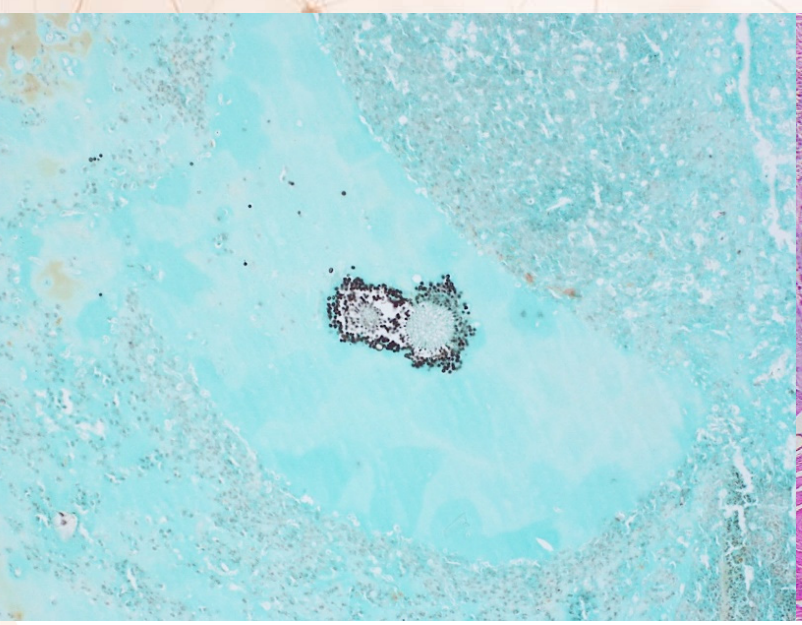
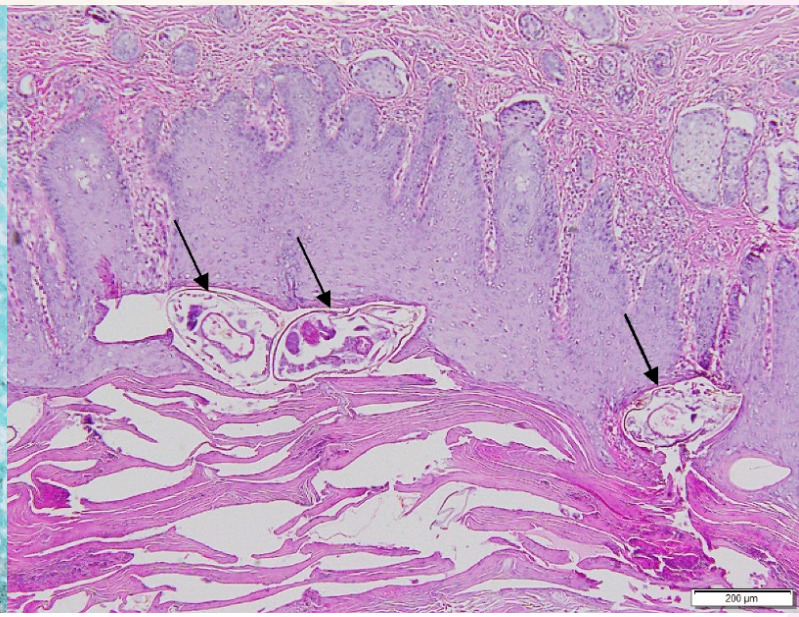
36th Annual Report



