

Appendix A. Probes 141-IIIa and 141-IIIb

Strain	C1204-Vol	C1204-OD	141IIIa-Vol	141IIIa-OD	141IIIb-Vol	141IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
DST87-60	31.456	1.950	17.904	1.746	4.937	0.662	0.569	0.895	0.157	0.339
D80-100	31.095	1.950	9.758	1.214	4.169	0.528	0.314	0.623	0.134	0.271
D80-218	28.056	1.950	3.945	0.652	2.605	0.387	0.141	0.334	0.093	0.198
D80-280	23.551	1.746	2.195	0.577	2.712	0.411	0.093	0.330	0.115	0.235
D87-011	25.066	1.950	5.375	1.181	2.306	0.395	0.214	0.606	0.092	0.203
D87-167	21.576	1.746	3.233	0.607	2.616	0.391	0.150	0.348	0.121	0.224
D87-199	18.755	1.746	1.369	0.356	1.321	0.248	0.073	0.204	0.070	0.142
D87-279	27.247	1.950	6.901	1.181	2.236	0.523	0.253	0.606	0.082	0.268
D87-300	29.056	1.950	4.766	0.750	3.728	0.538	0.164	0.385	0.128	0.276
D87-499	19.477	1.661	0.932	0.315	2.215	0.360	0.048	0.190	0.114	0.217
D87-642	23.919	1.746	2.256	0.493	2.193	0.371	0.094	0.282	0.092	0.212
D87-704	29.138	1.950	13.076	1.562	4.074	0.560	0.449	0.801	0.140	0.287
D87-738	28.807	1.950	7.375	1.181	2.467	0.432	0.256	0.606	0.086	0.222
D87-881	27.051	1.950	5.858	0.933	3.326	1.379	0.217	0.478	0.123	0.707
D87-1040	32.255	1.950	16.078	1.661	6.060	0.626	0.498	0.852	0.188	0.321
D87-1051	20.905	1.746	1.654	0.387	2.851	0.411	0.079	0.222	0.136	0.235
D87-1077	20.410	1.746	1.788	0.483	2.045	0.353	0.088	0.277	0.100	0.202
D87-1113	21.504	1.746	2.854	0.626	1.901	0.328	0.133	0.359	0.088	0.188
D87-1121	15.631	1.562	0.666	0.251	2.229	0.360	0.043	0.161	0.143	0.230
D87-1152	26.566	1.950	7.433	1.123	2.833	0.411	0.280	0.576	0.107	0.211
D87-1283	23.532	1.746	2.254	0.464	2.199	0.346	0.096	0.266	0.093	0.198
D87-1372	26.570	1.746	3.095	0.566	3.281	0.566	0.116	0.324	0.123	0.324
D87-1418	29.367	1.950	7.102	1.097	3.953	0.483	0.242	0.563	0.135	0.248
D87-1441	25.885	1.950	3.453	0.639	4.037	0.428	0.133	0.328	0.156	0.219
						MEAN	0.198	0.442	0.117	0.257
						SD	0.142	0.214	0.028	0.107
						2SD	0.284	0.428	0.057	0.213
						3SD	0.425	0.641	0.085	0.320
						X-SD	0.056	0.228	0.089	0.151
						X-2SD	-0.086	0.015	0.061	0.044
						X-3SD	-0.228	-0.199	0.032	-0.063

Appendix A. Probes 141-IIIa and 141-IIIb [continued]

Strain	C1204-Vol	C1204-OD	141IIIa-Vol	141IIIa-OD	141IIIb-Vol	141IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
D80-141	29.089	1.950	0.770	0.259	25.154	1.950	0.026	0.133	0.865	1.000
D87-1421	28.290	1.950	0.648	0.270	22.856	1.746	0.023	0.138	0.808	0.895
MK42-86	27.144	1.950	3.348	0.722	23.416	1.746	0.123	0.370	0.863	0.895
MK116-87	24.807	1.950	0.344	0.259	19.435	1.661	0.014	0.133	0.783	0.852
MK244-87	24.962	1.746	0.247	0.223	19.877	1.661	0.010	0.128	0.796	0.951
						MEAN	0.039	0.180	0.823	0.919
						SD	0.047	0.106	0.038	0.058
						2SD	0.095	0.212	0.076	0.115
						3SD	0.142	0.319	0.114	0.173
						X-SD	-0.008	0.074	0.785	0.861
						X-2SD	-0.056	-0.032	0.747	0.804
						X-3SD	-0.103	-0.138	0.709	0.746

Appendix A. Probes 141-IIIa and 141-IIIb [continued]

