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<http://fortune.com/2018/09/28/spotify-to-use-your-dna-for-playlists/>

<https://consequenceofsound.net/2018/09/spotify-ancestry-playlists/>

<https://www.spin.com/2018/09/ancestry-dna-genetic-data-spotify-playlist-partnership/>

The music streaming service, Spotify has announced that they will be partnering with genealogy company, Ancestry to personalize the playlist of subscribers based on their DNA. Once subscribers buy the genealogy DNA test kit for around \$100, Spotify will curate a playlist reflecting the cultural music of the user's heritage. Since the two companies collaborated and launched this new service on Sep. 21 of 2018, over 10,000 people have signed up. While the companies state that user's DNA results are not being stored, the terms and services of Ancestry requires that users give up partial rights on how the company uses their DNA.

Link to Ancestry DNA's website: <https://ancestrydnaplaylist.withspotify.com/1584986>

<https://medicalfuturist.com/top-companies-genomics>

Since the Human Genome Project that began in 1990, people's fascination of the human genome has grown. Below is a list of the most successful genomics companies:

- 1) Personal genomics – where consumers can order a kit from home and learn about their genetic makeup
 - a. 23and me – the oldest and most popular personal genetic company
 - b. Futura Genetics – Prague-based company that offers a DNA test on predisposition to the 28 most common diseases
 - c. Veritas Genetics – A Massachusetts-based company that has been hailed as the first company to be able to sequence, analyze, and interpret the human genome for \$999
 - d. Counsyl – A San Francisco-based company that sells test that tell couples whether they are at risk of having children with a range of inherited diseases
- 2) Pharmacogenomics – the study of variability in drug response due to the genetic code. Seeing that this area of research is viewed as highly important for improving drug therapy and prescriptions, many start-ups are leveraging on the results.
 - a. MyDNA – Offers a medication test that helps you and your doctor personalize your treatment and select the most appropriate medications based on your genetic code
 - b. Verge Genomics – A San Francisco-based company that determines which FDA-approved drugs affect various genes in the body.
- 3) Genomics combined with Artificial Intelligence – companies that use deep learning to mine vast amounts of genetic information for clues about disease, diagnosis, and treatment.
 - a. Deep Genomics – Their learning software is developing the ability to try and predict the effects of a particular mutation based on its analyses of hundreds of

thousands of examples of other mutations. They have developed a database that provides predictions for how more than 300 million genetic variations could affect a genetic code.

- b. IBM Watson for Genomics – A service that combines Watson’s AI capabilities with genomic tumor sequencing to determine the best treatment for individual patients.
 - c. Verily Life Sciences – Founded under Google’s umbrella corporation, Alphabet.
 - d. DeCODE – An Icelandic based company that discovered genetic risk factors for dozens of diseases, and collected full DNA sequences on 10,000 individuals living on the island
- 4) Precision Oncology - An emerging approach for disease treatment and prevention that takes into account individual variability in genes, environment, and lifestyle.
- a. Foundation Medicine – Offers a full suite of comprehensive genomic profiling assays to identify the molecular alterations in a patient’s cancer and match them with relevant target therapies
 - b. Rosetta Genomics - uses mainly micro-ribonucleic acid (microRNA) biomarkers to develop diagnostic tests designed to differentiate between various types of cancer.
 - c. Color Genomics – A Silicon Valley start-up that aims to democratize access to DNA testing through affordable and clinical-grade genetic tests
 - d. Quest Diagnostics – a Fortune 500 company that is one of the oldest clinical laboratory developing together with medical technology
- 5) Genetic ancestry – using genetic data to find out your family history
- a. National Geographic’s ancestry test – part of the Genographic Project, launched by NatGeo in cooperation with IBM. A multi-year genetic anthropology study that aims to map historical migration patterns by collecting and analyzing DNA samples
 - b. Ancestry – largest genealogy companies in the world. They have a large DNA database and offer genealogical DNA tests that can be completed at home, which can trace your family tree.

<https://techcrunch.com/2017/01/10/illumina-wants-to-sequence-your-whole-genome-for-100/>

Illumina has unveiled a new machine called NovaSeq, that is expected to one day, produce a whole genome for less than \$100. CEO Francis deSouza claims that the machine’s scanning speed can decipher an entire human genome in less than an hour. Many of the direct-to-consumer DNA tests such as the one by 23andMe has been done using one of Illumina’s machines.

Although the machine is not quite yet ready, companies such as Chan Zuckerberg, the Broad Institute of MIT, Regeneron, and Human Longevity have already placed an order for this new machine.

Website for Illumina: <https://www.illumina.com/systems/sequencing-platforms/novaseq.html#.WHVn1LYrKqA>

<http://www.bio-itworld.com/2016/1/11/illumina-spinoff-grail-trial-liquid-biopsies-early-detection-cancer.html>

Illumina's technology was used for more than 90% of DNA data collection in 2014. They have come out with a panel test called truSight Tumor 15, which searches for mutations that could present new treatment options in cancer cases and they also have created non-invasive prenatal tests that detect fetal disorders through a blood drawn from the pregnant mother. Now, Illumina has created a company called GRAIL that focuses on the early detection of all types of cancer with a simple blood test. Their goal is to develop a universal, direct measure of cancer that is far more accurate than proxy tests like mammograms or PSA tests. They aim to do this using technology called liquid biopsy, in which DNA and RNA molecules shed by tumors are picked up circulating freely in the bloodstream. GRAIL has raised more than \$100 million at launch. For GRAIL liquid biopsy to benefit patients the company would need to uncover genetic markers that can distinguish harmful cancers from benign one with high specificity.

<https://www.wired.co.uk/article/ibm-watson-artificial-intelligence>

In January of 2017, it was announced that IBM Watson Genomics would be integrated into biotech company Illumina's TruSight Tumor 170 tool which would speed up tailored drug recommendations for cancer patients. The addition of IBM Watson for Genomics will allow Illumina's tool to scan genetic sequences across 170 genes in a few minutes, look for alterations, and create a report based on alterations, clinical trials, and medical literature to recommend drugs. This is a process that would ordinarily take human doctors a week to do.

IBM Watson has already helped the Barrow Neurological Institute in Phoenix, Arizona to discover 5 new genes lined to ALS. It's computer power also helped to upgrade Pepper the Robot, making it smarter than ever.

<https://cloud.google.com/genomics/>

Google Genomics helps the life science community organize the world's genomic information and make it accessible and useful. It supports open industry standards, including those developed by the Global Alliance for Genomics and Health, so you can share your tools and data with your group, collaborators, or the broader community, if and when you choose. Moreover, Google's infrastructure provides reliable information security that can meet or exceed the requirements of HIPAA and protected health information. This platform also helps users better monetize the access and usage of their genomics data by hosting it in a storage bucket where operations, network and retrieval costs are easily billed to clients.

<https://www.technologyreview.com/lists/companies/2017/intro/#veritas-genetics>

<https://www.veritasgenetics.com/press-releases>

Veritas Genetics is a startup that spun out of Harvard University's Personal Genome Project that screens customers' DNA for a wide variety of mutations connected to health issues. Results of the DNA test is made available to customers via an app. In 2017, they also launched the first whole genome newborn screening test in China. They offered to decode the genomes of newborns in China for \$1500 each so that parents and physicians could make more informed decisions regarding childhood onset diseases and medications. This service has brought about concern by experts who worry that results may lead to incorrect assumptions about the child's future.