Cat Nasal Fungus

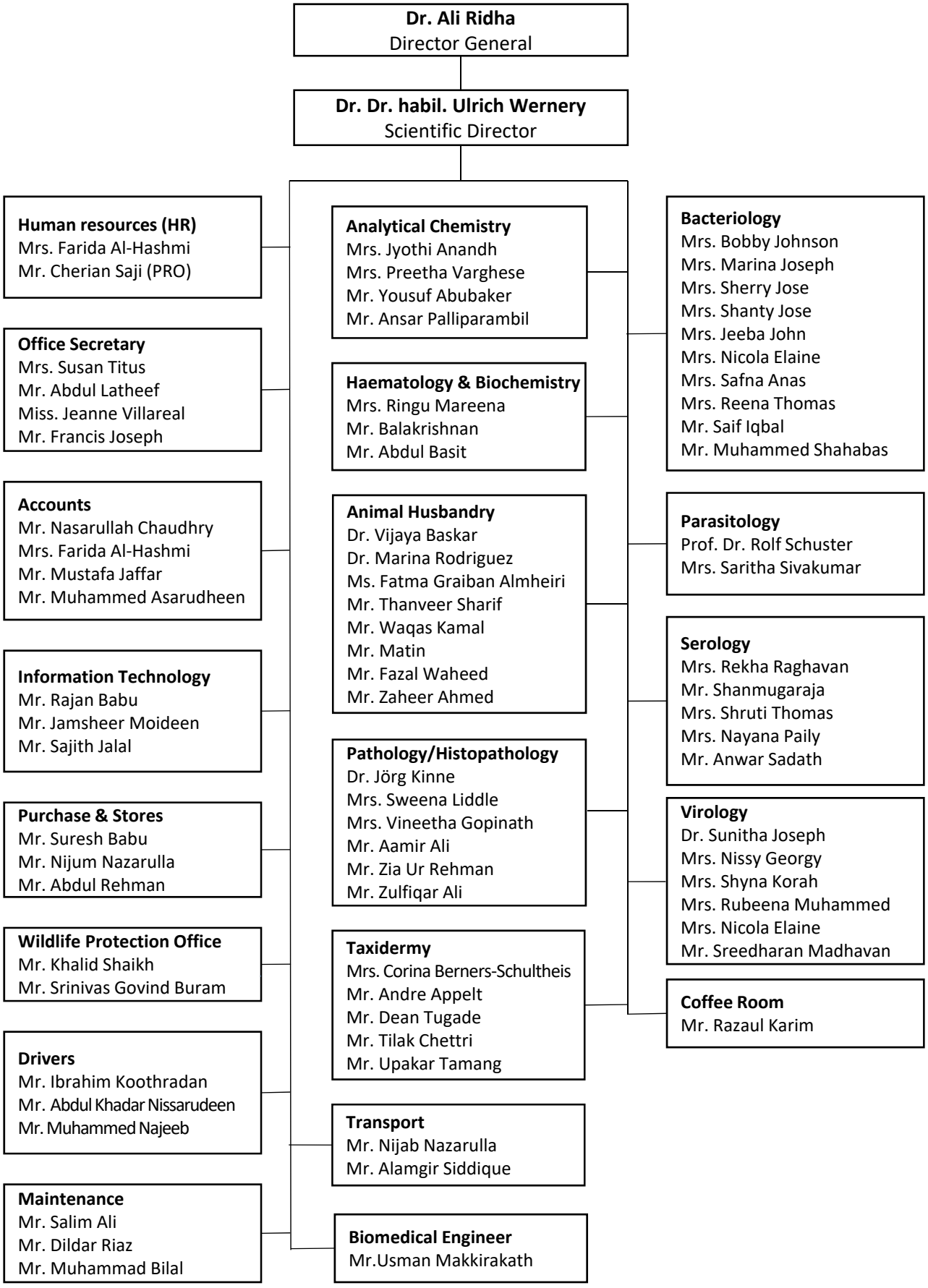


Female Sarcoptes mites in burrows in the surface layer of the skin of an Arabian oryx

2022

Central Veterinary Research Laboratory
PO Box 597, Dubai, UAE www.cvrl.ae

CVRL Organogram - 2023 (77 staff members)



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General Information

This is CVRL's 36th Annual Report. All previous reports are available at CVRL's library. To save paper, CVRL wants to become paperless in future and therefore the 36th annual report is only available online for you from our website www.cvrl.ae

We have also digitalized all of our paper requisition forms dating back to 1987 in order to free up more space in our storehouse, and the complete collection of papers will be recycled.

CVRL Annual Reports are an immense source of information on animal diseases in the United Arab Emirates and neighbouring countries and should be used by animal owners, veterinarians, ministries, municipalities and scientists in the UAE.

CVRL works closely together with all veterinary facilities in the UAE and has a fruitful cooperation with the Ministry of Climate Change and Environment (MOCCAE) as well with the Dubai Municipality on many different subjects.

Also in 2022, 16 veterinary and biology students completed a 4 to 6 weeks long internship at CVRL. These courses have become an important educational platform for students as they offer a wide range of veterinary aspects for them. These courses have also strengthened the relationship between the Veterinary Faculty in Al Ain and CVRL.

We have further increased our publications list from 734 scientific papers to 749. These scientific publications are available online or can be purchased at CVRL.

