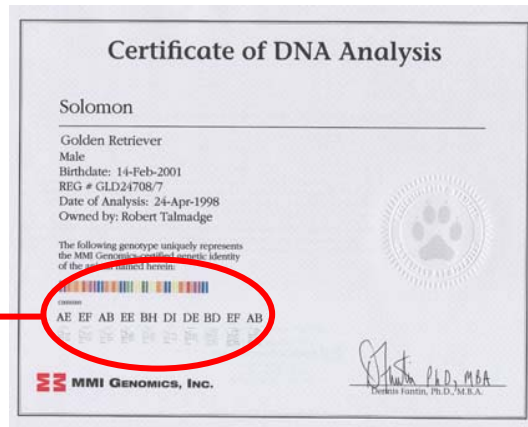


1 Ten marker genotypes from an MMI Genomics Certificate of DNA Analysis



How Does DNA Parentage Analysis Work?

Parentage analysis is based on MMI Genomics' standardized DNA markers (Figure 1). Each dog's unique DNA profile, also called genotypes are printed on your MMI Genomics Certificate of DNA Analysis.

There are two letters at each DNA marker, called alleles on the DNA Certificate. These allele pairs at each marker are inherited, with one allele coming from the sire and the other from the dam.

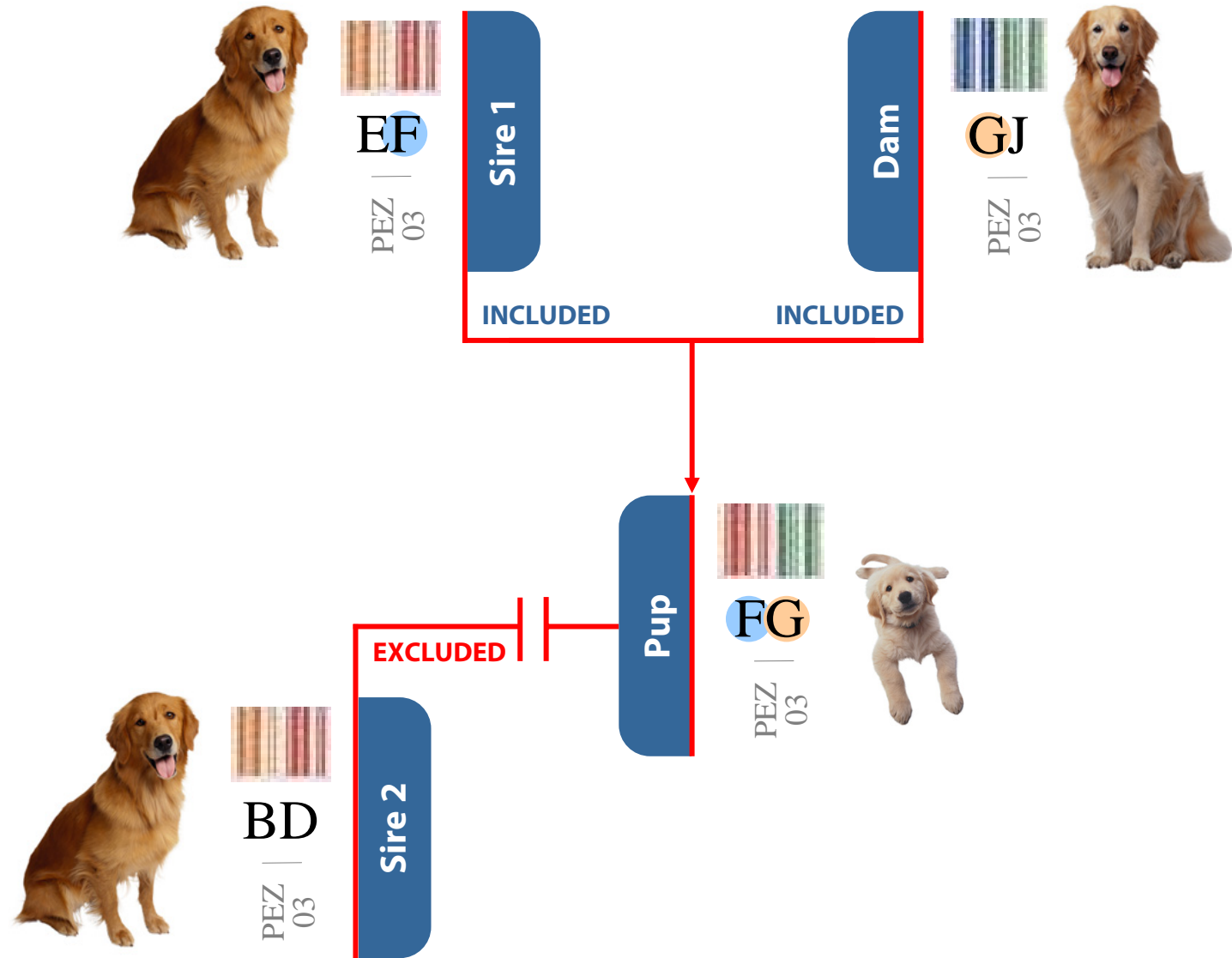
[Figure 2] illustrates that the pup inherited the J allele from the tested dam and the F allele from the tested sire at MMI Genomics DNA Marker PEZ3. Both tested parents are "included" at PEZ3 because alleles match. If the tested sire's alleles were BD at PEZ3, the parentage analysis would "exclude" him as the pup's sire because neither of his alleles match the pup's obligate paternal F allele. This analysis is conducted across all MMI Genomics DNA markers to determine parentage.

