XENOTECH
A BioIVT Company

Data Sheet
Certificate of Analysis

XTreme 200 Human Liver Microsomes

Lot No. 2310132

Human Liver Microsomes
Pool of 200 (100 Male and 100 Female)
Suspension medium: 250 mM sucrose

H2610 0.5 mL at 20 mg/mL
H2620 1.0 mL at 20 mg/mL
H2630 5.0 mL at 20 mg/mL
H2640 50.0 mL at 20 mg/mL

Specific Content and Enzyme Activities		***Content / Rate***
Cytochrome P450 content	(nmol/mg protein)	0.294
Cytochrome b_5 content	(nmol/mg protein)	0.334
NADPH-cytochrome c reductase	(nmol/mg protein/min)	221 ± 6

Enzyme	**Marker Substrate Reaction**	**[S] (µM)**	**Rate (pmol/mg protein/min)**
CYP1A2	Phenacetin *O*-dealkylation	80	343 ± 17
CYP2A6	Coumarin 7-hydroxylation	50	1010 ± 40
CYP2B6	Bupropion hydroxylation	500	576 ± 67
CYP2C8	Amodiaquine *N*-dealkylation	20	1940 ± 130
CYP2C9	Diclofenac 4'-hydroxylation	100	2450 ± 110
CYP2C19	*S*-Mephenytoin 4'-hydroxylation	400	51.7 ± 5.1
CYP2D6	Dextromethorphan *O*-demethylation	80	216 ± 18
CYP2E1	Chlorzoxazone 6-hydroxylation	500	2170 ± 90
CYP2J2	Ebastine hydroxylation	30	302 ± 19
CYP3A4/5	Testosterone 6β-hydroxylation	250	2690 ± 110
CYP3A4/5	Midazolam 1'-hydroxylation	30	829 ± 13
CYP4A11	Lauric acid 12-hydroxylation	100	1680 ± 50
FMO	Benzydamine *N*-oxygenation	500	1110 ± 70
UGT1A1	17β-Estradiol 3-glucuronidation	100	1050 ± 80
UGT1A3	Chenodeoxycholic acid 24O-glucuronidation	300	81.7 ± 1.3
UGT1A4	Trifluoperazine glucuronidation	25	872 ± 23
UGT1A6	1-Naphthol glucuronidation	500	19200 ± 1890
UGT1A9	Propofol glucuronidation	50	4480 ± 310
UGT2B7	Morphine 3-glucuronidation	1000	3430 ± 290
UGT2B17	17βO-Testosterone glucuronidation	50	880 ± 74

Values for enzyme activities were determined at a single substrate concentration and are mean ± standard deviation of three or more determinations.

To measure cytochrome P450 (CYP) activity, liver microsomes (50 µg/mL) were incubated in triplicate at 37 ± 2°C for 10 minutes in potassium phosphate buffer (50 mM, pH 7.4), containing $MgCl_2$ (3.0 mM), EDTA (1.0 mM), NADP (1.0 mM), glucose-6-phosphate (5.0 mM), glucose-6-phosphate dehydrogenase (1 Unit/mL) and marker substrate, at the final concentrations indicated. Metabolite formation was determined by validated LC-MS/MS methods with deuterated metabolites as internal standards. FMO activity was measured under similar conditions except the protein concentration was 1 mg/mL and the buffer was 49 mM Tricine (pH 8.5)

To measure UDP-glucuronosyltransferase (UGT) activity, liver microsomes (10 - 250 µg/mL) were incubated in triplicate at 37 ± 2°C for 5 or 10 minutes in Tris-HCl (100 mM, pH 7.7 at 37°C), CHAPS (0.5 mM), EDTA (1.0 mM), $MgCl_2$ (10 mM), D-saccharic acid 1,4-lactone (100 µM), uridine diphosphate-glucuronic acid (8.0 mM) and marker substrate at the final concentrations indicated.

Each donor is equally represented in this pool.

TBD: To be determined

Store at -80°C

CAUTION: This sample should be considered as a potential biohazard and universal precautions should be followed. Intended for *in vitro* use only.