Marina Rodriguez Caveney successfully completed the degree of DOCTOR MEDICINAE VETERINARIAE (Dr. med. vet.) from Leipzig University, Germany with a thesis title "Immune response of horses to inactivated African horse sickness vaccines".

Over the last years, due to the opening of more than a hundred pet clinics in the UAE, pets now make up the majority of the samples given to CVRL over camels, horses, and falcons. Additionally, more than 1500 sera from canines and felines for rabies antibody testing as far as Afghanistan, Singapore, etc. were tested.

Beware!

More than forty Diseases you can contact from your animals

Sl No	Diseases	Sl No.	Diseases
1	Ringworm – Fungus	10	Shigella
2	Staphylococcus/Streptococcus MRSA	11	Lyme – Disease – Borreliosis
3	Salmonella	12	Plague – Yersinia pestis
4	Parrot Fever – Chlamydia	13	Sarcoptic Mange
5	Cat Scratch Disease – Bartonella henselae	14	Paratuberculosis
6	Tuberculosis	15	Monkey pox
7	Rabies	16	Hepatitis E
8	Toxoplasmosis	17	Hantavirus
9	Leptospirosis	18	Campylobacter

Sl No	Diseases	Sl No.	Diseases
19	Brucellosis – B. canis, abortus, melitensis	30	Parapox
20	Helicobacter pylorum	31	MERS
21	Giardia	32	SARS
22	Rickettsia – Rocky Mountain Spotted Fever – Typhus fever	33	Tick-born encephalitis
23	West Nile Virus	34	Crimean – Congo haemorrhagic fever
24	Tularemia	35	Avian Influenza
25	Tape Worm	36	Anthrax
26	Hook Worm	37	Q Fever
27	Capnocytophaga	38	Ebola
28	Lymphocytic Choriomeningitis	39	Nipah virus infection
29	Camelpox	40	Glanders

Analytical Chemistry Department

Table 1: Total samples processed in Analytical Chemistry

Test	Year		
	2020	2021	2022
Vit B1	1,266	862	**606**
Vit A	138	793	**196**
Vit E	682	365	**254**
Vit C	99	66	**41**
Copper	723	716	**501**
Zinc	319	262	**215**
Lead from EDTA	20	30	**17**
Selenium	1,519	953	**673**
Bile Acid	42	38	**63**
Tissue	9	4	**4**
Minerals in feed	59	23	**42**
Heavy metals in feed	107	6	**19**
Water analysis for anions	74	37	**47**
Water analysis for minerals	74	37	**47**
Honey analysis for carbohydrates	99	70	**90**
Honey for hydroxymethyl furfural (HMF)*	114	79	**79**
Minerals in honey	40	62	**58**
Heavy metals in honey	82	46	**74**
Minerals in dates	-	24	**1**
Carbohydrates in dates	-	37	**4**
Moisture in honey	100	47	**76**
Total	**5,566**	**4,557**	**3,107**

*HMF: Test for adulteration of honey

Table 2: Result of vitamin B1 by HPLC analysis

Year	Vit B1		
	Deficient	Normal	Total No. of samples
2018	104 (8.1%)	1,183 (91.9%)	1,287
2019	102 (9.8%)	937 (90.2%)	1,039
2020	149(11.8%)	1117(88.2%)	1,266
2021	49(5.7%)	813(94.3%)	862
2022	**36(5.94%)**	**570(94.06%)**	**606**

Deficient: <0.1µmol/l (SI Units)

Table 3: Trace elements with the Atomic Absorption Spectrometer (AAS)

Species	Specimen Type	Tests							
		Copper		Zinc		Lead		Selenium	
		2021	2022	2021	2022	2021	2022	2021	2022
Camel	Serum/ Whole blood	531	316	90	29	0	0	715	462
Horse		70	87	70	89	0	0	95	107
Others		115	98	102	97	27	17	143	104
Total		**716**	**501**	**262**	**215**	**27**	**17**	**953**	**673**
Tissue		Copper		Zinc		Lead		Iron	
	Liver	3	4	2	1	2	1	3	1
	Kidney	1	0	0	0	0	0	0	0
Total		**4**	**4**	**2**	**1**	**2**	**1**	**3**	**1**

