

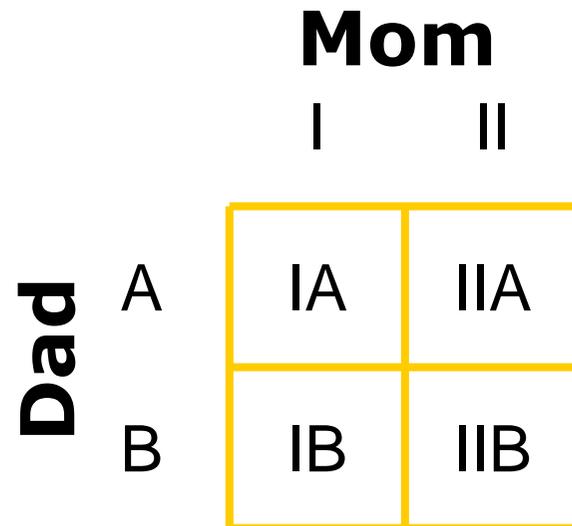
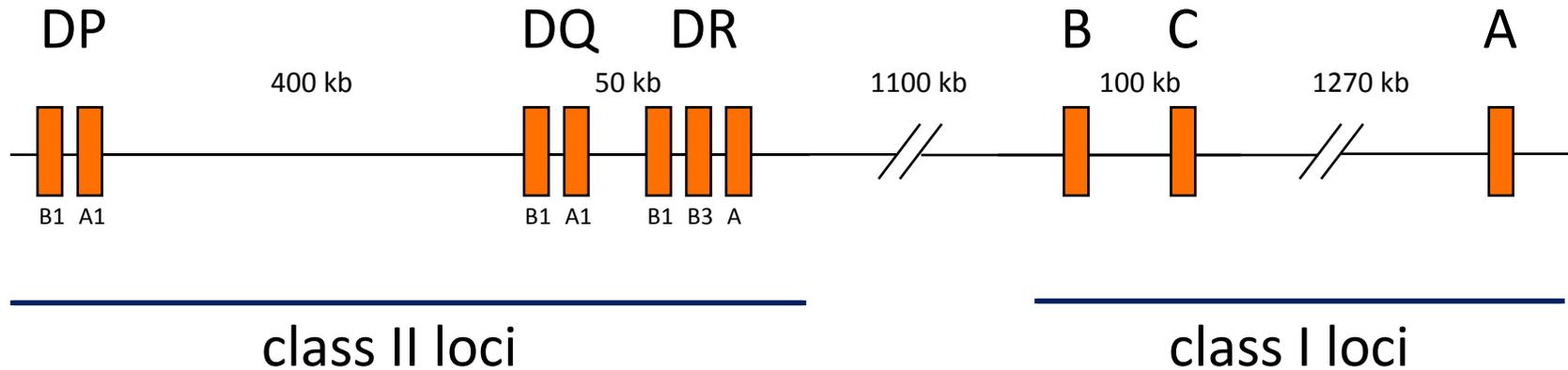
Donor Availability: Related and Unrelated

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What Does “Availability” Mean?

- A “matching” HLA type
- Is in the correct age range –
 - Related donors: 6 mos – 75+ years
 - Unrelated donors: Birth or 18 – 60 years
- Can be located: “contactable”
- Is willing to donate: “interested”
- Is healthy enough to donate: “suitable”
- Has no disease that will be transmitted – infectious or genetic
- Is not pregnant or “temporarily” unable

The HLA System on Chromosome #6



Likelihood of a Sibling Match

Match likelihood	1 – no match
“n” siblings	$1 - (0.75)^n$
1 sibling	$1 - (0.75)^1 = 0.25$
2 siblings	$1 - (0.75)^2 = 0.44$
4 siblings	$1 - (0.75)^4 = 0.68$
7 siblings	$1 - (0.75)^7 = 0.87$
USA:	
1.3 siblings	$1 - (0.75)^{1.3} = 0.30$

General Approach to Finding a Donor

- HLA type willing family members –
 - Full siblings
 - Parents (to identify haplotypes)
- If unrelated donor is considered -
 - Search for adult donor
 - Search for umbilical cord blood unit(s)
- Consider haploidentical donors

