

# Dissecting Genetics of Host-Pathogen Interactions

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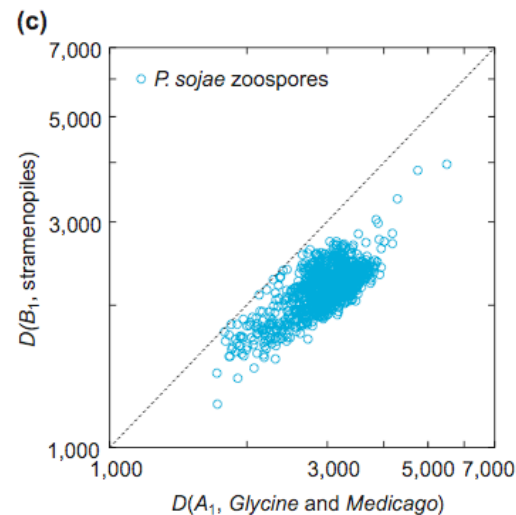
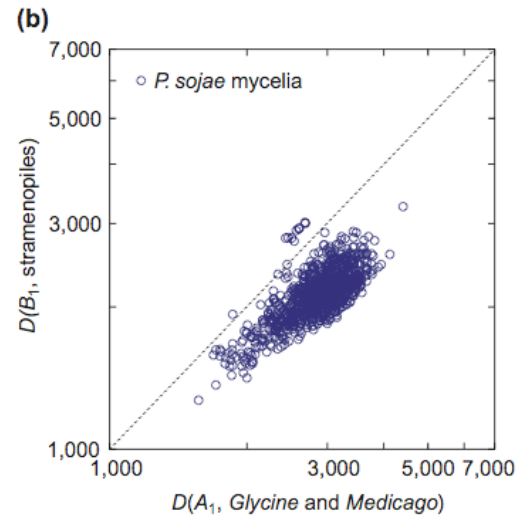
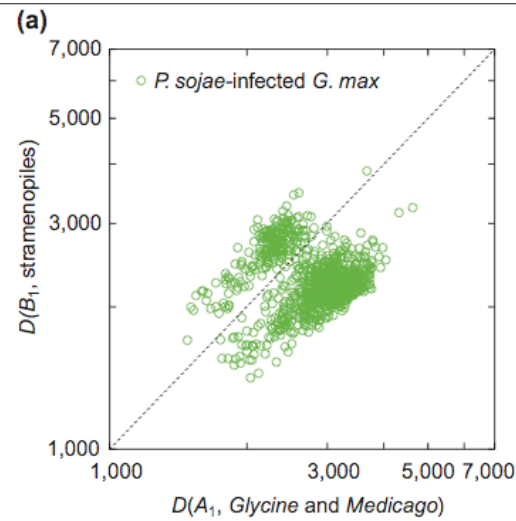
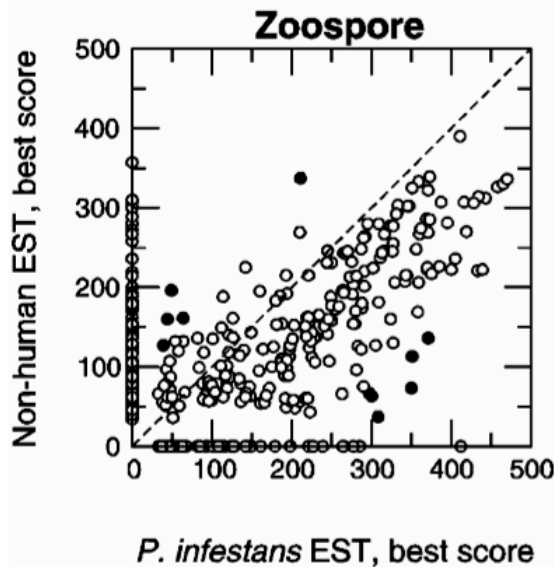
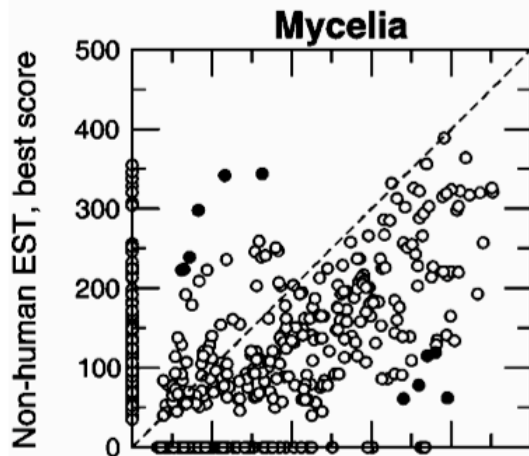
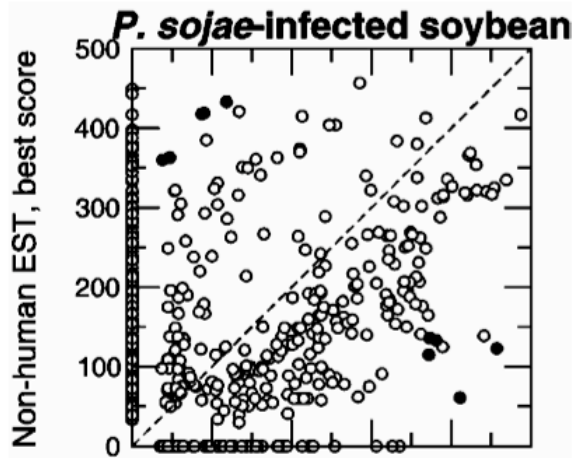
T-10 MS K710, LANL