This data sheet serves as a Certificate of Analysis and has been approved by Stephanie Helmstetter, Assistant Director.
Signature and Date: Stephanie Helmstetter 28 September 2023

Kinetic constants for CYP enzyme activities in human liver microsomes (pool of 200)

Enzyme	Marker Substrate	Kinetic Constants		
		Km (µM)	**Vmax** (pmol/mg protein/min)	**CL_{int}** (µL/mg protein/min)
CYP1A2	Phenacetin [S] range: 12-120 µM	**94.5 ± 3.8**	**662 ± 13**	**7.0**
CYP2A6	Coumarin [S] range: 0.15-7.5 µM	**0.812 ± 0.028**	**984 ± 12**	**1211**
CYP2B6	Bupropion [S] range: 10-500 µM	**190 ± 4**	**972 ± 10**	**5.12**
CYP2B6	Efavirenz [S] range: 0.3-18 µM	**3.27 ± 0.28**	**99.9 ± 3.1**	**30.6**
CYP2C8	Amodiaquine (low protein concentration) [S] range: 0.05-18 µM	**2.56 ± 0.11**	**2080 ± 30**	**812**
CYP2C9	Diclofenac [S] range: 1.5-60 µM	**9.16 ± 0.33**	**2610 ± 30**	**285**
CYP2C19	*S*-Mephenytoin [S] range: 8-400 µM	**56.3 ± 1.5**	**37.7 ± 0.3**	**0.670**
CYP2D6	Dextromethorphan [S] range: 1.5-75 µM	**11.0 ± 0.9**	**225 ± 6**	**20.5**
CYP2E1	Chlorzoxazone [S] range: 4-300 µM	**45.3 ± 0.8**	**2230 ± 10**	**49.2**
CYP3A4/5	Testosterone [S] range: 20-210 µM	**88.9 ± 8.2**	**3110 ± 130**	**35.0**
CYP3A4/5	Midazolam [S] range: 1-40 µM	**2.52 ± 0.19**	**807 ± 18**	**320**
CYP4A11	Lauric acid [S] range: 0.3-15 µM	**4.03 ± 0.21**	**1100 ± 20**	**273**

CL_{int}: Intrinsic clearance (i.e., Vmax/Km).
Kinetic constants are mean ± standard deviation of three or more determinations.

Donor Information

Sample	Gender	Age (Yrs)	Race	Cause of Death
248	M	29	Hispanic	Head trauma
255	M	46	Hispanic	Anoxia
262	M	42	Caucasian	Cerebrovascular accident
375	M	23	Caucasian	Head trauma
384	M	53	Caucasian	Anoxia
400	F	42	Caucasian	Anoxia
407	M	69	Caucasian	Cerebrovascular accident
408	M	32	Caucasian	Head trauma
411	M	55	Caucasian	Anoxia
412	M	66	Caucasian	Cerebrovascular accident
437	M	62	Caucasian	Cerebrovascular accident
451	M	58	Caucasian	Cerebrovascular accident
466	M	48	Caucasian	Anoxia
475	M	27	Caucasian	Anoxia
515	F	59	Caucasian	Cerebrovascular accident
530	F	64	Caucasian	Head trauma
532	M	26	Caucasian	Head trauma
533	M	28	African American	Anoxia
542	F	53	Caucasian	Cerebrovascular accident
544	M	45	Caucasian	Anoxia
546	F	53	Caucasian	Cerebrovascular accident
554	F	43	Caucasian	Anoxia
558	M	50	Caucasian	Anoxia
561	M	55	African American	Cerebrovascular accident
564	F	42	Caucasian	Cerebrovascular accident
572	M	68	Caucasian	Cerebrovascular accident
574	M	63	Caucasian	Cerebrovascular accident
576	F	55	Caucasian	Cerebrovascular accident
577	F	23	Caucasian	Cerebrovascular accident
582	F	60	Caucasian	Anoxia
589	F	55	Caucasian	Cerebrovascular accident
594	F	51	Caucasian	Cerebrovascular accident
599	M	51	Caucasian	Cerebrovascular accident
603	F	67	Caucasian	Head trauma
605	F	49	Caucasian	Cerebrovascular accident
608	F	54	Caucasian	Anoxia
609	F	48	Caucasian	Anoxia
611	F	25	Caucasian	Cerebrovascular accident
617	F	52	Caucasian	Cerebrovascular accident
618	F	70	Caucasian	Cerebrovascular accident
619	F	45	Caucasian	Cerebrovascular accident
625	F	39	Caucasian	Anoxia
628	F	62	Caucasian	Cerebrovascular accident