Worldwide Unrelated Donor Pool

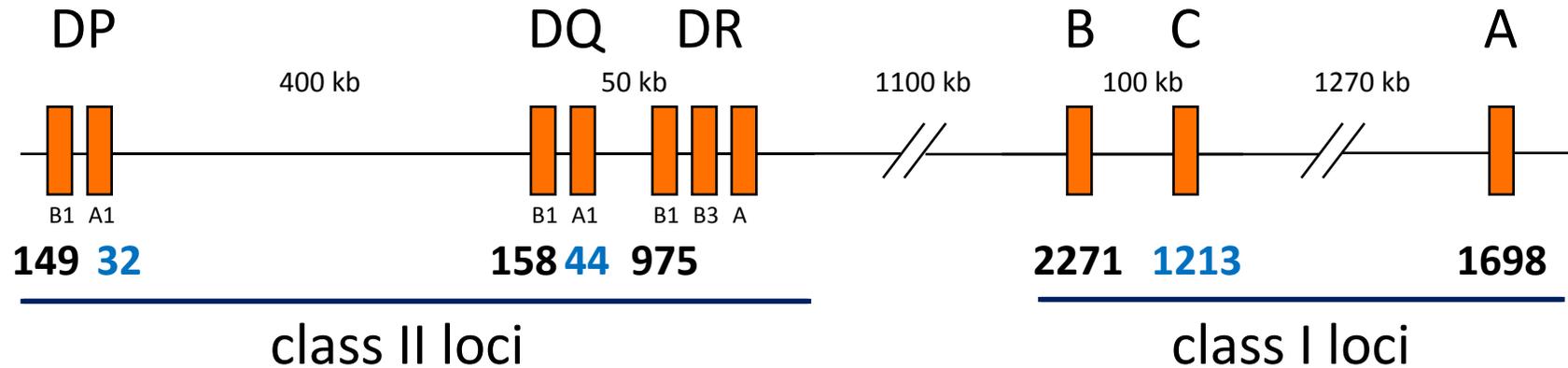
- World Marrow Donor Association (WMDA) surveyed 79 registries and 156 cord blood banks in 2010
 - 15.6 million HLA-A, B and DR-typed adults
 - 592,000 umbilical cord blood units
- Most are accessible through the Bone Marrow Donors Worldwide (BMDW)
 - www.bmdw.org

Asian Donors and Cord Blood Units

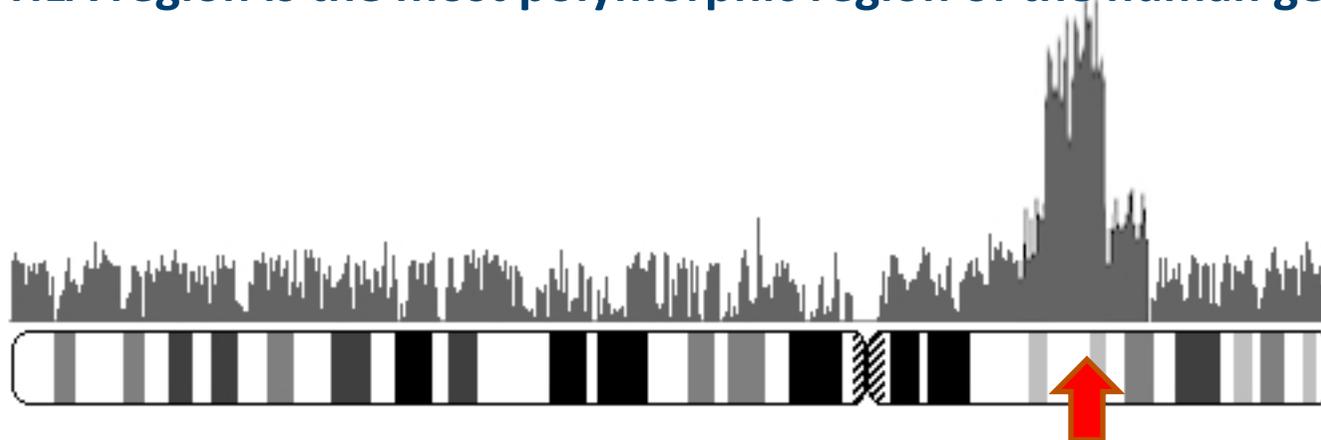
- Estimated 2.6 million adult donors in Western Pacific and South-East Asia Regions
- Estimated 213,000 Cord Blood Units
- Actual matching likelihoods are unknown
 - What percent of a population will find a suitable unrelated HLA match?

