

MONOCLONAL ANTIBODIES AND IMMUNOASSAY SPECIFIC FOR THE TOXIC CONGENERS OF POLYCHLORINATED BIPHENYLS

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ABSTRACT

Polychlorinated biphenyls (PCBs) are ubiquitous environmental pollutants with diverse toxic, teratogenic, reproductive, immunotoxic, and tumorigenic effects. Three of the least abundant of the 209 PCB isomers (congeners) are the most toxic and most difficult to quantify. These are 3,4,3',4'-tetrachlorobiphenyl, 3,4,3',4',5'-pentachlorobiphenyl, and 3,4,5,3',4',5'-hexachlorobiphenyl (IU-PAC No. 77, 126, and 169, respectively). An immunizing hapten was designed to retain the 3,4,3',4' chlorine-substitution pattern and coplanarity characteristic of these toxic congeners. The optimal competitors for immunoassay were weaker binding distinctive single-ring fragments of the PCBs. A monoclonal antibody designated S2B1 was derived and used in direct (antibody-capture) competitive enzyme immunoassays (EIAs). The EIAs are highly specific for non-ortho-substituted congeners and do not recognize the more prevalent but much less toxic noncoplanar PCB congeners or 2,3,7,8-tetrachlorodibenzo-p-dioxin, 2,3,7,8-tetrachlorodibenzofuran, or dichlorobenzenes. Hapten and competitor design for this assay suggests a basis for development of sensitive EIAs for other classes of PCB congeners.

Reference:

Chiu, YW, et al. 1995 Anal Chem. 67::3829-39

APPLICATIONS

This monoclonal antibody can be used in in a wide range of immunoassay and sensor formats including environmental monitoring, bioremediation, pharmacological, and occupational exposure assessment studies.

ADVANTAGES

S2B1 antibodies can provide basic information about PCB combining site and may make it possible to engineer antibodies with new properties by mutagenesis (See technology 01-100)

RELATED TECHNOLOGIES

- [Recombinant Fab Antibody Specific For Coplanar Ploychlorinated Biphenyls, And Haptens For Pcb Congeners](#)

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OTHER INFORMATION

KEYWORDS

remediation, remediation, antibody, research tool

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