Strain	C1204-Vol	C1204-OD	141IIIa-Vol	141IIIa-OD	141IIIb-Vol	141IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
D94-035	22.339	1.746	2.522	0.503	2.605	0.379	0.113	0.288	0.117	0.217
D94-039	24.888	1.950	3.801	0.789	1.700	0.296	0.153	0.405	0.068	0.152
D94-041	29.333	1.950	13.804	1.562	3.236	0.498	0.471	0.801	0.110	0.255
D94-082	23.777	1.746	3.350	0.560	1.583	0.371	0.141	0.321	0.067	0.212
D94-123	15.792	1.661	0.755	0.296	1.812	0.383	0.048	0.178	0.115	0.231
D94-173	23.101	1.950	3.695	0.917	1.911	0.371	0.160	0.470	0.083	0.190
D94-179	26.151	1.950	5.103	0.835	3.711	0.555	0.195	0.428	0.142	0.285
D94-197	27.590	1.950	6.500	0.986	4.916	0.560	0.236	0.506	0.178	0.287
D94-339	28.763	1.950	14.566	1.661	2.561	0.383	0.506	0.852	0.089	0.196
D94-373	26.754	1.950	11.998	1.562	1.994	0.383	0.448	0.801	0.075	0.196
D94-376	27.811	1.950	16.658	1.746	5.112	0.674	0.599	0.895	0.184	0.346
D94-389	29.772	1.950	14.616	1.562	3.818	0.528	0.491	0.801	0.128	0.271
D94-411	29.092	1.950	12.750	1.487	4.322	0.544	0.438	0.763	0.149	0.279
D94-439	29.211	1.950	11.994	1.430	1.798	0.299	0.411	0.733	0.062	0.153
D94-476	21.016	1.950	2.764	0.652	1.652	0.360	0.132	0.334	0.079	0.185
D94-529	20.263	1.746	3.106	0.652	3.492	0.446	0.153	0.373	0.172	0.255
D94-539	23.840	1.950	3.381	0.639	2.770	0.469	0.142	0.328	0.116	0.241
D94-548	21.876	1.746	1.778	0.399	1.666	0.306	0.081	0.229	0.076	0.175
D94-568	23.794	1.746	2.893	0.566	2.588	0.419	0.122	0.324	0.109	0.240
D94-586	26.419	1.950	4.554	0.811	2.301	0.364	0.172	0.416	0.087	0.187

Appendix B. Probes 203-IIIa and 203-IIIb

Strain	C1204-Vol	C1204-OD	203IIIa-Vol	203IIIa-OD	203IIIb-Vol	203IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
DST87-60	6.603	0.933	3.045	0.566			0.461	0.607		
D80-100	9.919	1.072	5.365	0.731			0.541	0.682		
D80-218	8.901	0.950	3.289	0.538			0.370	0.566		
D80-280	2.957	0.508	0.528	0.339			0.179	0.667		
D87-011	4.068	0.674	1.398	0.339			0.344	0.503		
D87-167	1.429	0.498	0.454	0.256			0.318	0.514		
D87-199	6.030	0.847	2.431	0.469			0.403	0.554		
D87-279	5.942	0.811	3.160	0.583			0.532	0.719		
D87-300	4.519	0.674	1.903	0.399			0.421	0.592		
D87-499	1.619	0.632	0.329	0.196			0.203	0.310		
D87-642	1.230	0.353	0.253	0.194			0.206	0.550		
D87-704	7.212	0.950	4.043	0.667			0.561	0.702		
D87-738	7.774	0.986	3.812	0.646			0.490	0.655		
D87-881	7.315	0.902	4.075	0.626			0.557	0.694		
D87-1040	8.903	1.072	4.487	0.731			0.504	0.682		
D87-1051	1.929	0.450	0.447	0.228			0.232	0.507		
D87-1077	1.633	0.415	0.386	0.194			0.236	0.467		
D87-1113	5.259	0.835	2.572	0.589			0.489	0.705		
D87-1121	1.847	0.483	0.389	0.238			0.211	0.493		
D87-1152	3.000	0.518	0.573	0.243			0.191	0.469		
D87-1283	7.979	0.950	4.275	0.646			0.536	0.680		
D87-1372	4.687	0.674	1.497	0.342			0.319	0.507		
D87-1418	3.426	0.619	1.711	0.483			0.499	0.780		
D87-1441	4.481	0.706	1.863	0.424			0.416	0.601		
					MEAN		0.384	0.592		
					SD		0.135	0.109		
					2SD		0.270	0.218		
					3SD		0.405	0.327		
					X-SD		0.249	0.483		
					X-2SD		0.114	0.374		
					X-3SD		-0.021	0.265		

Appendix B. Probes 203-IIIa and 203-IIIb [continued]

Strain	C1204-Vol	C1204-OD	203IIIa-Vol	203IIIa-OD	203IIIb-Vol	203IIIb-OD	IIIa Vol.R	IIIa OD.R	IIIb Vol.R	IIIb OD.R
D80-141	4.206	0.682	0.235	0.192	9.101	1.289	0.056	0.282	2.164	1.890
D87-1421	6.003	0.887	0.269	0.189	10.940	1.214	0.045	0.213	1.822	1.369
MK42-86	5.816	0.860	0.297	0.267	8.325	1.123	0.051	0.310	1.431	1.306
MK116-87	3.705	0.607	0.012	0.194	7.234	0.887	0.003	0.320	1.952	1.461
MK244-87	5.869	0.873	0.039	0.181	6.006	0.950	0.007	0.207	1.023	1.088
						MEAN	0.032	0.266	1.679	1.423
						SD	0.025	0.053	0.453	0.295
						2SD	0.051	0.106	0.906	0.590
						3SD	0.076	0.160	1.360	0.885
						X-SD	0.007	0.213	1.225	1.128
						X-2SD	-0.018	0.160	0.772	0.833
						X-3SD	-0.044	0.107	0.319	0.537