Huge Numbers of HLA Alleles

Most human genes have only a few (5-10) variants (alleles)



The HLA region is the most polymorphic region of the human genome



July 2011

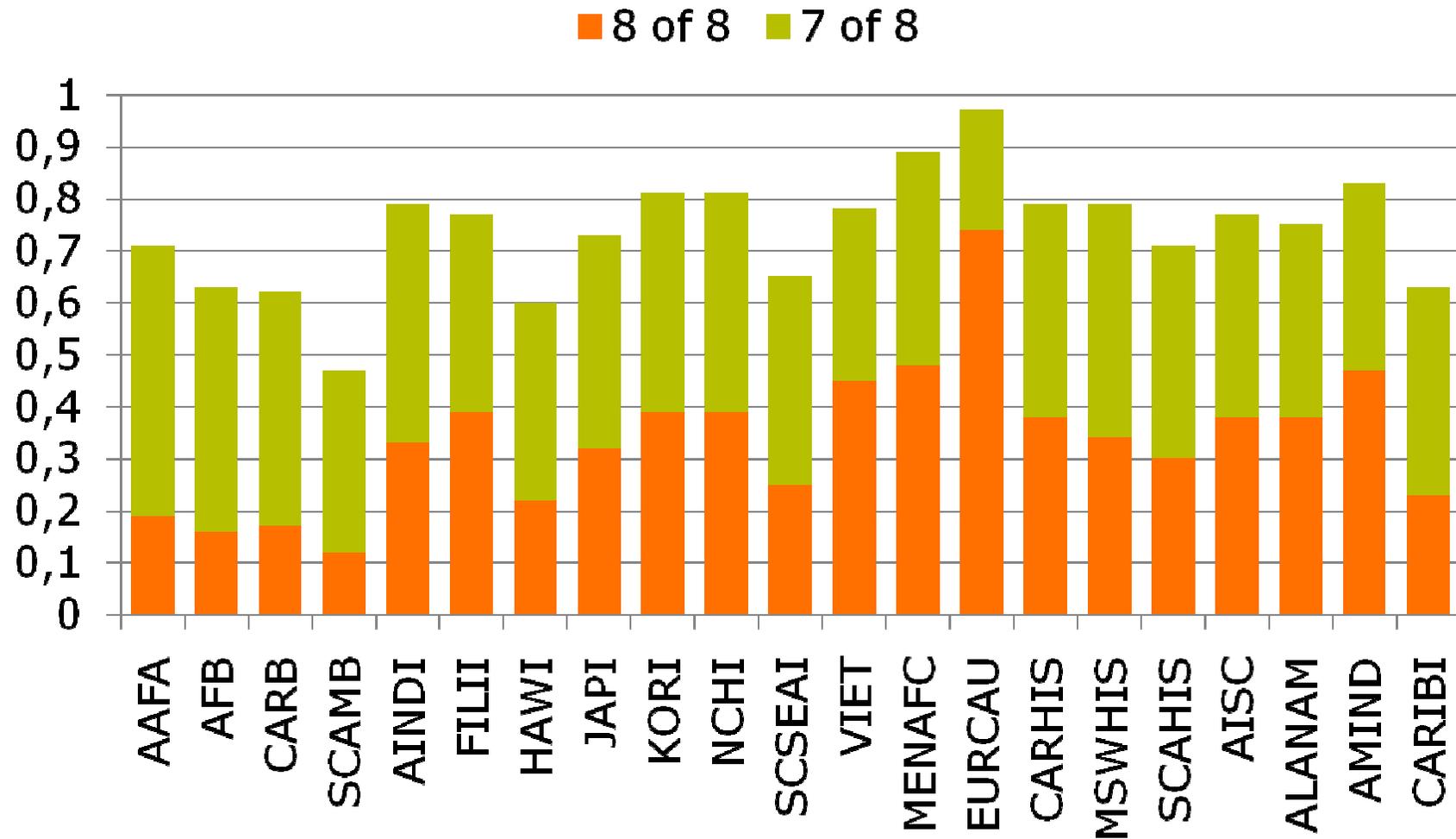
21 US Populations

Race_Code	Description	
AAFA	African American	AFAA
AFB	African	
CARB	Black Caribbean	
SCAMB	Black South or Central America	
AINDI	South Asian	API
FILII	Filipino	
HAWI	Hawaiian or other Pacific Islander	
JAPI	Japanese	
KORI	Korean	
NCHI	Chinese	
SCSEAI	Other Southeast Asian	
VIET	Vietnamese	CAU
MENAF	MidEast/No. Coast of Africa	
EURCAU	European Caucasian	HIS
CARHIS	Caribbean Hispanic	
MSWHIS	Mexican or Chicano	
SCAHIS	South/Cntrl Amer. Hisp.	
AISC	American Indian South or Central American	NAM
ALANAM	Alaska Native or Aleut	
AMIND	North American Indian	
CARIBI	Caribbean Indian	

