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| **Samples used for transcriptome analysis**  |
| **Sample ID\_group** | **RQN** | **DV200****(%)** | **breed** | **age (years)** | **sex** | **location** | **size****(up to X cm)** |
| AL3\_1 | 6.3 | 68.9 | French Bulldog | 0.5 | mn | Skin paw | 1.5 |
| AL4\_1 | 4.1 | 68.3 | Goldendoodle | 0.75 | m | Skin shoulder | 1.1 |
| AL6\_1 | 7.7 | 71.2 | Terrier | n/s | n/s | Skin neck | 1.0 |
| AL7\_1 | 7.8 | 69.4 | Boxer | 5.0 | mn | Skin ear | 1.1 |
| AL8\_1 | 4.5 | 64.5 | French Bulldog | 3.0 | f | Skin thigh | 1.7 |
| AL17\_2a | 7.4 | 76.6 | Bavarian Mountain Hound | 0.6 | m | Skin lip | 2.1 |
| AL22\_2a | 8.3 | 70.5 | English Bulldog | 3.0 | mn | Skin paw | 1.5 |
| AL24\_2a | 8.8 | 76.2 | Hovawart | 3.0 | w | Skin leg | 1.9 |
| AL25\_2a | 7.6 | 71.7 | Doberman | 1.0 | wn | Skin ear | 1.1 |
| AL28\_2a | 8.9 | 73.7 | Mix | 1.5 | m | Skin carpus | 1.7 |
| AL33\_2b | 6.9 | 76.3 | Akita | 0.7 | w | Skin leg | 1.5 |
| AL34\_2b | 5.4 | 72.5 | Pug | 6.0 | wn | Skin face | 1.2 |
| AL35\_2b(pooled sample) | 5.2 | 76.9 | Rhodesian Ridgeback  | 1.0 | w | Skin flank | 1.2 |
| French Bulldog | 3.0 | w | Skin chest | 1.1 |
| French Bulldog | 0.8 | m | Skin abdomen | 1.3 |
| Dachshund | 2.0 | m | Skin loin | 1.1 |
| AL39\_2b (pooled sample) | 4.7 | 73.1 | Doberman | 0.8 | m | Skin flank | 2.1 |
| French Bulldog | 3.0 | mn | Skin abdomen | 1.2 |
| Jack Russel Mix | 1.0 | w | Skin face | 1.4 |
| n/s | n/s | n/s | Skin lip | 1.4 |
| AL40\_2b(pooled sample) | 5 | 74.3 | Flat Coated Retriever  | 1.7 | w | Skin leg | 1.5 |
| n/s | 0.5 | m | Skin shoulder | 1.1 |
| Boxer | 3.5 | mn | Skin n/s | 1.4 |
| Bernese Mountain Dog | 1.5 | w | Skin paw | 2.4 |
| AL45\_2b (pooled sample) | 5.7 | 74.7 | Bordeaux Mastiff | 3.0 | m | Skin paw | 1.3 |
| French Bulldog | 4.0 | w | Skin face | 1.4 |
| Labradoodle  | 0.5 | m | Skin leg | 2.0 |
| AL48\_3 | 5.8 | 72.8 | Rottweiler | 1.5 | mn | Skin chin | 2.4 |
| AL51\_3 | 7.2 | 74.8 | Beagle | 9.0 | f | Skin tarsus | 1.7 |
| AL52\_3 | 8.3 | 75.8 | Pug | 2.5 | m | Skin flank | 1.2 |
| AL54\_3 | 7.4 | 71.2 | Bullterrier | 2.0 | m | Skin thigh | 1.5 |
| AL57\_3 | 6.7 | 74.5 | Jack Russell Terrier | 7.0 | m | Skin paw | 1.2 |

