**SMART Sensing Technology for Rapid and Error-Free Diagnosis**

Opti Microelectronics is an Italian SME that produces and commercializes microelectronic silicon-based optical sensors suitable for a wide variety of applications, including molecular diagnostics. Opti has a patent pending for a novel optoelectronic solid-state sensor kit, highly sensitive to light stimuli. The device can capture photons emitted by molecular markers enabling in vitro detection of nucleic acid sequences applied to in vitro diagnostics.

The novel ODG (Opti-DestiNA Genomics) kit has been designed for the rapid analysis/identification of nucleic acids, including DNA and microRNAs, with very high specificity. Combining the unique dynamic chemistry of DestiNA Genomics with Opti’s biophotonic sensors has created a novel assay to address unmet market need.

With its compact bench-top "footprint" requiring only a single technician to operate, the ODG Technology promises to transform and expand routine clinical diagnostic testing and screening for genetic diseases, cancer, drug toxology and heart disease, as well as employment in the emerging companion diagnostics market. Benefits for healthcare providers will be cost benefits in terms of reliability, time, and ease of use.

**MicroRNAs: regulators of gene expression**

MicroRNAs (miRNAs) are small non-coding RNAs of 19-24 nucleotides in length that regulate gene expression by base pairing with the 3’ untranslated region of a target gene’s mRNA, leading to degradation and/or translational repression of that gene.

Over the last two decades, miRNAs have been studied intensely as candidates for diagnostic and prognostic biomarkers for cancer and other serious illnesses. miRNAs are present in biological fluids (e.g., serum, plasma, urine, saliva) in a stable and reproducible fashion. Blood borne miRNAs fingerprints can be used to detect a variety of diseases.

**Circulating miRNAs: the ideal biomarkers**

Circulating miRNAs provide most of the characteristics for an ideal biomarker when considering clinical, analytical and practical criteria.

They are specific to the disease or pathology of interest, and can be a reliable indicator of disease before clinical symptoms appear - early detection, sensitive to changes in the pathology - disease progression or therapeutic response, easily obtained from biological fluids, and easily translatable from model systems to humans.

Furthermore, circulating miRNAs are remarkably stable, resisting degradation by ribonucleases. This essential nature makes them ideal for clinical diagnostic applications. The challenge has been to find simplified, cost-effective and reproducible technologies, superior to current analytical methods.

**DestiNA Technology and Toolbox**

DestiNA Genomics Ltd (DGJ) is a molecular diagnostic company focused on offering solutions and products to its customers based on a revolutionary and game-changing system to detect nucleic acids and their mutations.

Due to DestiNA’s unique chemistry-based core technology, this enables the creation of novel error free (no false positive) assays, with impressive single base resolution, highly valuable assays covering drug sensitivity, poor drug metabolisers, inherited and infectious diseases can now be developed, as well as those for cancer biomarkers that include detection of microRNAs.

**Reaction & measurement on ODG sensor**

Solid-state light detector for microRNA analysis. It can detect light flashes photon by photon, with outstanding performances:
- detection of extremely faint light;
- exceptionally good timing performance;
- insensitivity to magnetic fields;
- small and compact design.