Table 4: Reference values of different parameters

Parameters	Reference Range (SI Units) µmol/L		
	Camel	Equine	Falcon
Vit B1	0.1 – 0.2		1.0 – 4.0
Vit A	0.5 – 1.5	0.4 – 1.2	1.64 – 2.36
Vit E	3.0 – 7.0	2.5 – 10.0	38.7 – 106.9
Vit C	17.0 – 34.0	24.0 – 36.0	
Cu	9.0 – 14.0	19.0 – 21.0	
Zn	6.0 – 10.0	14.0 – 29.0	
Se	1.5 – 2.6	0.88 – 2.15	
Pb			<1.9

Table 5: Feed samples analysed for minerals

Minerals	No. of samples	
	2021	2022
Calcium (Ca)	24	41
Magnesium (Mg)	17	26
Sodium (Na)	17	25
Potassium (K)	16	24
Iron (Fe)	16	25
Manganese (Mn)	17	25
Copper (Cu)	16	25
Zinc (Zn)	17	25
Phosphorus (P)	20	39
Selenium (Se)	17	26
Total	**23**	**42**

Table 6: Feed/Honey samples analysed for heavy metals

Heavy metals	No. of samples	
	2021	2022
Lead	52	90
Chromium	33	58
Cobalt	33	58
Cadmium	34	58
Total	**52**	**90**

Table 7: Water analysis for anions and minerals

Year	No of Samples
2018	136
2019	135
2020	74
2021	36
2022	**47**

Table 8: Food analysis for carbohydrates, Water content, HMF, minerals & heavy metals

Samples	Moisture content	Carbohydrates			HMF*	Minerals	Heavy Metals
		Fructose	Glucose	Sucrose			
Honey	75	85	85	85	78	58	74
Others	1	2	2	3	1	1	20
Total 2022	**76**	**87**	**87**	**88**	**79**	**59**	**94**
Total 2021	**47**	**70**	**70**	**66**	**79**	**71**	**52**

* Hydroxymethylfurfural (HMF) – Test for adulteration of honey

Haematology / Biochemistry Department

Table 9: Haematology and biochemistry of camels, horses, falcons and other animal species*

Owner	Species	2021		2022	
		No of Samples	No of Tests	No of Samples	No of Tests
H.H. Sh. Mohammed bin Rashid Al Maktoum	Camel	357	4,640	365	3,226
H.H. Sh. Hamdan Bin Rashid Al Maktoum	"	39	432	1	20
H.H. Sh. Hamdan Bin Mohammed Al Maktoum	"	22	124	3	25
Other Sheikhs	"	35	590	62	999
Dubai Camel Racing Club	"	7,654	31,462	6,681	26,724
Bedouins	"	324	2,615	330	2,588
Total	**Camel**	**8,431**	**39,863**	**7,442**	**33,582**
-	Equine	2,080	45,943	2,643	56,100
-	Falcon	122	1,774	115	1,599
-	Canine	130	1,978	78	1,213
-	Feline	153	2,569	158	2,341
-	Gazelle	59	1,036	150	2,566
-	Human	25	629	26	598
-	Dolphin	205	1,013	156	664
-	Others*	447	4,691	668	5,818
Total		**11,652**	**99,496**	**11,436**	**104,481**

* Goat, sheep, cattle, birds, giraffe, etc.

Table 10: Early inflammatory response

Test	Species	Year	Total	Normal	Elevated
Serum Amyloid A (SAA)	Falcon	2021	2	1	1
		2022	**3**	**2**	**1**
	Equine	2021	1918	1670	248
		2022	**2278**	**1963**	**315**
	Others*	2021	4	-	-
		2022	**9**	-	-
Fibrinogen (Fb)	Equine	2021	19	19	0
		2022	**40**	**40**	**0**
	Dolphin	2021	178	-	-
		2022	**125**	-	-
	Others*	2021	1	-	-
		2022	**8**	-	-

*Seal, Dolphin, Camel, etc

Reference values:

SAA (Falcon) : 0-4 µg/ml ;

SAA (Equine) : 0-20 µg/ml

Fb (Equine) : 100 – 400 mg/dl

Table 11: Hormone analysis

Hormones	2021	2022
T3	32	26
T4	62	41
Progesterone	221	120
Estradiol	31	18
Testosterone	745	**2,513**
Cortisol	166	187
Vitamin B12	44	34
Vitamin D	80	127
Total	**1,381**	**3,066**