Donor Information

Sample	Gender	Age (Yrs)	Race	Cause of Death
634	F	63	Caucasian	Cerebrovascular accident
659	F	33	Hispanic	Anoxia
686	F	52	Caucasian	Anoxia
706	F	53	Caucasian	Cerebrovascular accident
721	F	52	Caucasian	Cerebrovascular accident
726	F	48	Caucasian	Cerebrovascular accident
729	F	66	Caucasian	Head trauma
736	F	46	Caucasian	Anoxia
744	M	57	Caucasian	Cerebrovascular accident
750	F	53	Caucasian	Anoxia
756	F	47	Caucasian	Cerebrovascular accident
761	M	70	Caucasian	Cerebrovascular accident
763	F	53	Caucasian	Anoxia
765	F	39	Caucasian	Cerebrovascular accident
771	F	47	Hispanic	Anoxia
778	M	61	Caucasian	Cerebrovascular accident
784	F	63	Caucasian	Head trauma
788	F	58	Caucasian	Cerebrovascular accident
808	M	57	Caucasian	Cerebrovascular accident
818	M	48	Hispanic	Cerebrovascular accident
819	F	49	Caucasian	Head trauma
820	F	65	Caucasian	Cerebrovascular accident
821	F	51	Caucasian	Anoxia
823	F	67	Caucasian	Anoxia
826	F	55	Caucasian	Cerebrovascular accident
839	F	25	African American	Cerebrovascular accident
840	M	77	Caucasian	Cerebrovascular accident
841	M	74	Caucasian	Head trauma
847	F	55	Caucasian	Cerebrovascular accident
851	F	47	Caucasian	Cerebrovascular accident
855	F	63	Hispanic	Cerebrovascular accident
858	F	69	Hispanic	Cerebrovascular accident
859	F	69	Caucasian	Cerebrovascular accident
860	F	67	Asian	Cerebrovascular accident
861	F	61	Caucasian	Head trauma
862	M	45	Hispanic	Cerebrovascular accident
864	F	46	Caucasian	Cerebrovascular accident
867	F	39	Hispanic	Cerebrovascular accident
869	F	39	Hispanic	Cerebrovascular accident
870	F	44	Caucasian	Head trauma
874	F	65	Caucasian	Cerebrovascular accident
898	F	58	African American	Cerebrovascular accident
899	F	49	African American	Anoxia

Donor Information

Sample	Gender	Age (Yrs)	Race	Cause of Death
901	F	71	Caucasian	Cerebrovascular accident
902	F	54	Caucasian	Cerebrovascular accident
903	F	54	African American	Anoxia
919	F	39	Caucasian	Anoxia
927	F	64	Hawaiian	Cerebrovascular accident
947	F	45	Caucasian	Cerebrovascular accident
948	M	53	Hispanic	Cerebrovascular accident
949	M	53	Caucasian	Cerebrovascular accident
950	M	55	Caucasian	Cerebrovascular accident
956	F	68	African American	Anoxia
966	F	53	Caucasian	Head trauma
968	M	54	Caucasian	Cerebrovascular accident
972	M	49	Caucasian	Cerebrovascular accident
975	M	46	Hispanic	Cerebrovascular accident
976	F	61	Caucasian	Head trauma
977	M	54	Caucasian	Head trauma
978	F	56	Hispanic	Cerebrovascular accident
979	M	53	Caucasian	Cerebrovascular accident
982	F	30	Caucasian	Anoxia
983	M	49	Caucasian	Anoxia
984	M	51	Caucasian	Cerebrovascular accident
989	F	47	Caucasian	Cerebrovascular accident
990	M	38	Caucasian	Cerebrovascular accident
991	M	42	Caucasian	Cerebrovascular accident
994	F	73	Caucasian	Cerebrovascular accident
995	F	45	Caucasian	Cerebrovascular accident
999	F	19	Hispanic	Anoxia
1001	F	50	American Indian	Cerebrovascular accident
1002	M	48	African American	Cerebrovascular accident
1003	F	75	Caucasian	Cerebrovascular accident
1004	F	45	Caucasian	Head trauma
1005	M	45	Caucasian	Cerebrovascular accident
1006	M	50	Caucasian	Anoxia
1007	M	20	Caucasian	Head trauma
1008	M	36	Hispanic	Cerebrovascular accident
1009	M	22	Caucasian	Cerebrovascular accident
1010	M	63	Caucasian	Cerebrovascular accident
1011	M	65	Caucasian	Cerebrovascular accident
1012	M	41	Caucasian	Anoxia
1013	M	51	Caucasian	Cerebrovascular accident
1014	M	55	Caucasian	Anoxia
1015	M	59	Caucasian	Cerebrovascular accident
1016	M	64	Hispanic	Head trauma

