CLAIMS

~~1. An HLA class II molecule comprising a DP beta chain, wherein the DP beta chain comprises an amino acid other than leucine at a position corresponding to amino acid residue 112 of SEQ ID NO: 1.~~

~~2. An HLA class II molecule comprising a DP beta chain, wherein the DP beta chain comprises a substitution mutation at a position corresponding to amino acid residue 112 of SEQ ID NO: 1, wherein the substitution mutation is with an amino acid other than leucine.~~

~~3. The HLA class II molecule of claim 1 or 2, wherein the DP beta chain further comprises an amino acid other than valine at a position corresponding to amino acid residue 141 of SEQ ID NO: 1.~~

~~4.~~1. An HLA class II molecule comprising a DP beta chain, wherein the DP beta chain comprises an amino acid other than valine at a position corresponding to amino acid residue 141 of SEQ ID NO: 1.

~~5. An HLA class II molecule comprising a DP beta chain, wherein the DP beta chain comprises a substitution mutation at a position corresponding to amino acid residue 141 of SEQ ID NO: 1, wherein the substitution mutation is with an amino acid other than valine.~~

~~6.~~2. The HLA class II molecule of claim ~~4 or 5~~1, wherein the DP beta chain further comprises an amino acid other than leucine at a position corresponding to amino acid residue 112 of SEQ ID NO: 1.

~~7.~~3. The HLA class II molecule of ~~any one of claims 1 to 6~~claim 1 or 2, wherein the DP beta chain comprises an amino acid sequence having at least about 80% ~~, at least about 85%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 98%, or at least about 99%~~ sequence identity to an amino acid sequence selected from SEQ ID NOs: 1, 3, 4, and 5.

~~8.~~4. The HLA class II molecule of ~~any one of claims 1 to 3, 6, and 7~~claim 2 or 3, wherein the amino acid other than leucine at a position corresponding to amino acid residue 112 of SEQ ID NO: 1 comprises a hydrophobic side chain.

~~9.~~5. The HLA class II molecule of claim ~~8~~4, wherein the amino acid other than leucine at a position corresponding to amino acid residue 112 of SEQ ID NO: 1 is selected from the group consisting of an alanine, a valine, an isoleucine, a methionine, a phenylalanine, a tyrosine, and a tryptophan.

~~10. The HLA class II molecule of any one of claims 1 to 3 and 6 to 9, wherein the amino acid other than leucine is a tryptophan.~~

~~11.~~6. The HLA class II molecule of any one of claims ~~3 to 10~~1 to 5, wherein the amino acid other than valine at a position corresponding to amino acid residue 141 of SEQ ID NO: 1 comprises a hydrophobic side chain.

~~12.~~7. The HLA class II molecule of claim ~~11~~6, wherein the amino acid other than valine at a position corresponding to amino acid residue 141 of SEQ ID NO: 1 is selected from the group consisting of an alanine, an isoleucine, a leucine, a methionine, a phenylalanine, a tyrosine, and a tryptophan.

~~13. The HLA class II molecule of any one of claims 3 to 12, wherein the amino acid other than valine is a methionine.~~

~~14.~~8. The HLA class II molecule of any one of claims 1 to ~~13~~7, wherein the DP beta chain comprises a tryptophan at a position corresponding to amino acid residue 112 of SEQ ID NO: 1 and a methionine at a position corresponding to amino acid residue 141 of SEQ ID NO: 1.

~~15.~~9. The HLA class II molecule of any one of claims 1 to ~~14~~8, wherein the DP beta chain comprises the amino acid sequence set forth in any one of SEQ ID NOs: 1, 3, and 4.