Appendix B. Probes 203-IIIa and 203-IIIb [continued]

Strain	C1204-Vol	C1204-OD	203IIIa-Vol	203IIIa-OD	203IIIb-Vol	203IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
D94-035	9.870	1.027	4.783	0.674			0.485	0.656		
D94-039	9.709	1.072	5.006	0.823			0.516	0.768		
D94-041	6.858	0.917	2.641	0.533			0.385	0.581		
D94-082	4.947	0.800	1.433	0.395			0.290	0.494		
D94-123	3.133	0.660	1.014	0.424			0.324	0.642		
D94-173	5.844	0.887	2.804	0.571			0.480	0.644		
D94-179	4.584	0.779	1.459	0.391			0.318	0.502		
D94-197	4.879	0.740	1.572	0.371			0.322	0.501		
D94-339	4.237	0.731	1.618	0.424			0.382	0.580		
D94-373	4.551	0.750	1.846	0.455			0.406	0.607		
D94-376	8.649	1.214	4.071	0.714			0.471	0.588		
D94-389	7.630	0.986	4.095	0.706			0.537	0.716		
D94-411	7.210	0.968	2.856	0.528			0.396	0.545		
D94-439	5.337	0.800	2.160	0.566			0.405	0.708		
D94-476	1.886	0.464	0.516	0.219			0.274	0.472		
D94-529	1.230	0.375	0.202	0.246			0.309	0.194		
D94-539	3.167	0.571	0.622	0.325			0.196	0.569		
D94-548	0.551	0.296	0.101	0.185			0.183	0.625		
D94-568	1.143	0.306	0.226	0.212			0.198	0.693		
D94-586	7.183	0.917	2.518	0.493			0.351	0.538		

Strain	C1763-Vol	C1763-OD	308IIIa-Vol	308IIIa-OD	308IIIb-Vol	308IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
DST87-60	22.676	1.950	26.187	1.950	7.568	1.181	1.155	1.000	0.334	0.606
D80-100	21.424	1.746	18.800	1.661	1.646	0.488	0.878	0.951	0.077	0.279
D80-218	16.630	1.562	10.888	1.289	0.260	0.518	0.655	0.825	0.016	0.332
D80-280	9.298	1.430	5.810	1.151	0.114	0.415	0.625	0.805	0.012	0.290
D87-011	12.167	1.661	9.193	1.487	0.355	0.356	0.756	0.895	0.029	0.214
D87-167	13.425	1.562	6.461	1.097	0.397	0.660	0.481	0.702	0.030	0.423
D87-199	3.805	0.689	4.839	0.847	0.053	0.469	1.272	1.229	0.014	0.681
D87-279	12.925	1.661	11.405	1.562	0.577	0.441	0.882	0.940	0.045	0.266
D87-300	13.691	1.487	12.179	1.379	0.318	0.415	0.890	0.927	0.023	0.279
D87-499	3.824	0.779	4.017	0.800	-0.189	0.375	1.050	1.027	-0.049	0.481
D87-642	7.668	1.123	5.819	0.968	0.019	0.571	0.759	0.862	0.002	0.508
D87-704	22.033	1.950	23.921	1.950	6.565	1.097	1.086	1.000	0.298	0.563
D87-738	16.104	1.746	16.155	1.661	1.066	0.450	1.003	0.951	0.066	0.258
D87-881	13.419	1.487	11.861	1.379	0.472	0.549	0.884	0.927	0.035	0.369
D87-1040	24.417	1.950	23.862	1.950	4.339	0.811	0.977	1.000	0.178	0.416
D87-1051	5.569	0.847	6.170	0.950	-0.070	0.399	1.108	1.122	-0.013	0.471
D87-1077	5.624	0.968	4.884	1.027	-0.093	0.371	0.868	1.061	-0.017	0.383
D87-1113	4.393	0.823	6.261	1.027	0.110	0.478	1.425	1.248	0.025	0.581
D87-1121	3.243	0.639	2.037	0.523	0.287	0.403	0.628	0.818	0.088	0.631
D87-1152	14.582	1.562	13.678	1.562	0.903	0.424	0.938	1.000	0.062	0.271
D87-1283	8.791	1.123	8.009	1.049	0.373	0.403	0.911	0.934	0.042	0.359
D87-1372	11.717	1.430	8.372	1.097	0.368	0.395	0.715	0.767	0.031	0.276
D87-1418	20.694	1.746	15.268	1.661	0.896	0.469	0.738	0.951	0.043	0.269
D87-1441	9.724	1.250	7.836	1.151	0.174	0.353	0.806	0.921	0.018	0.282
						MEAN	0.895	0.953	0.058	0.395
						SD	0.218	0.130	0.09	0.139
						2SD	0.436	0.259	0.181	0.277
						3SD	0.654	0.389	0.271	0.416
						X-SD	0.677	0.823	-0.032	0.257
						X-2SD	0.459	0.694	-0.123	0.118
						X-3SD	0.241	0.564	-0.213	-0.02