Table 12: Results of Heamio-infectious agents from blood smear

Year	Total no. of samples tested	Positive	
		Species	Parasites/Bacteria
2021	**745**	Camel	85 Trypanosoma
		Avian	8 Haemoproteus
		Feline	8 Mycoplasma
2022	**940**	Camel	109 Trypanosoma
		Canine	1 Microfilaria
		Avian	2 Haemoproteus
		Canine	2 Mycoplasma haemocanis
		Feline	7 Mycoplasma haemofelis
		Reptile	1 Haemogregarina
		Sheep	5 Anaplasma
		Bovine	12 Theileria annulata
		Canine	1 Babesia canis

Table 13: Other Tests

Test	2021	2022
Reticulocytes	111	140
Fructosamine	22	26
SIV/HIV* (antigen)	2	0
HBsAg* (antigen)	2	0
HCV* (antibody)	5	0
HSV1 & 2* (antibody)	2	0

*Primates

Serology Department

Table 14: Consignments and total number of sera tested

Species	Consignments			Sera		
	2020	2021	2022	2020	2021	2022
Equine	2,134	2,668	2,812	7,963	8,631	9,597
Camel	363	219	210	2,134	831	1,088
Avian	103	45	59	230	94	197
Caprine/Ovine	69	57	181	147	120	2,642
Bovine	79	31	30	195	112	95
Others	393	390	289	438	507	481
Total	**3,141**	**3,410**	**3,581**	**11,107**	**10,295**	**14,100**

Fig. 1: Total number of equine sera tested since 1997

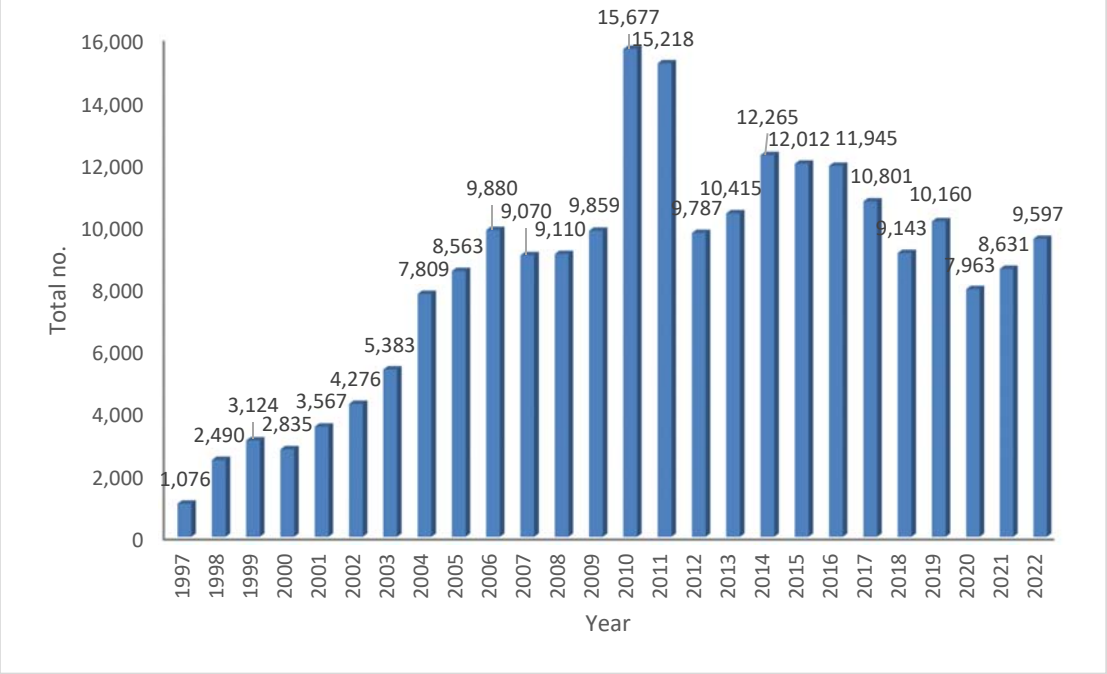
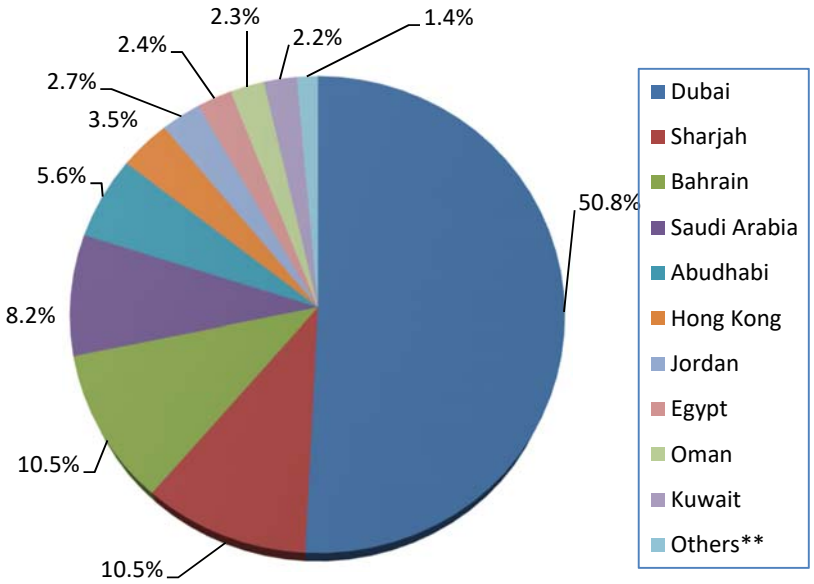
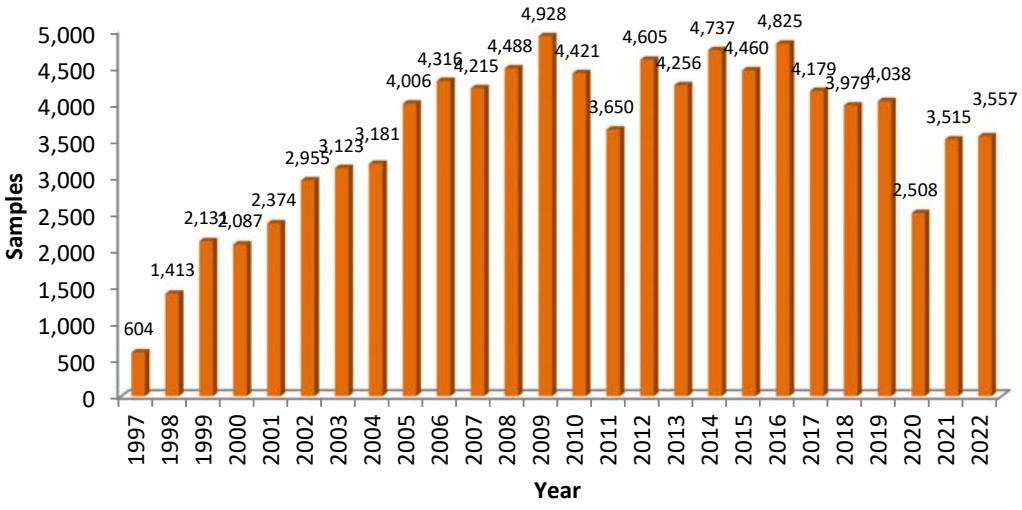