Can you determine the sire of each pup in a litter when the potential sires are related?

Yes. In the vast majority of cases, MMI Genomics DNA parentage analysis distinguishes between related sires, even if the potential sires are close relatives such as littermates, siblings, or sire versus son of sire. For rare cases where paternity results are inconclusive, additional DNA markers are used.

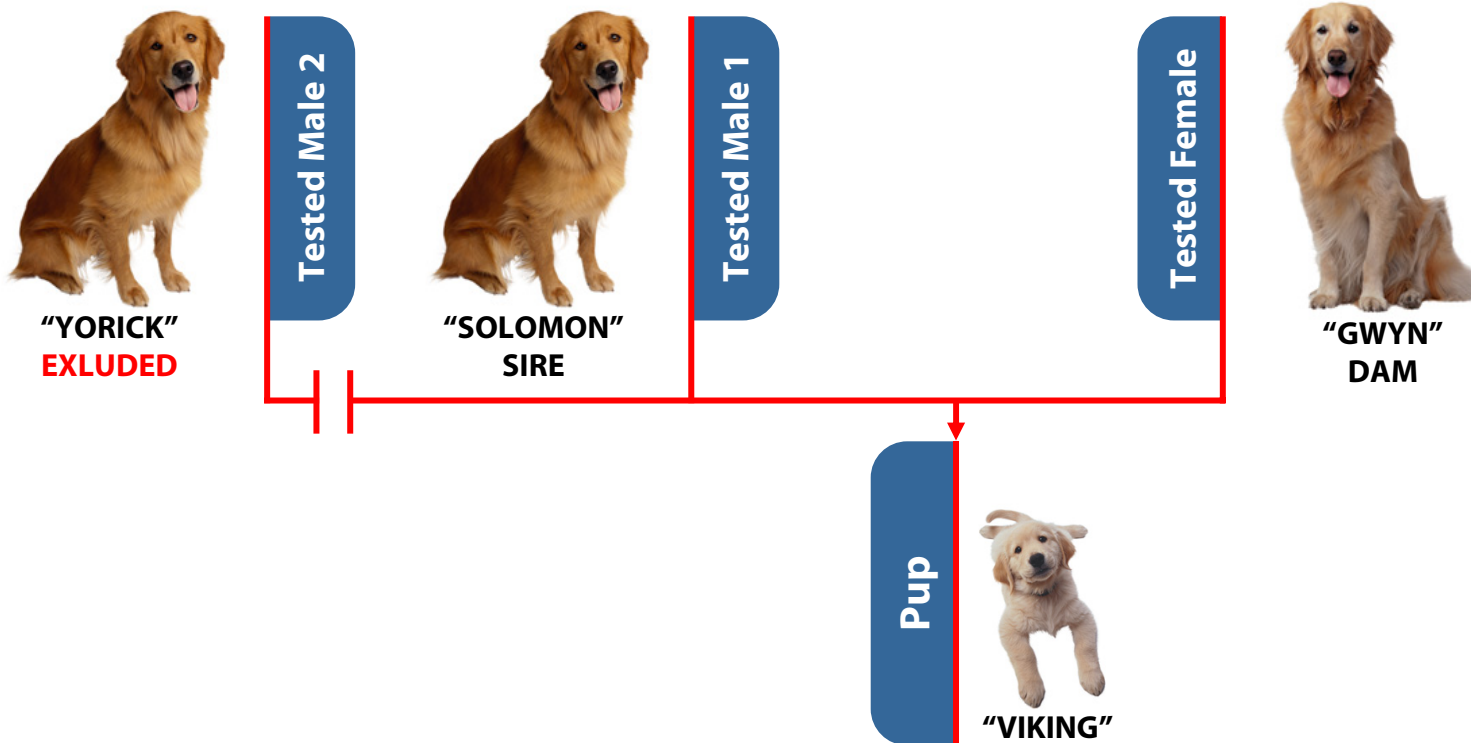
[Figure 3] shows a parentage analysis where two potential sires had access to a dam while she was in season. The parentage analysis determines Solomon is the sire of Viking.

2 Genetic Inheritance. The pup inherits a **G** allele from the dam and an **F** allele from the sire.



3

Paternity Testing. Potential Sires, Solomon and Yorick, are full-sibs. DNA parentage analysis determines Solomon is the sire of Viking.



REGISTERED NAME	PEZ1	PEZ3	PEZ5	PEZ6	PEZ8	PEZ12	PEZ20	FHC2010	FHC2054	FHC2079	PARENTAGE
SOLOMON	AE	EF	AB	EE	BH	DI	DE	BD	EF	AB	PATERNITY INCLUDED
VIKING	CE	FJ	AA	EE	EH	IK	BE	BD	EF	AB	
GWYN	CD	GJ	AD	DE	EE	FK	BD	BB	EE	BC	MATERNITY INCLUDED

REGISTERED NAME	PEZ1	PEZ3	PEZ5	PEZ6	PEZ8	PEZ12	PEZ20	FHC2010	FHC2054	FHC2079	PARENTAGE
YORICK	BD	FJ	AC	BD	BC	DI	BD	AD	BF	BD	PATERNITY EXCLUDED
VIKING	CE	FJ	AA	EE	EH	IK	BE	BD	EF	AB	
GWYN	CD	GJ	AD	DE	EE	FK	BD	BB	EE	BC	MATERNITY INCLUDED

- Exclusion
- Letters in blue indicate obligate paternal type
- Letters in red indicate obligate maternal type