Appendix C. Probes 308-IIIa and 308-IIIb [continued]

Strain	C1763-Vol	C1763-OD	308IIIa-Vol	308IIIa-OD	308IIIb-Vol	308IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
D80-141	18.313	1.746	2.546	0.667	14.75	1.661	0.139	0.382	0.805	0.951
D87-1421	15.099	1.661	0.921	0.498	11.232	1.487	0.061	0.300	0.744	0.895
MK42-86	18.325	1.746	7.889	1.181	15.01	1.661	0.431	0.676	0.819	0.951
MK116-87	10.480	1.332	0.256	0.364	7.083	1.151	0.024	0.273	0.676	0.864
MK244-87	9.300	1.214	0.699	0.332	5.737	0.986	0.075	0.273	0.617	0.812
						MEAN	0.146	0.381	0.732	0.895
						SD	0.164	0.171	0.086	0.059
						2SD	0.329	0.342	0.172	0.119
						3SD	0.493	0.513	0.258	0.178
						X-SD	-0.018	0.210	0.646	0.835
						X-2SD	-0.183	0.039	0.56	0.776
						X-3SD	-0.347	-0.132	0.474	0.716

Appendix C. Probes 308-IIIa and 308-IIIb [continued]

Strain	C1763-Vol	C1763-OD	308IIIa-Vol	308IIIa-OD	308IIIb-Vol	308IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
D94-035	10.180	1.289	15.231	1.289	0.014	0.379	1.496	1.000	0.001	0.294
D94-039	10.577	1.430	13.744	1.332	0.274	0.493	1.299	0.931	0.026	0.345
D94-041	19.124	1.746	20.984	1.746	1.644	0.513	1.097	1.000	0.086	0.294
D94-082	9.928	1.250	8.186	1.006	-0.099	0.566	0.825	0.805	-0.01	0.453
D94-123	4.007	0.902	2.408	0.660	-0.041	0.455	0.601	0.732	-0.01	0.504
D94-173	10.517	1.430	8.757	1.332	0.075	0.395	0.833	0.931	0.007	0.276
D94-179	9.048	1.289	12.251	1.430	0.393	0.346	1.354	1.109	0.043	0.268
D94-197	3.963	0.626	19.806	1.661	0.078	0.356	4.998	2.653	0.02	0.569
D94-336	17.244	1.562	16.483	1.487	0.032	0.674	0.956	0.952	0.002	0.431
D94-337	11.749	1.332	13.900	1.379	0.073	0.415	1.183	1.035	0.006	0.312
D94-339	12.824	1.430	24.719	1.950	0.23	0.411	1.928	1.364	0.018	0.287
D94-373	12.512	1.487	23.351	1.950	1.142	1.43	1.866	1.311	0.091	0.962
D94-376	21.477	1.950	23.528	1.950	5.754	1.049	1.095	1.000	0.268	0.538
D94-377	15.212	1.430	17.553	1.487	0.596	0.619	1.154	1.040	0.039	0.433
D94-389	21.922	1.746	21.305	1.746	0.588	0.488	0.972	1.000	0.027	0.279
D94-411	18.611	1.746	18.820	1.746	1.749	0.589	1.011	1.000	0.094	0.337
D94-435	3.616	0.887	11.939	1.289	0.203	0.353	3.302	1.453	0.056	0.398
D94-439	13.060	1.487	18.509	1.746	1.211	0.74	1.417	1.174	0.093	0.498
D94-476	7.381	1.289	5.885	1.151	0.028	0.342	0.797	0.893	0.004	0.265
D94-529	8.856	1.332	7.875	1.123	0.265	0.498	0.889	0.843	0.03	0.374
D94-539	8.526	1.151	9.714	1.289	0.198	0.399	1.139	1.120	0.023	0.347
D94-548	1.835	0.432	1.505	0.455	-0.002	0.478	0.820	1.053	-0.001	1.106
D94-568	8.823	1.250	7.857	1.123	0.136	0.346	0.891	0.898	0.015	0.277
D94-586	11.843	1.430	9.708	1.332	0.524	0.407	0.820	0.931	0.044	0.285