Fig. 2: Percentage of equine samples tested at CVRL for Notifiable Diseases from different countries /Emirates



Others*: Kenya, Qatar, Brazil, etc.

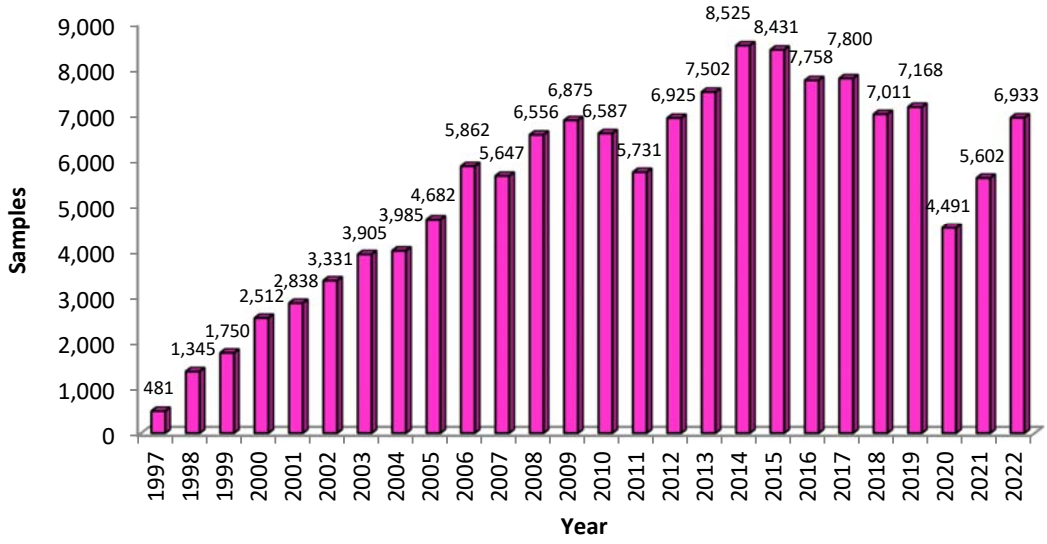
Fig. 3: Number of samples tested for African Horse Sickness (AHS) by competitive ELISA