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# Comparative BLAST analysis

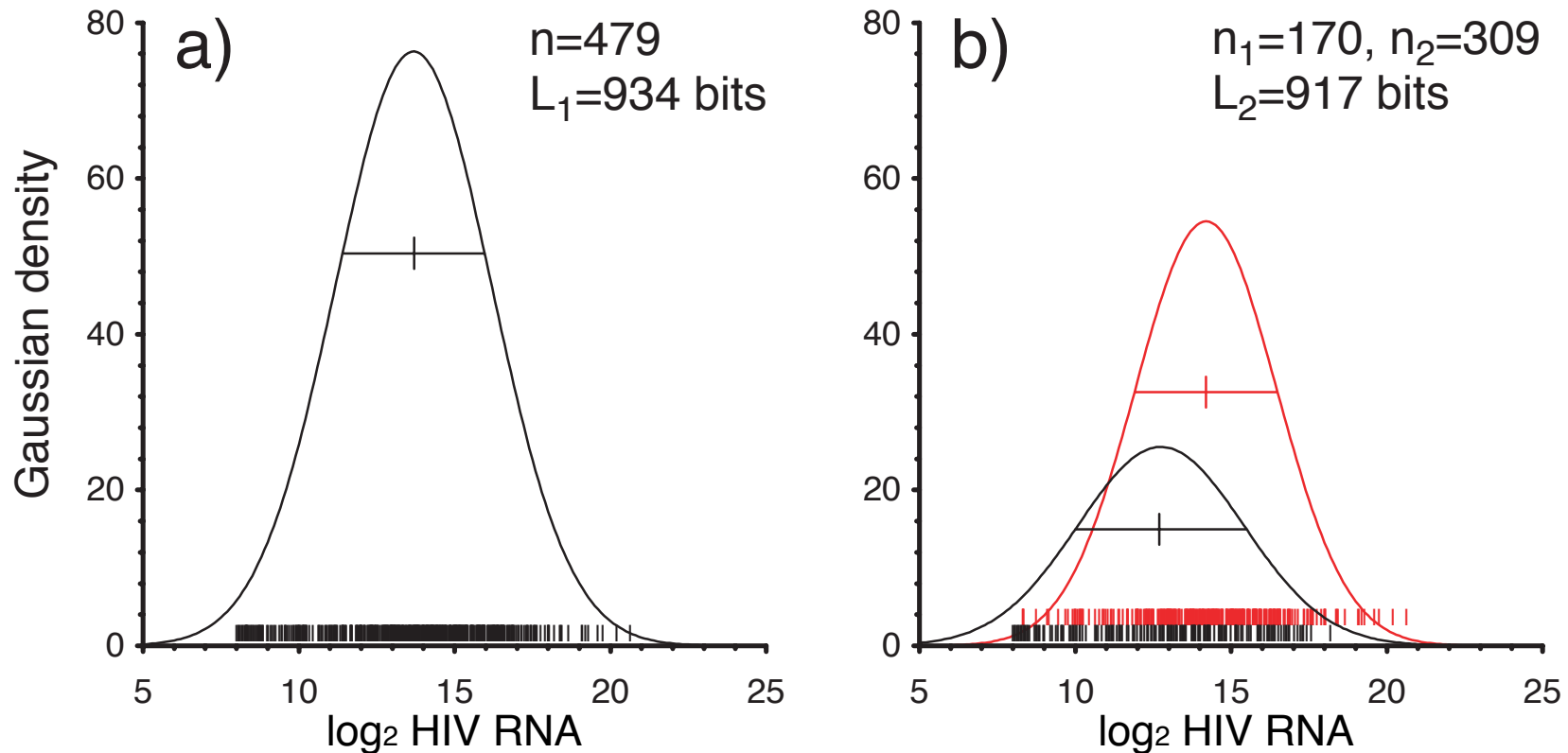
D Qutob,  
PT Hrabec,  
BWS Sobral,  
M Gijzen.  
Comparative  
analysis of  
expressed  
sequences in  
*Phytophthora  
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123:243-254,  
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# Comparative lexical analysis