Appendix D. Probes 484-IIIa and 484-IIIb

Strain	C1204-Vol	C1204-OD	484IIIa-Vol	484IIIa-OD	484IIIb-Vol	484IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
DST87-60	6.603	0.933	9.914	1.250	0.256	0.299	1.501	1.340	0.039	0.320
D80-100	9.919	1.072	15.377	1.430	0.805	0.387	1.550	1.334	0.081	0.361
D80-218	8.901	0.950	4.182	0.722	0.368	0.309	0.470	0.760	0.041	0.325
D80-280	2.957	0.508	9.120	1.181	0.120	0.306	3.084	2.325	0.041	0.602
D87-011	4.068	0.674	7.020	1.006	0.053	0.236	1.726	1.493	0.013	0.350
D87-167	1.429	0.498	4.998	0.835	0.053	0.228	3.498	1.677	0.037	0.458
D87-199	6.030	0.847	8.619	1.097	0.177	0.293	1.429	1.295	0.029	0.346
D87-279	5.942	0.811	7.120	0.968	0.134	0.279	1.198	1.194	0.023	0.344
D87-300	4.519	0.674	6.249	0.860	0.134	0.259	1.383	1.276	0.030	0.384
D87-499	1.619	0.632	3.919	0.646	0.048	0.226	2.421	1.022	0.030	0.358
D87-642	1.230	0.353	3.123	0.613	0.006	0.259	2.539	1.737	0.005	0.734
D87-704	7.212	0.950	13.700	1.379	0.625	0.309	1.900	1.452	0.087	0.325
D87-738	7.774	0.986	9.504	1.123	0.333	0.262	1.223	1.139	0.043	0.266
D87-881	7.315	0.902	11.790	1.181	0.439	0.276	1.612	1.309	0.060	0.306
D87-1040	8.903	1.072	13.123	1.289	0.605	0.387	1.474	1.202	0.068	0.361
D87-1051	1.929	0.450	3.248	0.566	0.037	0.254	1.684	1.258	0.019	0.564
D87-1077	1.633	0.415	2.898	0.607	0.013	0.371	1.775	1.463	0.008	0.894
D87-1113	5.259	0.835	9.651	1.289	0.292	0.279	1.835	1.544	0.056	0.334
D87-1121	1.847	0.483	4.768	0.835	0.094	0.256	2.581	1.729	0.051	0.530
D87-1152	3.000	0.518	4.174	0.667	0.084	0.254	1.391	1.288	0.028	0.490
D87-1283	7.979	0.950	11.576	1.332	0.400	0.226	1.451	1.402	0.050	0.238
D87-1372	4.687	0.674	10.822	1.430	0.310	0.395	2.309	2.122	0.066	0.586
D87-1418	3.426	0.619	7.583	1.123	6.127	0.860	2.213	1.814	1.788	1.389
D87-1441	4.481	0.706	10.686	1.181	0.256	0.262	2.385	1.673	0.057	0.371
					MEAN		1.860	1.452	0.115	0.468
					SD		0.664	0.341	0.357	0.250
					2SD		1.329	0.681	0.714	0.501
					3SD		1.993	1.022	1.072	0.751
					X-SD		1.195	1.111	-0.243	0.218
					X-2SD		0.531	0.771	-0.600	-0.033
					X-3SD		-0.133	0.430	-0.957	-0.283

Appendix D. Probes 484-IIIa and 484-IIIb [continued]

Strain	C1204-Vol	C1204-OD	484IIIa-Vol	484IIIa-OD	484IIIb-Vol	484IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
D80-141	4.206	0.682	0.074	0.209	11.293	1.289	0.018	0.306	2.685	1.890
D87-1421	6.003	0.887	0.200	0.223	13.051	1.430	0.033	0.251	2.174	1.612
MK42-86	5.816	0.860	1.066	0.367	10.724	1.289	0.183	0.427	1.844	1.499
MK116-87	3.705	0.607	0.039	0.189	9.193	1.123	0.011	0.311	2.481	1.850
MK244-87	5.869	0.873	0.327	0.299	11.844	1.379	0.056	0.342	2.018	1.580
						MEAN	0.060	0.328	2.240	1.686
						SD	0.071	0.064	0.342	0.173
						2SD	0.142	0.129	0.683	0.347
						3SD	0.213	0.193	1.025	0.520
						X-SD	-0.011	0.263	1.899	1.513
						X-2SD	-0.082	0.199	1.557	1.339
						X-3SD	-0.153	0.135	1.216	1.166

Appendix D. Probes 484-IIIa and 484-IIIb [continued]

Strain	CI204-Vol	CI204-OD	484IIIa-Vol	484IIIa-OD	484IIIb-Vol	484IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
D94-035	9.870	1.027	8.044	0.950	0.295	0.264	0.815	0.925	0.030	0.257
D94-039	9.709	1.072	14.940	1.379	1.132	0.332	0.815	1.286	0.117	0.310
D94-041	6.858	0.917	5.422	0.800	0.198	0.279	1.539	0.872	0.029	0.304
D94-082	4.947	0.800	8.098	1.072	0.300	0.464	1.637	1.340	0.061	0.580
D94-123	3.133	0.660	6.054	1.006	0.607	0.256	1.932	1.524	0.194	0.388
D94-173	5.844	0.887	9.247	1.181	0.577	0.325	1.582	1.331	0.099	0.366
D94-179	4.584	0.779	7.765	1.072	0.632	0.349	1.694	1.376	0.138	0.448
D94-197	4.879	0.740	13.018	1.332	0.763	0.306	2.668	1.800	0.156	0.414
D94-339	4.237	0.731	14.514	1.430	1.038	0.356	3.426	1.956	0.245	0.487
D94-373	4.551	0.750	14.879	1.430	0.991	0.325	3.269	1.907	0.218	0.433
D94-376	8.649	1.214	12.413	1.379	0.797	0.428	1.435	1.136	0.092	0.353
D94-389	7.630	0.986	10.281	1.181	0.528	0.328	1.347	1.198	0.069	0.333
D94-411	7.210	0.968	9.031	1.097	0.574	0.312	1.253	1.133	0.080	0.322
D94-439	5.337	0.800	8.504	1.097	0.496	0.284	1.593	1.371	0.093	0.355
D94-476	1.886	0.464	4.244	0.750	0.189	0.312	2.250	1.616	0.100	0.672
D94-529	1.230	0.375	3.424	0.682	0.122	0.223	2.784	1.819	0.099	0.595
D94-539	3.167	0.571	6.988	1.049	0.226	0.432	2.207	1.837	0.071	0.757
D94-548	0.297	0.221	0.500	0.364	0.050	0.233	1.684	1.647	0.168	1.054
D94-568	1.143	0.306	2.086	0.459	0.201	0.223	1.825	1.500	0.176	0.729
D94-586	7.183	0.917	9.299	1.123	0.467	0.309	1.295	1.225	0.065	0.337