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| **Samples used for *in situ* hybridization** |
| **Sample ID** | **Group** | **Target** | **breed** | **age (years)** | **sex** | **location** | **size****(up to X cm)** |
| In situ\_1 | CCH1 | CD86 | English Miniature Bullterrier  | 0.75 | m | Skin n/s | 0.3 |
| In situ\_2 | CCH1 | CD86 | French Bulldog | 1.0 | w | Skin n/s | 1.1 |
| In situ\_3 | CCH1 | CD86 | Labrador-Golden Retriever | 6.0 | w | Skin paw | 2.2 |
| In situ\_4 | CCH2 | CD86 | Goldendoodle | 3.75 | m | Skin thorax | 0.9 |
| In situ\_5 | CCH2 | CD86 | Staffordshire | 7.0 | wn | Skin thorax | 1.8 |
| In situ\_6 | CCH2 | CD86 | Cane Corso | n/s | mn | Skin ear | 1.1 |
| In situ\_7 | CCH3 | CD86 | Great Dane | 2.0 | w | Skin lip | 2.5 |
| In situ\_8 | CCH3 | CD86 | Mix | 10 | wn | Skin lip | 1.2 |
| In situ\_9 | CCH3 | CD86 | Labrador Retriever | 2.0 | m | Skin face | 0.5 |
| In situ\_10 | CCH1 | CD80 | Cane Corso | 0.5 | m | Skin thorax | 1.6 |
| In situ\_11 | CCH1 | CD80 | French Bulldog | 1.0 | w | Skin n/s | 1.3 |
| In situ\_12 | CCH1 | CD80 | Border Colli | 0.7 | m | Skin paw | 1.2 |
| In situ\_13 | CCH2 | CD80 | French Bulldog | n/s | m | Skin leg | 1.4 |
| In situ\_14 | CCH2 | CD80 | Labrador Retriever | 1.0 | m | Skin leg | 2.3 |
| In situ\_15 | CCH2 | CD80 | Bordeaux Mastiff | 8.0 | mn | Skin lip | 1.4 |
| In situ\_16 | CCH3 | CD80 | French Bulldog | 2.0 | w | Skin n/s | 3.7 |
| In situ\_17 | CCH3 | CD80 | Mix | 4.0 | mn | Skin tarsus | 1.8 |
| In situ\_18 | CCH3 | CD80 | Mix | 2.0 | mn | Skin loin | 1.7 |
| In situ\_19 | HS | CD80, CD86 | Bernese Mountain dog | 9.0 | mn | Spleen | 7.7 |
| In situ\_20 | HS | CD80, CD86 | Mix | 9.0 | mn | Spleen | 14.4 |
| In situ\_21 | HS | CD80, CD86 | Small Münsterländer | 8.0 | wn | Knee n/s | 6.5 |

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| **Samples used for MALDI-MSI** |
| **Sample ID** | **Group** | **breed** | **age (years)** | **sex** | **location** | **size****(up to X cm)** |
| MALDI\_1 | CCH1 | English Miniature Bullterrier  | 0.75 | m | Skin n/s | 0.3 |
| MALDI\_2 | CCH1 | Labrador-Golden Retriever | 6.0 | w | Skin paw | 2.2 |
| MALDI\_3 | CCH1 | French Bulldog | 1.0 | w | Skin n/s | 1.1 |
| MALDI\_4 | CCH2 | Staffordshire | 7.0 | wn | Skin thorax | 1.8 |
| MALDI\_5 | CCH2 | Goldendoodle | 3.75 | m | Skin thorax | 0.9 |
| MALDI\_6 | CCH2 |  Pug | 1.0 | m | Skin n/s | 1.0 |
| MALDI\_7 | CCH3 | Mix | 10 | wn | Skin lip | 1.2 |
| MALDI\_8 | CCH3 |  n/s | n/s | n/s | n/s | 1.5 |
| MALDI\_9 | CCH3 | Great Dane | 2.0 | w | Skin lip | 2.5 |

m: male

f: female

mn: male neutered

fm: female neutered

n/s: not specified