Disease	Total	Positive	Negative
AHS	**3,617**	**153***	**3,464**

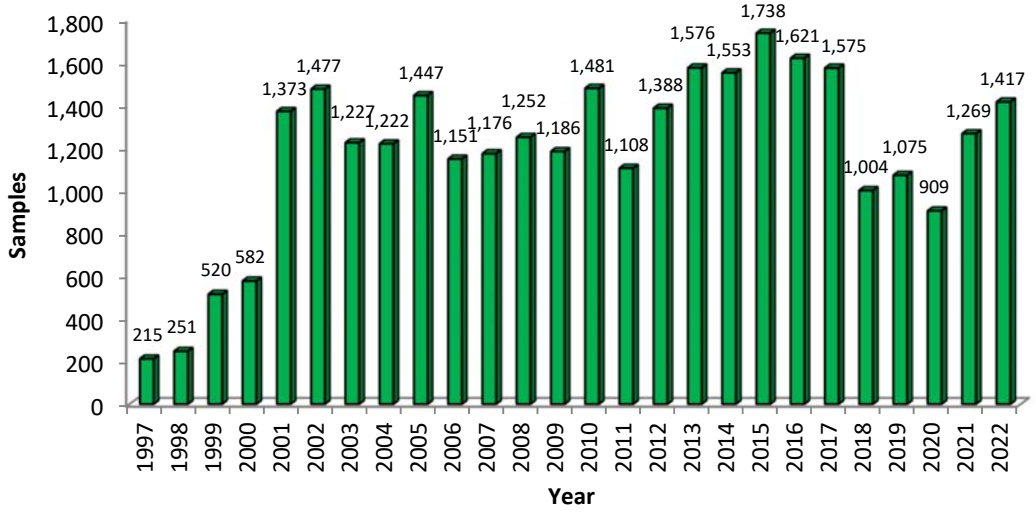
***** vaccinated animals

Fig. 4: Number of samples tested for Equine Infectious Anaemia (EIA) by Agar Gel Immunodiffusion (Coggins)



Disease	Total	Positive	Negative
EIA	6,933	0	6,933

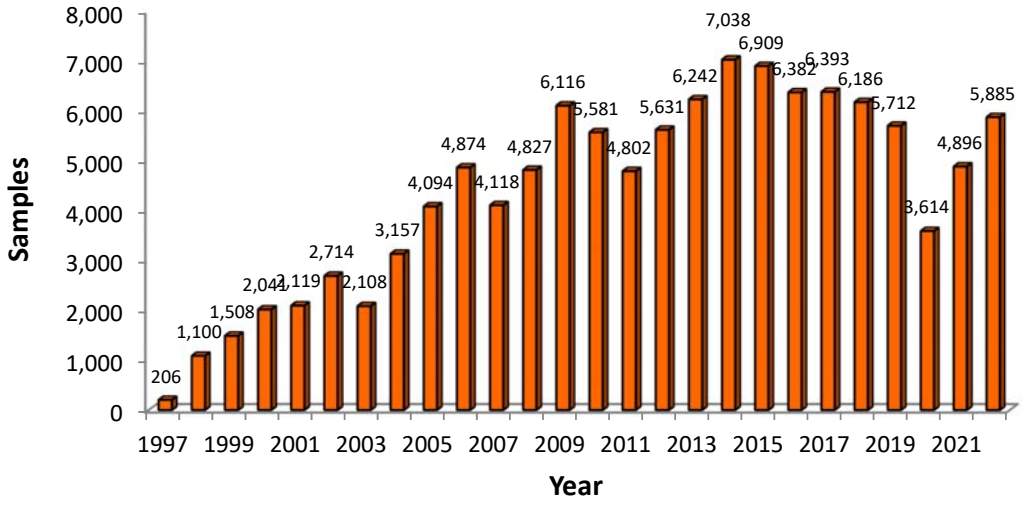
Fig. 5: Number of samples tested for Equine Viral Arteritis (EVA) by Virus Neutralisation Test (VNT)



