

Immunohistochemical screening for a polycyclic aromatic hydrocarbon carcinogen

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Technology description

Summary

Polycyclic aromatic hydrocarbons (PAHs) are a class of ubiquitous carcinogenic compounds that are produced by burning of carbon-based compounds like organic matter, oil, and coal. They are found in burnt food, soot, and in cigarette and other smokes. PAHs' carcinogenicity comes from their ability to cause mutations by binding to DNA, which makes them tumor initiators and also allows them to assist in tumor progression. This technology is two monoclonal antibodies that recognize the DNA- and protein-adducts of benzo[a]pyrene diol epoxide (BPDE), an oxidized form of the PAH benzo[a]pyrene. They have been developed into an assay that can quantify the amount of BPDE in white blood cells and can be used to screen patients for exposure to BPDE.

Assays based on monoclonal antibodies 5D11 and 8E11 detect, respectively, BDPE-DNA and BDPE-protein adducts with high specificity and sensitivity

This technology consists of the monoclonal antibodies 5D11, which detects BDPE-DNA adducts, and 8E11, which detects BDPE-protein adducts. The antibodies are produced in vitro, and can thus be developed in limitless supply in the laboratory. Furthermore, BDPEs can be produced in different geometric arrangements, and both antibodies can detect adducts of multiple geometries while maintaining a high specificity for the BDPE-DNA or -protein adduct.

This technology has been used in multiple screening experiments and to monitor environmental exposure to PAHs, including the screening of breast cancer tissues for the presence of PAHs.

Institution

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