Appendix E. Probes 491-IIIa and 491-IIIb

Strain	C1204-Vol	C1204-OD	491IIIa-Vol	491IIIa-OD	491IIIB-Vol	491IIIB-OD	IIa Vol. R	IIa OD. R	IIb Vol. R	IIb OD. R
DST87-60	6.603	0.933	12.273	1.332			1.859	1.428		
D80-100	9.919	1.072	17.469	1.379			1.761	1.286		
D80-218	8.901	0.950	16.661	1.379			1.872	1.452		
D80-280	2.957	0.508	12.897	1.214			4.362	2.390		
D87-011	4.068	0.674	10.138	1.181			2.492	1.752		
D87-167	1.429	0.498	6.608	0.968			4.624	1.944		
D87-199	6.030	0.847	11.500	1.250			1.907	1.476		
D87-279	5.942	0.811	10.891	1.214			1.833	1.497		
D87-300	4.519	0.674	10.659	1.214			2.359	1.801		
D87-499	1.619	0.632	6.723	0.873			4.153	1.381		
D87-642	1.230	0.353	5.355	0.860			4.354	2.436		
D87-704	7.212	0.950	13.840	1.379			1.919	1.452		
D87-738	7.774	0.986	13.695	1.332			1.762	1.351		
D87-881	7.315	0.902	14.963	1.379			2.046	1.529		
D87-1040	8.903	1.072	15.491	1.379			1.740	1.286		
D87-1051	1.929	0.450	6.723	0.860			3.485	1.911		
D87-1077	1.633	0.415	5.713	0.873			3.498	2.104		
D87-1113	5.259	0.835	11.470	1.332			2.181	1.595		
D87-1121	1.847	0.483	6.442	1.027			3.488	2.126		
D87-1152	3.000	0.518	7.254	0.950			2.418	1.834		
D87-1283	7.979	0.950	14.264	1.430			1.788	1.505		
D87-1372	4.687	0.674	12.992	1.289			2.772	1.912		
D87-1418	3.426	0.619	10.854	1.250	0.342	0.152	3.168	2.019	0.100	0.246
D87-1441	4.481	0.706	14.397	1.289			3.213	1.826		
							2.710	1.721		
							0.967	0.335		
							1.934	0.670		
							2.901	1.005		
							1.744	1.385		
							0.777	1.050		
							-0.190	0.715		

Appendix E. Probes 491-IIIa and 491-IIIb [continued]

Strain	C1204-Vol	C1204-OD	491IIIa-Vol	491IIIa-OD	491IIIb-Vol	491IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
D80-141	4.206	0.682	0.420	0.254	2.058	0.403	0.100	0.372	0.489	0.591
D87-1421	6.003	0.887	0.647	0.287	3.861	0.652	0.108	0.324	0.643	0.735
MK42-86	5.816	0.860	1.633	0.419	2.701	0.518	0.281	0.487	0.464	0.602
MK116-87	3.705	0.607	0.203	0.273	1.577	0.322	0.055	0.450	0.426	0.530
MK244-87	5.869	0.873	0.686	0.221	2.651	0.478	0.117	0.253	0.452	0.548
					MEAN		0.132	0.377	0.495	0.601
					SD		0.087	0.094	0.086	0.080
					2SD		0.173	0.189	0.172	0.161
					3SD		0.260	0.283	0.258	0.241
					X-SD		0.045	0.283	0.409	0.521
					X-2SD		-0.041	0.188	0.323	0.440
					X-3SD		-0.128	0.094	0.237	0.360

Appendix E. Probes 491-IIIa and 491-IIIb [continued]

Strain	C1204-Vol	C1204-OD	491IIIa-Vol	491IIIa-OD	491IIIb-Vol	491IIIb-OD	IIIa Vol. R	IIIa OD. R	IIIb Vol. R	IIIb OD. R
D94-035	8.755	1.006	15.667	1.379			1.789	1.371		
D94-039	7.872	0.933	14.408	1.430			1.830	1.533		
D94-041	6.858	0.917	12.991	1.250			1.894	1.363		
D94-082	4.947	0.800	10.743	1.214			2.172	1.518		
D94-123	3.133	0.660	8.401	1.214			2.681	1.839		
D94-173	5.844	0.887	11.661	1.289			1.995	1.453		
D94-179	4.584	0.779	11.183	1.250			2.440	1.605		
D94-197	4.879	0.740	15.619	1.379			3.201	1.864		
D94-339	4.237	0.731	15.408	1.430			3.637	1.956		
D94-373	4.551	0.750	16.999	1.379			3.735	1.839		
D94-376	6.340	0.933	12.471	1.379			1.967	1.478		
D94-389	7.630	0.986	13.247	1.332			1.736	1.351		
D94-411	7.210	0.968	1.617	0.383			0.224	0.396		
D94-439	5.337	0.800	11.941	1.289			2.237	1.611		
D94-476	1.886	0.464	7.186	1.006			3.810	2.168		
D94-529	1.230	0.375	4.605	0.811			3.744	2.163		
D94-539	3.167	0.571	9.208	1.214			2.907	2.126		
D94-548	0.297	0.221	1.495	0.415			5.034	1.878		
D94-568	1.143	0.306	4.501	0.682			3.938	2.229		
D94-586	7.183	0.917	13.059	1.332			1.818	1.453		

