# A Fluorescence Imaging Technology for Accurate Diagnosis of Cancer

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In these post-genomic era, the mechanism of various diseases, especially cancer, have been understood at molecular level. As cancer is established to be caused by genetic alterations, it is expected to achieve the accurate diagnosis for each cancer based on the genetic information. Recently, the comparative genomic hybridization method (CGH) was developed, which can detect the chromosomal abnormalities by an imaging technique. CGH has the remarkable advantages that the chromosomal gains and losses in whole genome can be detected by only one hybridization process without probes of known DNA sequences. Therefore, we are focusing on developing the methods for cancer diagnosis by CGH technology.
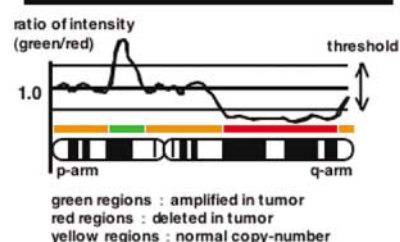


Genome-wide analysis of chromosomal abnormalities in cancer by an imaging technology, comparative genomic hybridization (CGH)
Differently labeled tumor (green) and reference (red) DNA are co-hybridized to a normal metaphase spread. After the microscopic observation and imaging, DNA copy-number changes in the tumor genome can be detected as the imbalance of fluorescence intensity in the acquired image and be located on the chromosome map. Green regions indicate the chromosomal amplifications in the tumor cells and red regions indicate the losses. This figure shows a typical CGH analysis of hepatocellular carcinoma.

## Information and Communication Technology

# Isosurfaces in Three-Dimensional Ray-Tracing Software POV-Ray

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Recently, a new version (version 3.5) of POV-Ray (http://www.povray.org), which is an open-source software for three-dimensional ray-tracing computer graphics, has been released. In this software, isosurface algorithm developed by the authors has been officially implemented. The users can easily create complex objects with the isosurface feature combining various mathematical functions, noise functions, and external data. Since the POV-Ray with isosurface objects is extremely flexible, it will be useful not only for scientific visualization but also for business presentation, arts, education, hobby, etc.



Example of isosurface objects