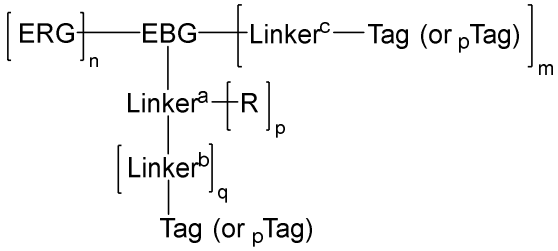
CLAIMS

1. A probe having a structure satisfying Formula II

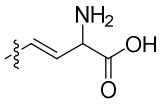


Formula II

wherein

ERG, if present, is $S(O)_2OH$, or an anionic form thereof; $P(O)(OH)_2$, or an anionic form thereof; a halogen; or -OPh-CH_2-ONO_2;

EBG has a structure satisfying Formulas IIB_{EBG}



Formula IIB_{EBG};

$Linker^a$ comprises an aliphatic group, a heteroaliphatic group, an aromatic group, an aliphatic-aromatic group, a heteroaliphatic-aromatic group, a heteroaromatic group, an aliphatic-heteroaromatic group, or a heteroaliphatic-heteroaromatic group;

each of $Linker^b$, and $Linker^c$, if present, independently comprises an aliphatic group, a heteroaliphatic group, an aromatic group, an aliphatic-aromatic group, a heteroaliphatic-aromatic group, a heteroaromatic group, an aliphatic-heteroaromatic group, or a heteroaliphatic-heteroaromatic group;

R, if present, is a group comprising a carbamate or a carbonate;

each Tag, if present, independently comprises a functional group or molecule capable of generating a detectable signal;

each $_p$Tag, which is present if a Tag is not present, independently comprises a clickable functional group;

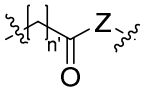
n and m are 0; and

each of p and q independently is 0 or 1.

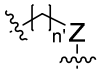
2. The probe of claim 1, wherein $Linker^a$ is a linker group having a structure satisfying one or more of Formulas $IIA_{Linkera}$-$IIH_{Linkera}$



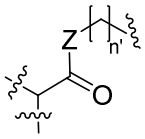
Formula IIA$_{linkera}$



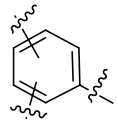
Formula IIB$_{linkera}$



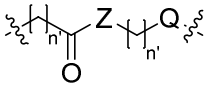
Formula IIC$_{linkera}$



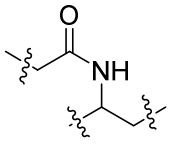
Formula IID$_{linkera}$



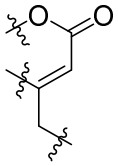
Formula IIE$_{linkera}$



Formula IIF$_{linkera}$



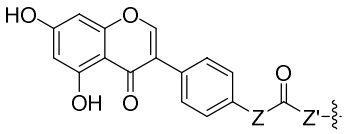
Formula IIG$_{linkera}$



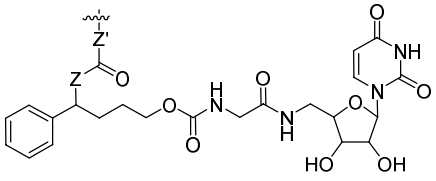
Formula IIH$_{linkera}$

wherein each n' independently is an integer ranging from 1 to 50; Z is oxygen or NR"', wherein R"' is hydrogen, aliphatic, or aromatic; and Q is carbon, oxygen or NR"', wherein R"' is hydrogen, aliphatic, or aromatic.

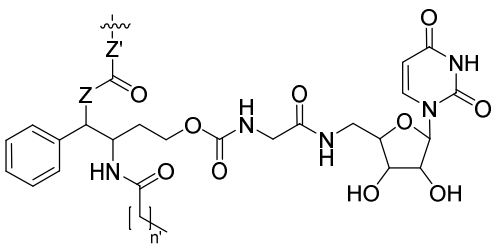
3. The probe of claim 1 or claim 2, wherein R is present and has a structure satisfying any one or more Formulas IIA$_R$-IIC$_R$



Formula IIA$_R$



Formula IIB$_R$



Formula IIC$_R$

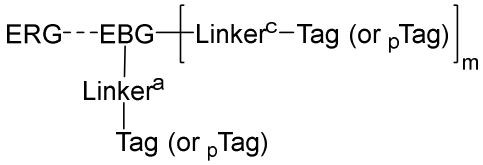
wherein Z and Z' independently are oxygen or NR"', wherein R"' is hydrogen, aliphatic, or aromatic; and n' is an integer ranging from 0 to 50.

4. The probe of any one of claims 1-3, wherein one or more Tags are present and wherein each Tag independently is a fluorophore, a binding partner of an affinity-based binding pair, a quantum dot, or a dye.

5. The probe of claim 4, wherein the one or more Tags independently are rhodamine, fluorescein, or biotin.

6. The probe of any one of claims 1-3, wherein one or more $_p$Tags are present and wherein each $_p$Tag independently is an azide or an alkyne.

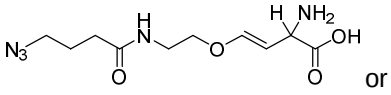
7. The probe of claim 1, wherein the compound has a structure satisfying Formula IIIA



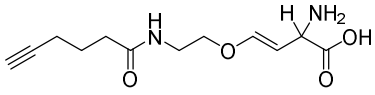
Formula IIIA.

8. The probe of claim 7, wherein Linker^a is an ester group, an -O(CH$_2$)$_{n'}$NR"'C(O)(CH$_2$)$_{n'}$- group, or a -(CH$_2$)$_{n'}$- group, wherein each n' independently is an integer ranging from 1 to 20 and wherein R"' is hydrogen, aliphatic, or aromatic.

9. A probe selected from



or



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10. A method, comprising:

exposing a subject or a sample to a probe according to any one of claims 1-9 for a time sufficient to allow the probe to bind to an enzyme involved in xenobiotic metabolism such that a probe-enzyme conjugate is formed; and

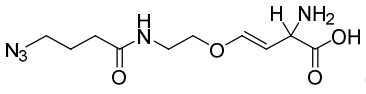
analyzing the probe-enzyme conjugate using a fluorescent detection technique, a colorimetric detection technique, a mass spectrometry technique, or a combination thereof.

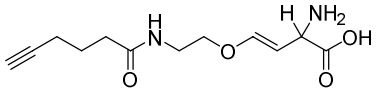
11. The method of claim 10, further comprising exposing the probe-enzyme conjugate to a Tag-containing compound to form a probe-enzyme conjugate comprising a Tag moiety.

12. The method of claim 10 or 11, further comprising exposing the probe to a light source.

13. The method of any one of claims 10-12, further comprising extracting a subject sample from the subject and analyzing the subject sample using a fluorescent detection technique, a colorimetric detection technique, a mass spectrometry technique, or a combination thereof.

14. The method of any one of claims 10-13, wherein the probe is selected from



or


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15. An assay platform, comprising:

a substrate; and

a probe according to any one of claims 1-9, wherein the probe is covalently bound to the substrate.