

CYTAG® SuperCGH Used In Prenatal Diagnostics

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What is Microarray-Based Comparative Genomic Hybridization (aCGH)?

Microarray-based comparative genomic hybridization (aCGH) is a molecular diagnostic technique that detects chromosomal copy number gains and losses present in genetic diseases and cancers. Array CGH compares differences in copy number of test sample DNA suspected to have chromosomal abnormalities with a reference control sample with the complementary normal DNA (cDNA). Our CYTAG® SuperCGH Labeling Kit has been optimized to label low input DNA for dual sample comparative genomic hybridization (CGF) on oligonucleotide arrays. We empower our end-users with a proprietary labeling technology that utilizes a shorter workflow while providing them with the ability to achieve superior labeling efficiency with greater sensitivity and fewer failed trials. The CYTAG® SuperCGH Labeling Kit comes equipped with all necessary reagents for labeling such as our fully optimized nucleotide mixes that contain either Cyanine 3 or Cyanine 5-labeled dUTPs and purification components.

What are the advantages of our CYTAG® SuperCGH Labeling Kit?

A common issue among scientists working on the CGH platform is the use of small amounts of available genomic material extracted and purified from amniotic fluid, bone marrow aspirates, or total blood. Enzo's CYTAG® SuperCGH Labeling Kit addresses this issue with a design compatible with small quantities of DNA and minimized derivative log ratio (DLR) scores, which measure point-to-point consistency. Low DLR scores reduce the need for end-users to repeat their experiment, thereby preserving samples with small DNA quantities. Thus far, Enzo's CYTAG® SuperCGH Labeling Kit has been able to demonstrate higher labeled DNA yields while maintaining a high degree of specific activity with few false positives and false negatives for low-input DNA samples as low as 50 ng. Furthermore, our CYTAG® SuperCGH Labeling Kit has been able to detect genomic aberrations in samples of different origins, validating its ability to perform total genomic DNA analysis in a cytogenetic laboratory setup.



Key Features

- Provides excellent dynamic analytical range as low as 50 ng
- Shorter workflow allows samples to be ready for hybridization in under 4 hours
- Suitable for precious low input samples
- Superior derivative log ratios (DLRs)
- QC benchmarked and validated using high-resolution assays
- High signal-to-noise ratio

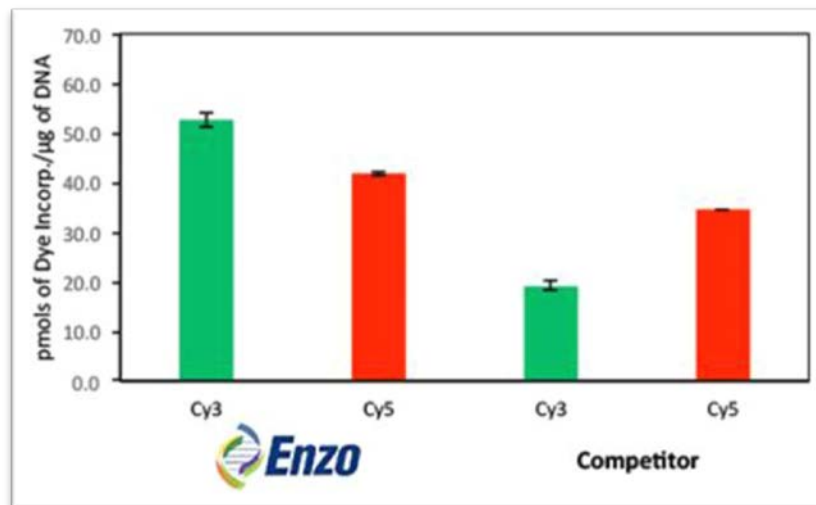


Figure 1. 50 ng DNA samples were labeled with Enzo's CYTAG® SuperCGH Labeling Kit for Oligo Arrays or a leading competitor's kit. Enzo's proprietary labeling technology generates the highest specific activity of labeling for Cy3 and Cy5.

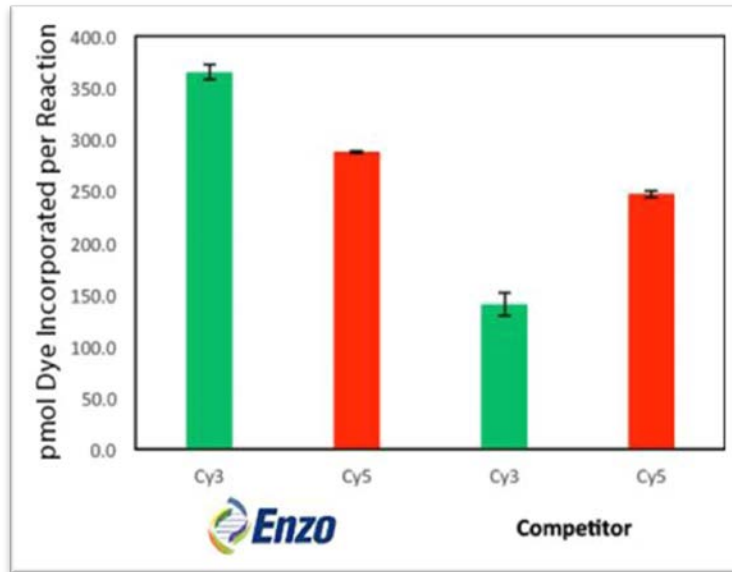


Figure 2. 50 ng DNA samples were labeled with Enzo's CYTAG[®] SuperCGH Labeling Kit for Oligo Arrays or a leading competitor's kits.