~~16. The HLA class II molecule of any one of claims 1 to 15, wherein the DP beta chain comprises the amino acid sequence set forth in SEQ ID NO: 4.~~

~~17. The HLA class II molecule of any one of claims 1 to 16, wherein the DP beta chain is selected from DPB1*01, DPB1*02, DPB1*03, DPB1*04, DPB1*05, DPB1*06, DPB1*08, DPB1*09, DPB1*10, DPB1*100, DPB1*101, DPB1*102, DPB1*103, DPB1*104, DPB1*105, DPB1*106, DPB1*107, DPB1*108, DPB1*109, DPB1*11, DPB1*110, DPB1*111, DPB1*112, DPB1*113, DPB1*114, DPB1*115, DPB1*116, DPB1*117, DPB1*118,~~

~~DPB1*119, DPB1*120, DPB1*121, DPB1*122, DPB1*123, DPB1*124, DPB1*125, DPB1*126, DPB1*127, DPB1*128, DPB1*129, DPB1*13, DPB1*130, DPB1*131, DPB1*132, DPB1*133, DPB1*134, DPB1*135, DPB1*136, DPB1*137, DPB1*138, DPB1*139, DPB1*14, DPB1*140, DPB1*141, DPB1*142, DPB1*143, DPB1*144, DPB1*145, DPB1*146, DPB1*147, DPB1*148, DPB1*149, DPB1*15, DPB1*150, DPB1*151, DPB1*152, DPB1*153, DPB1*154, DPB1*155, DPB1*156, DPB1*157, DPB1*158, DPB1*159, DPB1*16, DPB1*160, DPB1*161, DPB1*162, DPB1*163, DPB1*164, DPB1*165, DPB1*166, DPB1*167, DPB1*168, DPB1*169, DPB1*17, DPB1*170, DPB1*171, DPB1*172, DPB1*173, DPB1*174, DPB1*175, DPB1*176, DPB1*177, DPB1*178, DPB1*179, DPB1*18, DPB1*180, DPB1*181, DPB1*182, DPB1*183, DPB1*184, DPB1*185, DPB1*186, DPB1*187, DPB1*188, DPB1*189, DPB1*19, DPB1*190, DPB1*191, DPB1*192, DPB1*193, DPB1*194, DPB1*195, DPB1*196, DPB1*197, DPB1*198, DPB1*199, DPB1*20, DPB1*200, DPB1*201, DPB1*202, DPB1*203, DPB1*204, DPB1*205, DPB1*206, DPB1*207, DPB1*208, DPB1*209, DPB1*21, DPB1*210, DPB1*211, DPB1*212, DPB1*213, DPB1*214, DPB1*215, DPB1*216, DPB1*217, DPB1*218, DPB1*219, DPB1*22, DPB1*220, DPB1*221, DPB1*222, DPB1*223, DPB1*224, DPB1*225, DPB1*226, DPB1*227, DPB1*228, DPB1*229, DPB1*23, DPB1*230, DPB1*231, DPB1*232, DPB1*233, DPB1*234, DPB1*235, DPB1*236, DPB1*237, DPB1*238, DPB1*239, DPB1*24, DPB1*240, DPB1*241, DPB1*242, DPB1*243, DPB1*244, DPB1*245, DPB1*246, DPB1*247, DPB1*248, DPB1*249, DPB1*25, DPB1*250, DPB1*251, DPB1*252, DPB1*253, DPB1*254, DPB1*255, DPB1*256, DPB1*257, DPB1*258, DPB1*259, DPB1*26, DPB1*260, DPB1*261, DPB1*262, DPB1*263, DPB1*264, DPB1*265, DPB1*266, DPB1*267, DPB1*268, DPB1*269, DPB1*27, DPB1*270, DPB1*271, DPB1*272, DPB1*273, DPB1*274, DPB1*275, DPB1*276, DPB1*277, DPB1*278, DPB1*279, DPB1*28, DPB1*280, DPB1*281, DPB1*282, DPB1*283, DPB1*284, DPB1*285, DPB1*286, DPB1*287, DPB1*288, DPB1*289, DPB1*29, DPB1*290, DPB1*291, DPB1*292, DPB1*293, DPB1*294, DPB1*295, DPB1*296, DPB1*297, DPB1*298, DPB1*299, DPB1*30, DPB1*300, DPB1*301, DPB1*302, DPB1*303, DPB1*304, DPB1*305, DPB1*306, DPB1*307, DPB1*308, DPB1*309, DPB1*31, DPB1*310, DPB1*311, DPB1*312, DPB1*313, DPB1*314, DPB1*315, DPB1*316,~~