Appendix F. Probes 346-IIIa

Strain	C1763-Vol	C1763-OD	346IIIa-Vol	346IIIa-OD	IIIa Vol. R	IIIa OD. R
DST87-60	22.676	1.950	23.715	1.950	1.046	1.000
D87-011	12.167	1.661	7.257	1.430	0.596	0.861
D87-167	13.425	1.562	4.725	1.006	0.352	0.644
D87-199	3.805	0.689	2.648	0.823	0.696	1.194
D87-279	12.925	1.661	9.622	1.487	0.744	0.895
D87-300	13.691	1.487	9.335	1.250	0.682	0.841
D87-499	3.824	0.779	2.413	0.626	0.631	0.804
D87-642	7.668	1.123	3.474	0.769	0.453	0.685
D87-704	22.033	1.950	21.148	1.950	0.960	1.000
D87-738	16.104	1.746	13.529	1.746	0.840	1.000
D87-881	13.419	1.487	9.616	1.332	0.717	0.896
D87-1040	24.417	1.950	22.222	1.950	0.910	1.000
D87-1051	5.569	0.847	0.558	0.383	0.100	0.452
D87-1077	12.148	1.430	1.270	0.478	0.105	0.334
D87-1113	4.393	0.823	1.019	0.560	0.232	0.680
D87-1121	3.243	0.639	1.799	0.589	0.555	0.922
D87-1152	14.582	1.562	10.495	1.430	0.720	0.915
D87-1283	8.791	1.123	4.652	0.860	0.529	0.766
D87-1372	11.717	1.430	7.040	1.097	0.601	0.767
D87-1418	20.694	1.746	14.139	1.562	0.683	0.895
D87-1441	9.724	1.250	7.783	1.097	0.800	0.878
			MEAN		0.617	0.830
			SD		0.256	0.194
			2SD		0.512	0.389
			3SD		0.768	0.583
			X-SD		0.361	0.636
			X-2SD		0.105	0.441
			X-3SD		-0.151	0.247

Appendix F. Probes 346-IIIa [continued]

Strain	C1763-Vol	C1763-OD	346IIIa-Vol	346IIIa-OD	IIIa Vol.R	IIIa OD.R
16681	19.775	1.746	2.207	0.523	0.112	0.300
D80-100	21.424	1.746	2.003	0.674	0.093	0.386
D80-218	16.630	1.562	1.365	0.652	0.082	0.417
D80-280	9.298	1.430	-0.091	0.503	-0.010	0.352
D80-141	18.313	1.746	0.497	0.455	0.027	0.261
D87-1421	15.099	1.661	0.278	0.549	0.018	0.331
MK42-86	18.325	1.746	4.800	0.873	0.262	0.500
MK116-87	10.480	1.332	-0.254	0.432	-0.024	0.324
MK244-87	9.300	1.214	-0.387	0.464	-0.042	0.382
			MEAN		0.058	0.361
			SD		0.094	0.071
			2SD		0.187	0.141
			3SD		0.281	0.212
			X-SD		-0.036	0.291
			X-2SD		-0.130	0.220
			X-3SD		-0.223	0.150

Appendix F. Probes 346-IIIa [continued]

Strain	C1763-Vol	C1763-OD	346IIIa-Vol	346IIIa-OD	IIIa Vol. R	IIIa OD. R
D94-035	10.180	1.289	5.384	0.887	0.529	0.688
D94-039	10.577	1.430	5.818	1.097	0.550	0.767
D94-041	19.124	1.746	15.841	1.661	0.828	0.951
D94-082	9.928	1.250	4.837	0.789	0.487	0.631
D94-123	4.007	0.902	1.529	0.632	0.382	0.701
D94-173	10.517	1.430	6.655	1.214	0.633	0.849
D94-179	9.048	1.289	8.919	1.289	0.986	1.000
D94-197	3.963	0.626	18.101	1.746	4.567	2.789
D94-336	17.244	1.562	16.102	1.562	0.934	1.000
D94-337	11.749	1.332	12.012	1.379	1.022	1.035
D94-339	12.824	1.430	26.731	1.950	2.084	1.364
D94-373	12.512	1.487	23.534	1.950	1.881	1.311
D94-376	21.477	1.950	20.381	1.950	0.949	1.000
D94-377	15.212	1.430	14.343	1.430	0.943	1.000
D94-389	21.922	1.746	19.230	1.746	0.877	1.000
D94-411	18.611	1.746	15.900	1.950	0.854	1.117
D94-435	3.616	0.887	12.513	1.430	3.460	1.612
D94-439	13.060	1.487	14.677	1.661	1.124	1.117
D94-476	7.381	1.289	3.398	0.873	0.460	0.677
D94-529	8.856	1.332	5.177	1.049	0.585	0.788
D94-539	8.526	1.151	6.084	1.072	0.714	0.931
D94-548	1.835	0.432	0.590	0.459	0.322	1.063
D94-568	8.823	1.250	5.004	0.950	0.567	0.760
D94-586	11.843	1.430	8.393	1.289	0.709	0.901