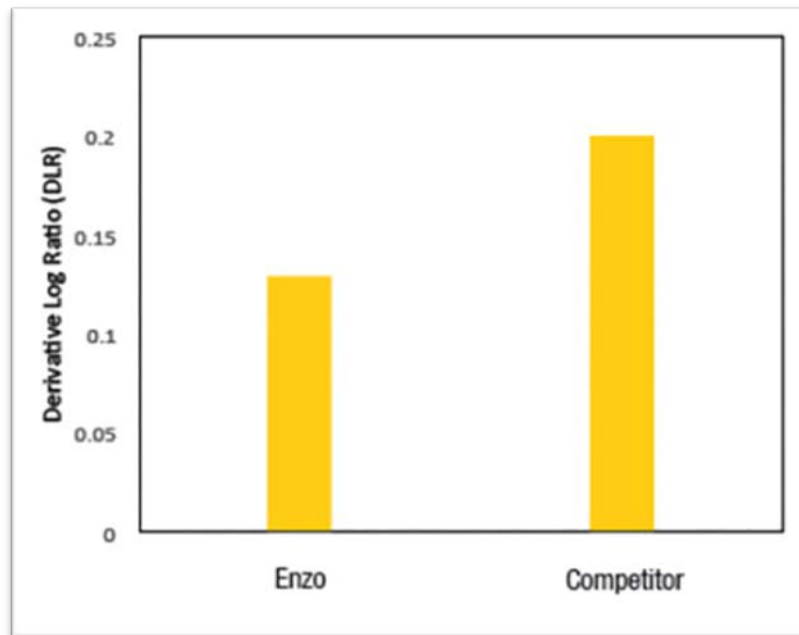


Figure 3. Comparative analysis of 50 ng DNA samples labeled with Enzo's CYTAG[®] SuperCGH Labeling Kit or that of a leading competitor demonstrates significantly lower DLR scores.

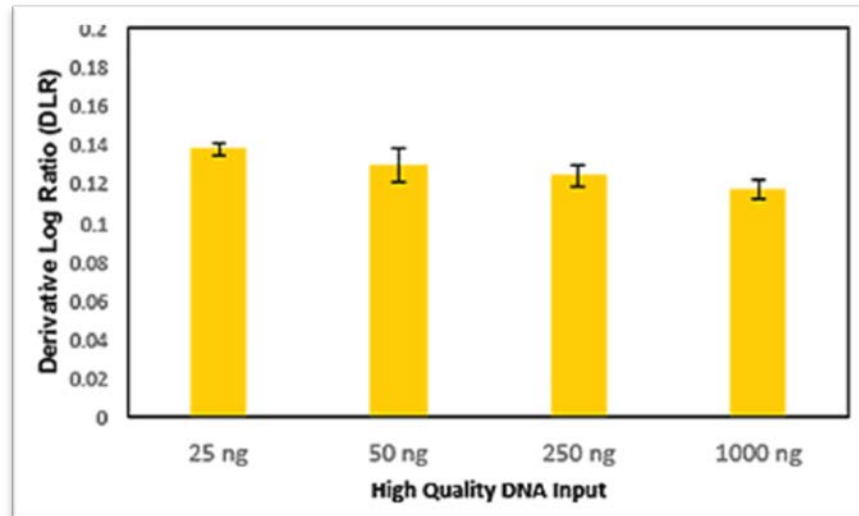


Figure 4. Comparative analysis over a range of DNA samples labeled with Enzo's CYTAG[®] SuperCGH Labeling Kit demonstrating low DLR scores.

WORKFLOW

Input DNA	50 – 1,000 ng
Denature DNA and Anneal Random Primers	Mix DNA (19 µL) Primers/Reaction Buffer (20 µL) Add water to 39 µL Heat 99 °C, 20 min Ice 5 min, Centrifuge, Ice
Extend Primers with Klenow Exo-DNA Polymerase	Add Cy Nucleotide Mix (10 µL) and Klenow (1 µL)
Purify Labeled DNA	PCR & Gel Clean-Up Columns
Block Repetitive Sequences with Cot DNA	Combine Labeled DNA Block with Human Cot DNA

Figure 5. Shorter workflow for CYTAG[®] SuperCGH Labeling Kit reduces sample preparation time to under 4 hours.

Application with CYTAG® SuperCGH Labeling Kit: Prenatal Testing on Amniotic Fluid

Karyotyping, fluorescence in situ hybridization (FISH), and aCGH are a few molecular diagnostic techniques utilized to deliver cytogenetic analyses of prenatal, postnatal, and oncological samples. Prenatal diagnosis employs a combination of non-invasive and invasive techniques to examine the health and condition of an unborn fetus. In the second or third trimester of pregnancy, amniotic samples are acquired by an invasive procedure known as an amniocentesis to be analyzed via the aforementioned molecular diagnostic techniques. However, while amniotic fluid is rich in fetal cells, scientists examining chromosomal aberrations with a CGH platform are often tasked with working around the small quantities of genomic material present in amniotic fluids. At the cytogenetics laboratory of the CHU Nantes (France), a study was conducted to examine the compatibility of CYTAG® SuperCGH Labeling Kit from Enzo with DNA extracted from amniotic fluid. Chromosomal abnormalities were successfully identified in prenatal samples with as low as 50ng of DNA present while demonstrating superior DLR scores. For more information, check out our Application Note which describes the present study in further detail.

Enzo offers geneticists a comprehensive portfolio for genomic analysis including our [CYTAG® CGH labeling kit](#) as well as our [Nick translation DNA labeling system](#) with ready-to-use nick translation enzyme mix and shorter labeling time to prepare FISH probes.