~~DPB1*317, DPB1*318, DPB1*319, DPB1*32, DPB1*320, DPB1*321, DPB1*322, DPB1*323, DPB1*324, DPB1*325, DPB1*326, DPB1*327, DPB1*328, DPB1*329, DPB1*33, DPB1*330, DPB1*331, DPB1*332, DPB1*333, DPB1*334, DPB1*335, DPB1*336, DPB1*337, DPB1*338, DPB1*339, DPB1*34, DPB1*340, DPB1*341, DPB1*342, DPB1*343, DPB1*344, DPB1*345, DPB1*346, DPB1*347, DPB1*348, DPB1*349, DPB1*35, DPB1*350, DPB1*351, DPB1*352, DPB1*353, DPB1*354, DPB1*355, DPB1*356, DPB1*357, DPB1*358, DPB1*359, DPB1*36, DPB1*360, DPB1*361, DPB1*362, DPB1*363, DPB1*364, DPB1*365, DPB1*366, DPB1*367, DPB1*368, DPB1*369, DPB1*37, DPB1*370, DPB1*371, DPB1*372, DPB1*373, DPB1*374, DPB1*375, DPB1*376, DPB1*377, DPB1*378, DPB1*379, DPB1*38, DPB1*380, DPB1*381, DPB1*382, DPB1*383, DPB1*384, DPB1*385, DPB1*386, DPB1*387, DPB1*388, DPB1*389, DPB1*39, DPB1*390, DPB1*391, DPB1*392, DPB1*393, DPB1*394, DPB1*395, DPB1*396, DPB1*397, DPB1*398, DPB1*399, DPB1*40, DPB1*400, DPB1*401, DPB1*402, DPB1*403, DPB1*404, DPB1*405, DPB1*406, DPB1*407, DPB1*408, DPB1*409, DPB1*41, DPB1*410, DPB1*411, DPB1*412, DPB1*413, DPB1*414, DPB1*415, DPB1*416, DPB1*417, DPB1*418, DPB1*419, DPB1*420, DPB1*421, DPB1*422, DPB1*423, DPB1*424, DPB1*425, DPB1*426, DPB1*427, DPB1*428, DPB1*429, DPB1*430, DPB1*431, DPB1*432, DPB1*433, DPB1*434, DPB1*435, DPB1*436, DPB1*437, DPB1*438, DPB1*439, DPB1*44, DPB1*440, DPB1*441, DPB1*442, DPB1*443, DPB1*444, DPB1*445, DPB1*446, DPB1*447, DPB1*448, DPB1*449, DPB1*45, DPB1*450, DPB1*451, DPB1*452, DPB1*453, DPB1*454, DPB1*455, DPB1*456, DPB1*457, DPB1*458, DPB1*459, DPB1*46, DPB1*460, DPB1*461, DPB1*462, DPB1*463, DPB1*464, DPB1*465, DPB1*466, DPB1*467, DPB1*468, DPB1*469, DPB1*47, DPB1*470, DPB1*471, DPB1*472, DPB1*473, DPB1*474, DPB1*475, DPB1*476, DPB1*477, DPB1*478, DPB1*479, DPB1*48, DPB1*480, DPB1*481, DPB1*482, DPB1*483, DPB1*484, DPB1*485, DPB1*486, DPB1*487, DPB1*488, DPB1*489, DPB1*49, DPB1*490, DPB1*491, DPB1*492, DPB1*493, DPB1*494, DPB1*495, DPB1*496, DPB1*497, DPB1*498, DPB1*499, DPB1*50, DPB1*500, DPB1*501, DPB1*502, DPB1*503, DPB1*504, DPB1*505, DPB1*506, DPB1*507, DPB1*508, DPB1*509, DPB1*51, DPB1*510, DPB1*511, DPB1*512, DPB1*513, DPB1*514, DPB1*515,~~