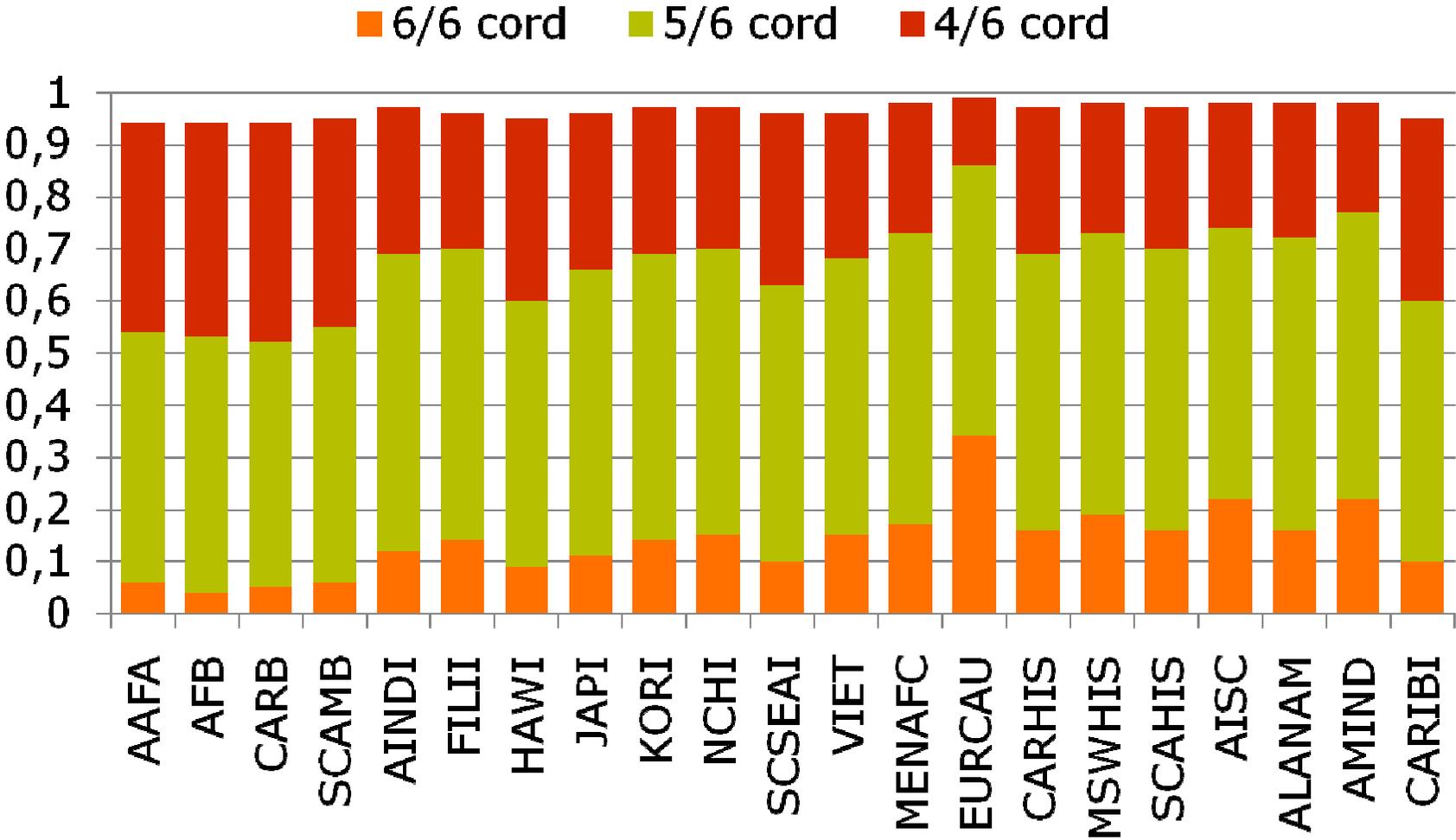
21 US Populations

Race_Code	"Available" Donors in NMDP File	
AAFA	140,277	AFAA
AFB	7,982	
CARB	9,623	
SCAMB	1,688	
AINDI	73,065	API
FILII	19,822	
HAWI	4,146	
JAPI	10,479	
KORI	33,625	
NCHI	37,469	
SCSEAI	10,035	
VIET	9,483	
MENAF	182,211	CAU
EURCAU	3,216,667	
CARHIS	52,862	HIS
MSWHIS	136,685	
SCAHIS	62,844	
AISC	2,514	NAM
ALANAM	650	
AMIND	17,893	
CARIBI	2,157	

7/8 and 8/8 Allele, Available-Match Rates in the Adult Donor Registry - 2010



Pediatric Cord Match Rates in the Cord Blood Registry, Dose ≥ 2.5 /Kg - 2010



Donor Availability: Summary

- Many factors impact donor availability
- HLA matching is one of the most important
 - Relatively trivial within the family
 - Complex in the unrelated donor setting
 - New techniques are helping to model HLA matching with greater accuracy
- Sufficient numbers of ethnically diverse donors and cord blood units are essential