS machines, undertaking sample prep and automation for NGS, and outsourcing NGS. Equal emphasis was given to soliciting opinion from all organizations where NGS is currently being investigated, with no geographic bias in the distribution of persons contacted.
- The survey looked at the following aspects of NGS as practiced today (2011) and in some cases as predicted for the future (2013): NGS platforms respondents have access to; applications investigated on NGS platforms; current bottlenecks in NGS; main bottleneck in sample prep for NGS; how many samples are processed in NGS-related sample prep techniques; vendors reagents used in NGS-related sample prep techniques; automation of NGS-related sample prep techniques; interest in open liquid handling platforms and closed systems for the automation of NGS sample prep; interest in modifying vendor recommended sample prep product protocols; % of NGS sample prep off-protocol; NGS sample prep automation platforms used; cost per mappable Gb sequenced; mappable Gb read per run; average duration of sequencing run; sequencing throughput achieved; biggest hurdle to improving sequencing throughput; what is mainly used for NGS data analysis and storage; where respondents plan future investment in NGS data analysis and storage; interest in purchasing NGS systems; whether respondents are waiting for 3rd generation sequencing solutions; future sequencing requirements; improvements most wanted in future NGS solutions; current level of use of NGS outsourcing; NGS applications outsourced; budgets allocated for NGS-related sample prep reagents and kits, NGS machine consumables, and outsourcing; and unmet needs in the NGS process.
- The main questionnaire consisted of 29 multi-choice questions and 1 open-ended question. In addition, there were 5 questions related solely to the administration and demographics of survey.
- The survey collected 148 validated responses.
- Survey responses were geographically split: 43% Europe; 41% North America; 8% Rest of World; 6% Asia (Excluding Japan); and 2% Japan.
- Respondents came from 89 University/Research Institute/Not-for-Profit Facilities; 14 Biotechs; 8 Hospitals/Clinics; 8 Government/Military/Defense Labs; 6 Other; 6 Diagnostics; 6 Pharmas; 6 Not-For-Profit Sequencing Centers; and 5 Commercial Fee-For-Service Providers.
- Most survey respondents had a senior job role or position which was in descending order: 31 research scientists; 26 professors/assistant professors; 24 lab/research/facilities managers; 14 other roles; 13 post-docs; 9 senior scientists/research associates; 8 directors; 8 section/group leaders; 7 principal investigators; 6 department heads; and 2 vice presidents.
- Survey results were expressed as an average of all survey respondents. In addition, were appropriate the data was reanalyzed after sub-division into the following 4 survey groups: 1) University or Research Institute; 2) Other Organizations; 3) Europe; and 4) North America.
- The NGS machines most used or accessed by survey respondents were from Solexa/Illumina (98% using), this was followed by FLX/Roche 454 (70% using), and then SOLiD/ABI (49% using).
- The NGS applications most investigated were transcriptome analysis and mutation/SNP discovery.
- Data analysis and results interpretation was the most limiting bottleneck in NGS today.
- Library construction was ranked the most limiting bottleneck in NGS sample prep.
- The median number of samples processed per month in NGS-related sample prep techniques was <100.
- The reagent vendor(s) survey respondents expect to make greatest use for NGS-related sample prep techniques was dominated by the 3 main sequencer manufacturers.
- The NGS-related sample prep technique most automated today (2011) was DNA shearing.
- The preferred open liquid handling platform for the automation of NGS-related sample prep was a low throughput 8-channel pipetting device platform.