~~DPB1*516, DPB1*517, DPB1*518, DPB1*519, DPB1*52, DPB1*520, DPB1*521, DPB1*522, DPB1*523, DPB1*524, DPB1*525, DPB1*526, DPB1*527, DPB1*528, DPB1*529, DPB1*53, DPB1*530, DPB1*531, DPB1*532, DPB1*533, DPB1*534, DPB1*535, DPB1*536, DPB1*537, DPB1*538, DPB1*539, DPB1*54, DPB1*540, DPB1*541, DPB1*542, DPB1*543, DPB1*544, DPB1*545, DPB1*546, DPB1*547, DPB1*548, DPB1*549, DPB1*55, DPB1*550, DPB1*551, DPB1*552, DPB1*553, DPB1*554, DPB1*555, DPB1*556, DPB1*557, DPB1*558, DPB1*559, DPB1*56, DPB1*560, DPB1*561, DPB1*562, DPB1*563, DPB1*564, DPB1*565, DPB1*566, DPB1*567, DPB1*568, DPB1*569, DPB1*57, DPB1*570, DPB1*571, DPB1*572, DPB1*573, DPB1*574, DPB1*575, DPB1*576, DPB1*577, DPB1*578, DPB1*579, DPB1*58, DPB1*580, DPB1*581, DPB1*582, DPB1*583, DPB1*584, DPB1*585, DPB1*586, DPB1*587, DPB1*588, DPB1*589, DPB1*59, DPB1*590, DPB1*591, DPB1*592, DPB1*593, DPB1*594, DPB1*595, DPB1*596, DPB1*597, DPB1*598, DPB1*599, DPB1*60, DPB1*600, DPB1*601, DPB1*602, DPB1*603, DPB1*604, DPB1*605, DPB1*606, DPB1*607, DPB1*608, DPB1*609, DPB1*61, DPB1*610, DPB1*611, DPB1*612, DPB1*613, DPB1*614, DPB1*615, DPB1*616, DPB1*617, DPB1*618, DPB1*619, DPB1*62, DPB1*620, DPB1*621, DPB1*622, DPB1*623, DPB1*624, DPB1*625, DPB1*626, DPB1*627, DPB1*628, DPB1*629, DPB1*63, DPB1*630, DPB1*631, DPB1*632, DPB1*633, DPB1*634, DPB1*635, DPB1*636, DPB1*637, DPB1*638, DPB1*639, DPB1*64, DPB1*640, DPB1*641, DPB1*642, DPB1*643, DPB1*644, DPB1*645, DPB1*646, DPB1*647, DPB1*648, DPB1*649, DPB1*65, DPB1*650, DPB1*651, DPB1*652, DPB1*653, DPB1*654, DPB1*655, DPB1*656, DPB1*657, DPB1*658, DPB1*659, DPB1*66, DPB1*660, DPB1*661, DPB1*662, DPB1*663, DPB1*664, DPB1*665, DPB1*666, DPB1*667, DPB1*668, DPB1*669, DPB1*67, DPB1*670, DPB1*671, DPB1*672, DPB1*673, DPB1*674, DPB1*675, DPB1*676, DPB1*677, DPB1*678, DPB1*679, DPB1*68, DPB1*680, DPB1*681, DPB1*682, DPB1*683, DPB1*684, DPB1*685, DPB1*686, DPB1*687, DPB1*688, DPB1*689, DPB1*69, DPB1*690, DPB1*691, DPB1*692, DPB1*693, DPB1*694, DPB1*695, DPB1*696, DPB1*697, DPB1*698, DPB1*699, DPB1*70, DPB1*700, DPB1*701, DPB1*702, DPB1*703, DPB1*704, DPB1*705, DPB1*706, DPB1*707, DPB1*708, DPB1*709, DPB1*71, DPB1*710, DPB1*711, DPB1*712,~~