APPENDIX G

A. Solution for RNA preparation

1. Solution D (5 ml)

4 M guanidine isothiocyanate	2.36	g
25 mM sodium citrate, pH 7.0	0.125	ml
5% sarcosyl	0.25	ml
DEPC-treated water	1	ml

Dissolve this solution at 60-65°C, cool down to room temperature.

0.1 M 2-mercaptoethanol	36	μl
DEPC-treated water to	5	ml

Store this solution in the dark bottle.

2. 3 M sodium acetate, pH 5.2

sodium acetate . 3H ₂ O	408.1	g
sterile distilled water	800	ml

Adjust the pH to 5.2 with glacial acetic acid.

sterile distilled water to	1000	ml
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Dispense into aliquots, sterile by autoclaving and store at room temperature.

B. Solution for dot blot hybridization**1. 20X SSPE (3 M NaCl, 0.2 NaH₂PO₄, 20 mM EDTA)**

NaCl	175.5	g
NaH ₂ PO ₄	24	g
0.5 M EDTA	30	ml
Sterile distilled water to	1000	ml

Adjust pH to 7.4 with NaOH. Store at room temperature.

2. 50X Denhardt's solution

2.1 Prepare 100 ml of 2% polyvinylpyrrolidone (PVP) (Sigma) and 2% Ficoll 400 and autoclave for 10 min at 120 °C.

2.2 Cool down to room temperature.

2.3 Add 2 g of BSA (fraction V) and sterile distilled water to make up 200 ml of solution.

2.4 Filter through a 0.45 µm filter and store in aliquot at -20 °C until use.

3. Hybridization buffer (6X SSPE, 5X denhardt's solution, 0.1% sarcosine sodium, 0.02% SDS)

20X SSPE	300	ml
50X denhardt's solution	100	ml
0.1% sarcosine sodium	1	g
20% SDS	1	ml

Mix thoroughly and store at 4 °C.

4. Tetramethylammonium chloride (TMAC) solution (50 mM Tris-HCl, pH 8.0; 3.0 TMAC (Sigma), 2 mM EDTA, 0.1% SDS)

1 M Tris-HCl, pH 8.0	50	ml
5 M TMAC	600	ml
0.5 M EDTA	4	ml
20% SDS	5	ml
Sterile distilled water to	1000	ml

Mix thoroughly and store at 4°C in the dark bottle.

5. 20X SSC (3 M NaCl, 0.3 M tri-sodium citrate, pH 7.5)

NaCl	175.5	g
tri-sodium citrate	88.2	g

Adjust pH to 7.5 with NaOH, sterile by autoclaving and store at room temperature.

C. Solution for DIG-anti-DIG chemiluminescent detection

1. Buffer 1 (100 mM maleic acid, 150 mM NaCl, pH 7.5)

maleic acid	11.61	g
NaCl	8.78	g
Sterile distilled water to	1000	ml

Adjust pH to 7.5 with NaOH, sterile by autoclaving and store at room temperature.

2. Buffer 2 (Stock blocking solution, 10% W/V)

Blocking reagent	10	g
Buffer 1	100	ml

Stir on hot plate until dissolve. Sterile by autoclaving and store at 4 °

C.

3. Buffer 3 (100 mM Tris-HCl, pH 9.5; 100 mM NaCl, 50 mM MgCl₂)

1 M Tris-HCl, pH 9.5	100	ml
5 M NaCl	20	ml
0.5 M MgCl ₂	100	ml

Mix thoroughly. A new solution should be prepared fresh daily unless the solution will precipitate.

D. Instrument

1. DNA Thermal Cycle (Perkin Elmer, Forster City, California, USA)
2. Ultra Violet fluorescent table (Vilber Lourmat, France)
3. Gel photography FCR-10 (Fotodyne Incorporated, USA)
4. Dot-blotter (Schleicher and Schuell, Keene, New Hampshire, USA)
5. Bio-Rad GS Gene linker UV chamber (Bio-Rad, Hercules, California, USA)
6. Flip-flop shaker (Model FF 120 S, J.S.C. Instrument)
7. pH/Millivolt meter model 661 (Orion Research Incorporated Laboratory product Group, USA)
8. Microcentrifuge (Hermle)
9. X-ray film cassette PUSH type L (Okamoto manufacturing Co., Ltd., Japan)
10. Microwave oven NN-6208 (Matsushita Electric Industrial Co., Ltd., Japan)

CURRICULUM VITAE

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