- When using automated NGS-related sample prep systems respondents placed moderate importance in being able to modify vendor-recommended product protocols; and high importance in being able to support multiple vendor product protocols for the same application.
- A median of 20% of NGS-related sample prep work today (2011) was carried out off vendor recommended or programmed protocols.
- Only a small minority of survey respondents have considered or purchased a closed system for NGS-related sample prep.
- Respondents provided feedback on 30 automation platforms, sourced from 12 different vendors, used for NGS-related sample prep.
- The median cost per mappable Gb was <$2,500 for FLX/Roche 454; <$1,000K for Solexa/Illumina; and<$500 for SOLiD/ABI.
- The median number of mappable bases read per run today (2011) was 0.5Gb for FLX/Roche 454; 5Gb for SOLiD/ABI; and 10Gb billion for Solexa/Illumina.
- The median duration of a NGS run reported today (2011) was 8-16h for FLX/Roche 454; >48h for SOLiD/ABI; and >48h for Solexa/Illumina.
- The median sequencing throughput (mappable Gb read per 24h day) reported today (2011) was <0.5Gb for FLX/Roche 454; <5Gb for SOLiD/ABI; and <5Gb for Solexa/Illumina.
- Data analysis (quality of software tools) was rated the biggest restriction to improving sequencing throughput.
- The majority of respondents use in house bioinformatics for NGS data analysis and storage.
- Bioinformatics expertise was ranked the aspect of NGS data analysis and storage where respondents planned biggest future investment.
- Infrastructure requirements were ranked what had most impacted respondent's ability to purchase and/or implement a NGS capability in their organization.
- A total of 85 purchasing plans for NGS machines spread over the next 3 years were identified from 36 different labs. Greatest interest was for purchasing Solexa/Illumina NGS machines.
- Most respondents had already purchased a sequencer and are not waiting for a 3rd generation sequencers to emerge before they initiate sequencing.
- The future requirements of respondents (i.e. where they expect be by the end of 2013) on the cost per genome sequenced are reported with respect to base pair read length (fragment size) processed.
- Read length accuracy (irrespective of the definition) was ranked what respondents most wanted to see improved in NGS offerings.
- The majority of respondents are already outsourcing NGS, with this activity split equally between outsourcing at a not-for-profit collaborating lab or at a commercial fee-for-service provider.
- The NGS applications most outsourced today (2011) were transcriptome analysis and mutation/SNP discovery.
- Respondent feedback on the biggest unmet needs in NGS was documented.
- The median 2011 budgets for: 1) NGS-related sample prep reagents and kits was $25K-$50K per lab; 2) money spent specifically to run a NGS machine (i.e. consumables & reagents) was $50K-$100K per sequencer: and 3) NGS outsourcing at a commercial fee-for-service provider was $10K-$25K per lab.
- Several simple bottom-up models were developed to estimate the markets for: 1) NGS-related sample prep reagents and kits; 2) NGS machine consumables; and 3) NGS outsourcing. These models used budget data derived from this survey together with mapped estimates of the number of facilities involved in NGS or the number of NGS machines worldwide from http://pathogenomics.bham.ac.uk/hts/.
- The following 2011 market estimates were made: 1) NGS-related sample prep reagents and kits - $55M; 2) NGS machine consumables - $320M; and 3) NGS outsourcing - $24M.
- The full report provides the data, the mean values, details of the breakdown of the responses for each question and the estimates for the future (2013), % CAGR and some segmentation of the market estimates. It also highlights a few interesting differences between the survey groups.

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General Information on HTStec and HTStec's Trends Market Reports

- HTStec Limited an independent market research consultancy founded in September 2003 whose focus is on assisting clients delivering novel enabling platform technologies (liquid handling, laboratory automation, detection instrumentation and assay reagent technologies) to drug discovery. Over the past 8 years HTStec has published more than 50 market reports on drug discovery technologies and authored over 30 review articles in Drug Discovery World (at least article one per issue).
- HTStec's Trends reports owe their origins to the need by developers and vendors of new enabling technologies in drug discovery to get up-to-date relevant market metrics on which to base informed business decisions.
- Typically focused on a specific market niche or segment, in many cases overlooked or frequently misunderstood by broader market studies.
- Investigations are mainly initiated in response to a sponsor's specific requests.
- HTStec's extensive experience of the market, both as a Pharma End-User and working for a major Life Science Tool Provider ensures the industry relevance of the market research collected.
- Based entirely on web-based feedback from potential customers typically drawn mainly from Pharma and Biotechs, although increasingly University and Research Institute labs are also being researched.
- Produced extremely rapidly and typically published within 3 weeks of starting the collection phase.
- Reports are short, concise and focused on giving readers the basic data, analyzed in several different ways.
- Limited to reporting the main findings alone, without exhaustive discussion on the relevance of the results.
- Market estimates are mainly based on bottom-up calculations and usually avoid attempts to forecast widely beyond the next 2-3 years. Full details on the derivation of market estimates are given so readers can apply their own factors and easily make alternative estimates if they prefer or know better.
- Owing to the sensitivity of some of the data collected, all reference to the origin of participating companies is removed, data is pooled to get an industry average and the anonymity of all respondents fully preserved and guaranteed.
- Unlike alternatives HTStec's Market Surveys and Report are aimed at giving readers, information they want and can rely on, not information they don't need, cannot easily discern or is of dubious authenticity.
- HTStec aims to be the premier global provider of highly focused market research on enabling technologies in drug discovery.
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