~~DPB1*713, DPB1*714, DPB1*715, DPB1*716, DPB1*717, DPB1*718, DPB1*719, DPB1*72, DPB1*720, DPB1*721, DPB1*722, DPB1*723, DPB1*724, DPB1*725, DPB1*726, DPB1*727, DPB1*728, DPB1*729, DPB1*73, DPB1*730, DPB1*731, DPB1*732, DPB1*733, DPB1*734, DPB1*735, DPB1*736, DPB1*737, DPB1*738, DPB1*739, DPB1*74, DPB1*740, DPB1*741, DPB1*742, DPB1*743, DPB1*744, DPB1*745, DPB1*746, DPB1*747, DPB1*748, DPB1*749, DPB1*75, DPB1*750, DPB1*751, DPB1*752, DPB1*753, DPB1*754, DPB1*755, DPB1*756, DPB1*757, DPB1*758, DPB1*759, DPB1*76, DPB1*760, DPB1*761, DPB1*762, DPB1*763, DPB1*764, DPB1*765, DPB1*766, DPB1*767, DPB1*768, DPB1*769, DPB1*77, DPB1*770, DPB1*771, DPB1*772, DPB1*773, DPB1*774, DPB1*775, DPB1*776, DPB1*777, DPB1*778, DPB1*779, DPB1*78, DPB1*780, DPB1*781, DPB1*782, DPB1*783, DPB1*784, DPB1*785, DPB1*786, DPB1*787, DPB1*788, DPB1*789, DPB1*79, DPB1*790, DPB1*791, DPB1*792, DPB1*794, DPB1*795, DPB1*796, DPB1*797, DPB1*798, DPB1*799, DPB1*80, DPB1*800, DPB1*801, DPB1*802, DPB1*803, DPB1*804, DPB1*805, DPB1*806, DPB1*807, DPB1*808, DPB1*809, DPB1*81, DPB1*810, DPB1*811, DPB1*812, DPB1*813, DPB1*814, DPB1*815, DPB1*816, DPB1*817, DPB1*818, DPB1*819, DPB1*82, DPB1*820, DPB1*821, DPB1*822, DPB1*823, DPB1*824, DPB1*825, DPB1*826, DPB1*827, DPB1*828, DPB1*829, DPB1*83, DPB1*830, DPB1*831, DPB1*832, DPB1*833, DPB1*834, DPB1*835, DPB1*836, DPB1*837, DPB1*838, DPB1*839, DPB1*84, DPB1*840, DPB1*841, DPB1*842, DPB1*843, DPB1*844, DPB1*845, DPB1*846, DPB1*847, DPB1*848, DPB1*849, DPB1*85, DPB1*850, DPB1*851, DPB1*852, DPB1*853, DPB1*854, DPB1*855, DPB1*856, DPB1*857, DPB1*858, DPB1*859, DPB1*86, DPB1*860, DPB1*861, DPB1*862, DPB1*863, DPB1*864, DPB1*865, DPB1*866, DPB1*867, DPB1*868, DPB1*869, DPB1*87, DPB1*870, DPB1*871, DPB1*872, DPB1*873, DPB1*874, DPB1*875, DPB1*876, DPB1*877, DPB1*878, DPB1*879, DPB1*88, DPB1*880, DPB1*881, DPB1*882, DPB1*883, DPB1*884, DPB1*885, DPB1*886, DPB1*887, DPB1*888, DPB1*889, DPB1*89, DPB1*890, DPB1*891, DPB1*892, DPB1*893, DPB1*894, DPB1*895, DPB1*896, DPB1*897, DPB1*898, DPB1*899, DPB1*90, DPB1*900, DPB1*901, DPB1*902, DPB1*903, DPB1*904, DPB1*905, DPB1*906, DPB1*907, DPB1*908, DPB1*909, DPB1*91, DPB1*910,~~

~~DPB1*911, DPB1*912, DPB1*913, DPB1*914, DPB1*915, DPB1*916, DPB1*917, DPB1*918, DPB1*919, DPB1*92, DPB1*920, DPB1*921, DPB1*922, DPB1*923, DPB1*924, DPB1*925, DPB1*926, DPB1*927, DPB1*928, DPB1*929, DPB1*93, DPB1*930, DPB1*931, DPB1*932, DPB1*933, DPB1*934, DPB1*935, DPB1*936, DPB1*937, DPB1*938, DPB1*939, DPB1*94, DPB1*940, DPB1*941, DPB1*942, DPB1*943, DPB1*944, DPB1*945, DPB1*946, DPB1*947, DPB1*948, DPB1*949, DPB1*95, DPB1*950, DPB1*951, DPB1*952, DPB1*953, DPB1*954, DPB1*955, DPB1*956, DPB1*957, DPB1*958, DPB1*959, DPB1*96, DPB1*960, DPB1*961, DPB1*962, DPB1*963, DPB1*964, DPB1*965, DPB1*97, DPB1*98, and DPB1*99.~~