PT Hrabec &  
JW Weller.  
On the species  
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*Genome Biology*  
2(9):37.1-14,  
2001.

# HIV & HLA via MDL



E Trachtenberg, B Korber, C Sollars, TB Kepler, PT Hraber, E Hayes, R Funkhouser, M Fugate, J Theiler, YS Hsu, K Kunstman, S Wu, J Phair, H Erlich, S Wolinsky. Advantage of rare HLA supertype in HIV disease progression. *Nature Medicine* 9(7):928-935, 2003.

PT Hraber, BT Korber, S Wolinsky, HA Erlich, EA Trachtenberg, TB Kepler. HLA and HIV infection progression: application of the minimum description length principle to statistical genetics. q-bio.QM/0505050 & LNCS, Springer, in press.

# HLA Heterozygote Advantage against HCV

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- HCV infection outcome varies widely, with genetic & environmental components.
- Do carriers of heterozygous (different) HLA alleles have better outcomes?
- Heterozygote advantage versus HBV & HIV already known.
  - MR Thursz, HC Thomas, BM Greenwood, AVS Hill.  
Heterozygote advantage for HLA class-II type in hepatitis B virus infection. *Nature Genetics* 17:11-12, 1997.
  - M Carrington, GW Nelson, MP Martin, T Kissner, D Vlahov, JJ Goedert, R Kaslow, S Buchbinder, K Hoots, SJ O'Brien. HLA and HIV-1: heterozygote advantage and B\*35-Cw\*04 disadvantage. *Science* 283:1748-1752, 1999.
- Mechanism is increased repertoire of antigen presentation to T cells.
- HLA & HCV data from 22,038 HBV- US liver-transplant recipients, 1995-2005.
- Contingency tables analyzed with Fisher's exact test.

<b>HLA Locus</b>	<b>LOH- HCV-</b>	<b>LOH+ HCV-</b>	<b>LOH- HCV+</b>	<b>LOH+ HCV+</b>	<b>OR</b>	<b>95% CI</b>	<b>P</b>
<b>Genotype Alleles</b>							
<b>A</b>	9,824	608	4,985	273	0.8849	> 0.7797	0.9533
<b>B</b>	10,541	380	5,315	186	0.9708	> 0.8316	0.6433
<b>C</b>	3,744	746	1,871	388	1.0401	> 0.9271	0.2915
<b>DQ</b>	7,242	835	3,494	463	1.1493	> 1.0365	0.01313
<b>DR</b>	9,965	497	4,891	304	1.2462	> 1.0983	0.001986*
<b>Supertype Alleles</b>							
<b>A</b>	8,933	1,486	4,478	773	1.0377	> 0.9577	0.2272
<b>B</b>	8,689	2,050	4,276	1,124	1.1141	> 1.0395	0.005032
<b>DR</b>	9,574	744	4,644	484	1.3412	> 1.2104	0.00000112*

\* P < 0.0025 (=0.05/20) by one-sided Fisher's exact test



Thanks to...

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Jennifer Weller (GMU)		Alan Perelson (T-10)

*...and more!*