Donor Information

Sample	Gender	Age (Yrs)	Race	Cause of Death
1018	M	59	Caucasian	Anoxia
1020	F	24	Caucasian	Cerebrovascular accident
1022	M	41	Caucasian	Anoxia
1024	F	59	Caucasian	Anoxia
1025	M	57	Caucasian	Cerebrovascular accident
1026	F	55	African American	Head trauma
1027	F	63	Caucasian	Cerebrovascular accident
1028	F	51	African American	Cerebrovascular accident
1029	M	48	Caucasian	Anoxia
1030	M	67	Caucasian	Cerebrovascular accident
1031	F	70	Caucasian	Cerebrovascular accident
1032	M	64	Caucasian	Cerebrovascular accident
1033	F	55	Caucasian	Cerebrovascular accident
1034	M	45	Caucasian	Anoxia
1037	M	27	Caucasian	Cerebrovascular accident
1042	M	51	Caucasian	Cerebrovascular accident
1044	F	19	Caucasian	Anoxia
1045	M	48	Caucasian	Cerebrovascular accident
1046	M	49	Caucasian	Anoxia
1047	M	53	Hispanic	Cerebrovascular accident
1051	F	57	African American	Cerebrovascular accident
1054	M	19	Caucasian	Head trauma
1055	F	29	African American	Head trauma
1060	M	49	Hispanic	Cerebrovascular accident
1061	M	40	Hispanic	Cerebrovascular accident
1063	M	43	Hispanic	Head trauma
1066	M	60	Caucasian	Cerebrovascular accident
1069	M	39	Caucasian	Cerebrovascular accident
1075	M	56	Caucasian	Cerebrovascular accident
1077	F	57	Caucasian	Head trauma
1078	F	66	Caucasian	Head trauma
1079	M	41	Caucasian	Anoxia
1081	M	55	Caucasian	Cerebrovascular accident
1082	F	66	Caucasian	Cerebrovascular accident
1083	M	68	African American	Cerebrovascular accident
1084	M	52	Caucasian	Cerebrovascular accident
1086	M	63	Caucasian	Cerebrovascular accident
1087	M	51	African American	Cerebrovascular accident
1088	F	61	Caucasian	Cerebrovascular accident
1089	M	55	Caucasian	Anoxia
1090	M	49	Caucasian	Cerebrovascular accident
1091	M	74	Caucasian	Cerebrovascular accident
1093	F	48	Caucasian	Cerebrovascular accident

Donor Information

Sample	Gender	Age (Yrs)	Race	Cause of Death
1094	M	59	African American	Cerebrovascular accident
1095	F	60	Caucasian	Cerebrovascular accident
1097	M	36	Caucasian	Cerebrovascular accident
1098	M	54	Caucasian	Head trauma
1099	M	65	Caucasian	Cerebrovascular accident
1101	F	47	Caucasian	Anoxia
1102	M	48	Caucasian	Cerebrovascular accident
1104	M	51	Caucasian	Anoxia
1105	M	62	Caucasian	Anoxia
1106	F	20	Caucasian	Cerebrovascular accident
1107	F	55	Caucasian	Cerebrovascular accident
1108	F	45	African American	Cerebrovascular accident
1113	M	59	Caucasian	Anoxia
1114	M	39	Caucasian	Head trauma
1115	M	56	Caucasian	Head trauma
1117	F	66	Caucasian	Cerebrovascular accident
1119	M	44	Caucasian	Cerebrovascular accident
1120	M	49	Caucasian	Cerebrovascular accident
1121	M	60	Caucasian	Cerebrovascular accident
1130	F	65	Caucasian	Cerebrovascular accident
1131	M	52	Caucasian	Head Trauma
1155	F	43	Caucasian	Cerebrovascular accident
1157	F	59	Hispanic	Head trauma
1161	F	60	Caucasian	Anoxia
1360	M	53	Caucasian	Cerebrovascular accident
1361	M	46	Caucasian	Anoxia
1363	M	51	Caucasian	Head trauma
1372	M	39	Caucasian	Cerebrovascular accident

Serology information

- Cytomegalovirus: 125 of 200 donors tested positive and 2 donors were not determined.
- RPR*: All donors tested negative.
- HIV, HTLV, HbsAg, and HCV**: All donors tested negative.

* Rapid Plasma Reagin

** Antibody to Human Immunodeficiency Virus, Antibody to Human T Cell Lymphotropic Virus, Hepatitis B Surface Antigen, Antibody to Hepatitis C Virus, respectively.