~~18. The HLA class II molecule of any one of claims 1 to 17, wherein the DP beta chain comprises the amino acid sequence set forth in SEQ ID NO: 1.~~

~~19.~~10. The HLA class II molecule of any one of claims 1 to 9~~18~~, further comprising a DP alpha chain.

~~20. The HLA class II molecule of claim 19, wherein the DP alpha chain is selected from DPA1*01:03:01:01, DPA1*01:03:01:02, DPA1*01:03:01:03, DPA1*01:03:01:04, DPA1*01:03:01:05, DPA1*01:03:01:06, DPA1*01:03:01:07, DPA1*01:03:01:08, DPA1*01:03:01:09, DPA1*01:03:01:10, DPA1*01:03:01:11, DPA1*01:03:01:12, DPA1*01:03:01:13, DPA1*01:03:01:14, DPA1*01:03:01:15, DPA1*01:03:01:16, DPA1*01:03:01:17, DPA1*01:03:01:18Q, DPA1*01:03:01:19, DPA1*01:03:01:20, DPA1*01:03:01:21, DPA1*01:03:01:22, DPA1*01:03:01:23, DPA1*01:03:02, DPA1*01:03:03, DPA1*01:03:04, DPA1*01:03:05, DPA1*01:03:06, DPA1*01:03:07, DPA1*01:03:08, DPA1*01:03:09, DPA1*01:04, DPA1*01:05, DPA1*01:06:01, DPA1*01:06:02, DPA1*01:07, DPA1*01:08, DPA1*01:09, DPA1*01:10, DPA1*01:11, DPA1*01:12, DPA1*01:13, DPA1*01:14, DPA1*01:15, DPA1*01:16, DPA1*01:17, DPA1*01:18, DPA1*01:19, DPA1*02:01:01:01, DPA1*02:01:01:02, DPA1*02:01:01:03, DPA1*02:01:01:04, DPA1*02:01:01:05, DPA1*02:01:01:06, DPA1*02:01:01:07, DPA1*02:01:01:08, DPA1*02:01:01:09, DPA1*02:01:01:10, DPA1*02:01:01:11, DPA1*02:01:02:01, DPA1*02:01:02:02, DPA1*02:01:03, DPA1*02:01:04, DPA1*02:01:05, DPA1*02:01:06, DPA1*02:01:07, DPA1*02:01:08:01, DPA1*02:01:08:02,~~

~~DPA1*02:02:02:01, DPA1*02:02:02:02, DPA1*02:02:02:03, DPA1*02:02:02:04, DPA1*02:02:02:05, DPA1*02:02:03, DPA1*02:02:04, DPA1*02:02:05, DPA1*02:02:06, DPA1*02:03, DPA1*02:04, DPA1*02:05, DPA1*02:06, DPA1*02:07:01:01, DPA1*02:07:01:02, DPA1*02:07:01:03, DPA1*02:08, DPA1*02:09, DPA1*02:10, DPA1*02:11, DPA1*02:12, DPA1*02:13N, DPA1*02:14, DPA1*02:15, DPA1*02:16, DPA1*03:01:01:01, DPA1*03:01:01:02, DPA1*03:01:01:03, DPA1*03:01:01:04, DPA1*03:01:01:05, DPA1*03:01:02, DPA1*03:02, DPA1*03:03, DPA1*03:04, DPA1*04:01:01:01, DPA1*04:01:01:02, and DPA1*04:01:01:03, DPA1*04:02.~~

~~21.~~11. The HLA class II molecule of claim ~~19 or 20~~10, wherein the DP alpha chain comprises an amino acid sequence having at least about 80%~~, at least about 85%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 98%, or at least about 99%~~ sequence identity to SEQ ID NO: 6 or 8.

~~22.~~12. The HLA class II molecule of claim ~~21~~11, wherein the DP alpha chain comprises the amino acid sequence set forth in SEQ ID NO: 6 or 8.

~~23.~~13. The HLA class II molecule of any one of claims 1 to ~~22~~12, which is a DP1, DP2, DP3, DP4, DP5, DP6, DP8, or DP9 allele.

14. The HLA class II molecule of any one of claims 1 to ~~23~~13, wherein:

(a) the DP beta chain has an increased affinity for a CD4 protein as compared to a reference HLA class II molecule, wherein the reference HLA class II molecule comprises a DP beta chain comprising (i) a leucine at a position corresponding to amino acid residue 112 of SEQ ID NO: 1 and/or (ii) a valine at a position corresponding to amino acid residue 141 of SEQ ID NO: 1;

(b) the DP beta chain is bound to a membrane of a cell;

(c) the DP beta chain comprises an extracellular domain of a full length DP beta chain;

(d) the DP beta chain is linked to or associated with an inert particle;

(e) the DP alpha chain comprises a signal peptide;

(f) the HLA class II molecule further comprises a DP alpha chain bound to a membrane of a cell;

(g) the HLA class II molecule further comprises a DP alpha chain comprising an extracellular domain of a full length DP alpha chain; or

~~24.~~ (h) any combination of (a)-(g).

~~25. The HLA class II molecule of claim 24, wherein the increased affinity is at least about 1.5-fold, at least about 2-fold, at least about 3-fold, at least about 4-fold, at least about 5-fold, at least about 6-fold, at least about 7-fold, at least about 8-fold, at least about 9-fold, at least about 10-fold, at least about 15-fold, at least about 20-fold, at least about 25-fold, at least about 30-fold, at least about 35-fold, at least about 40-fold, at least about 45-fold, at least about 50-fold, at least about 75-fold, at least about 100-fold, at least about 200-fold, at least about 300-fold, at least about 400-fold, at least about 500-fold, or at least about 1000.~~

~~26. The HLA class II molecule of any one of claims 1 to 25, wherein the DP beta chain is bound to a membrane of a cell.~~

~~27. The HLA class II molecule of any one of claims 1 to 25, wherein the DP beta chain is not bound to a membrane of a cell.~~

~~28. The HLA class II molecule of any one of claims 1 to 25, wherein the DP beta chain comprises an extracellular domain of a full length DP alpha chain.~~

~~29. The HLA class II molecule of claim 28, wherein the DP beta chain does not comprise a transmembrane domain of a full length DP beta chain.~~

~~30. The HLA class II molecule of any one of claims 19 to 29, wherein the DP alpha chain is bound to a membrane of a cell.~~

~~31. The HLA class II molecule of any one of claims 19 to 29, wherein the DP alpha chain is not bound to a membrane of a cell.~~

~~32. The HLA class II molecule of any one of claims 19 to 29, wherein the DP alpha chain comprises an extracellular domain of a full length DP alpha chain.~~

~~33. The HLA class II molecule of claim 32, wherein the DP alpha chain does not comprise a transmembrane domain of a full length DP alpha chain.~~

~~34. The HLA class II molecule of any one of claims 27 to 33, wherein the DP beta chain is linked to or associated with an inert particle.~~

~~35. The HLA class II molecule of claim 34, wherein the inert particle is a bead.~~

~~36. The HLA class II molecule of claim 35, wherein the inert particle is a nanoparticle.~~

~~37. The HLA class II molecule of claim 36, wherein the nanoparticle is selected from a pegylated iron oxide, chitosan, dextrane, gelatin, alginate, liposome, starch, branched polymer, carbon-based carrier, polylactic acid, poly(cyano)acrylate, polyethyleinemine, block copolymer, ply caprolactone, SPIONS, USPIONS, Cd/Zn selenide, or silica nanoparticle.~~

~~38. The HLA class II molecule of claim 36 or 37, wherein the nanoparticle is a pegylated iron oxide nanoparticle.~~

~~39. The HLA class II molecule of any one of claims 1 to 38, wherein the DP beta chain comprises a signal peptide.~~

~~40. The HLA class II molecule of any one of claims 19 to 39, wherein the DP alpha chain comprises a signal peptide.~~

~~41. The HLA class II molecule of claim 39 or 40, wherein the signal peptide comprises the amino acid sequence set forth in SEQ ID NO: 9.~~

~~42.~~15. A nucleic acid molecule encoding the ~~DP beta chain~~HLA class II molecule of any one of claims 1 to 1~~441~~.

~~43. The nucleic acid molecule of claim 42, further encoding the DP alpha chain of any of claims 19 to 41.~~

~~44. The nucleic acid molecule of claim 42 or 43, comprising a nucleotide sequence having at least about 70%, at least about 75%, at least about 80%, at least about 85%, at least about 90%, at least about 95%, at least about 96%, at least about 97%, at least about 98%, or at least about 99% sequence identity to SEQ ID NO: 2.~~

~~45.~~16. A vector comprising the nucleic acid molecule of ~~any one of claims 42 to 44~~claim 15.

~~46.~~17. A cell comprising the HLA class II molecule of any one of claims 1 to ~~41~~14, the nucleic acid molecule of ~~any one of claims 42 to 44~~claim 15, or the vector of claim ~~45~~16.

~~47. The cell of claim 46, which is a mammalian cell or an insect cell.~~

~~48. The cell of claim 46 or 47, which is selected from a K562 cell, T2, HEK293, HEK293T, A375, SK-MEL-28, Me275, COS, a fibroblast cell, a tumor cell, or any combination thereof.~~

~~49. The cell of any one of claims 46 to 48, which lacks endogenous MHC class II DP beta chain expression.~~

~~50. The cell of any one of claims 46 to 49, which lacks endogenous MHC class II DP alpha chain expression.~~

18. A method of identifying a T cell receptor capable of binding an epitope in an MHC class II complex, comprising

(a) pulsing the cell of ~~any one of claims 46 to 50~~claim 17 with one or more peptide comprising the epitope, and

~~51.~~(b) stimulating one or more $CD4^+$ T cell with the ~~APC~~pulsed cell.

~~52.~~19. Use of ~~A method of treating a disease or condition in a subject in need thereof, comprising administering to the subject~~ the ~~MHC~~ HLA class II molecule of any one of claims 1 to ~~41~~14 in the manufacture of a medicament for treating a disease or condition in a subject in need thereof.

~~53. The method of claim 52, wherein the disease or condition is cancer or an infection.~~

~~54. The method of claim 53, wherein the cancer is selected from the group consisting of melanoma, bone cancer, pancreatic cancer, skin cancer, cancer of the head or neck, uterine cancer, ovarian cancer, rectal cancer, stomach cancer, uterine cancer, lung cancer, Hodgkin's Disease, non-Hodgkin's lymphoma (NHL), cancer of the esophagus, cancer of the small intestine, cancer of the urethra, chronic or acute leukemia, acute myeloid leukemia, chronic myeloid leukemia, acute lymphoblastic leukemia (ALL) (including non T cell ALL), chronic lymphocytic leukemia (CLL), cancer of the bladder, cancer of the kidney or ureter, carcinoma of the renal pelvis, glioma, squamous cell cancer, and combinations of said cancers.~~

~~55. The method of claim 53 or 54, wherein the cancer is relapsed or refractory.~~

~~56. The method of any one of claims 53 to 55, wherein the cancer is locally advanced.~~

~~57. The method of any one of claims 53 to 56, wherein the cancer is advanced.~~

~~58. The method of any one of claims 53 to 57, wherein the cancer is metastatic.~~

~~59. The HLA class II molecule of any one of claims 1 to 41, which binds CD4 with a K_D of less than about 10 μM.~~

~~60. The HLA class II molecule of any one of claims 1 to 1, which binds CD4 with a K_D of about 8.9 μM or less.~~

20. A complex comprising:

(a) the HLA class II molecule of any one of claims 1 to ~~41, 59, and 60~~14 and

~~61.~~(b) a peptide, wherein the peptide comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 32-237.