Disease	Total	Positive	Negative	Doubtful
EVA	1,417	2*	1,414	1

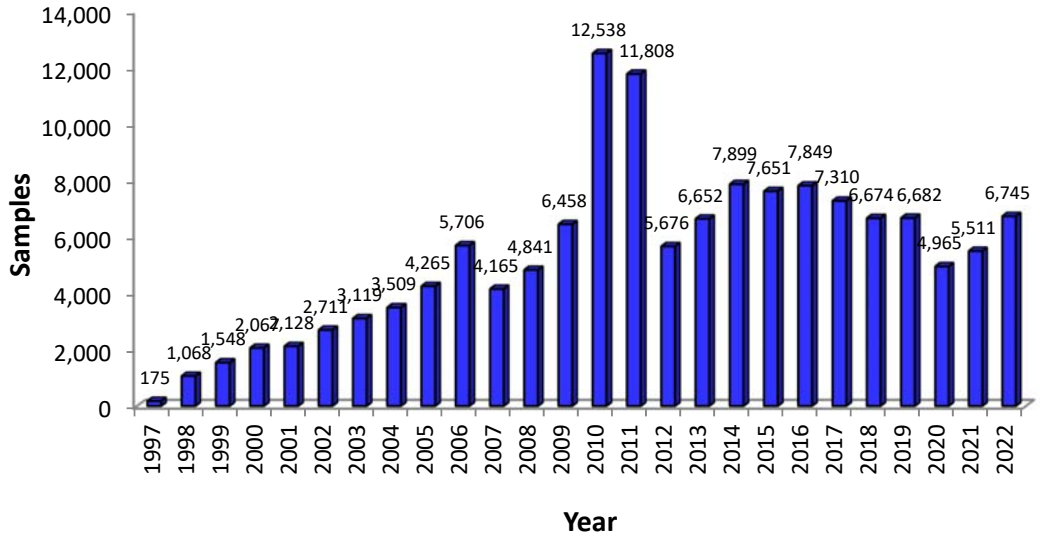
* Bahrain, UAE

Fig. 6: Number of samples tested for Dourine by Complement Fixation Test (CFT)



Disease	Total	Positive	Negative
Dourine	5,885	0	5,885

Fig. 7: Number of samples tested for Glanders by Complement Fixation Test (CFT)



Disease	Total	Positive	Negative	Inconclusive
Glanders	6,745	2*	6,742	1

* Saudi Arabia

Table 15: Number of samples tested for Strangles (Antigen A and C) by ELISA

Year	Strangles ELISA	Total	Pos.	Neg.	Dubious
2021	Antigen A	2,690	213 (7.9%)	2,025	452
	Antigen C	2,690	134 (5.0%)	2,359	197
2022	Antigen A	**1,304**	**181 (13.9%)**	**874**	**249**
	Antigen C	**1,304**	**228 (17.5%)**	**837**	**239**

Table 16: Results of Equine Herpes virus antibody ELISA

Year	Equine herpes virus ELISA (EHV 1 & EHV 4 Ab ELISA)							
	EHV 1				EHV4			
	Total	Pos	Neg	Dubious	Total	Pos	Neg	Dubious
2019	18	4	14	0	18	17	1	0
2020	9	1	8	0	8	8	0	0
2021	30	2	28	0	10	4	6	0
2022	**73**	**7**	**61**	**5**	**73**	**67**	**6**	**0**

* Routine samples with unknown vaccination history

Table 17: Results of equine sera tested for Piroplasmosis ELISA

Parasite	Year	Total	Pos	Neg
T.equi	2021	664	234 (35.2%)	430
	2022	**333**	**63 (18.9%)**	**270**
B.caballi	2021	664	50 (7.5%)	614
	2022	**333**	**17 (5.1%)**	**316**

Table 18: Results of *Trypanosoma evansi* tests in equines

Year	Surra Ab ELISA*		
	Total	Pos	Neg
2018	53	0	53
2019	52	0	52
2020	90	9**	81
2021	65	0	65
2022	**1,287**	**0**	**1,287**

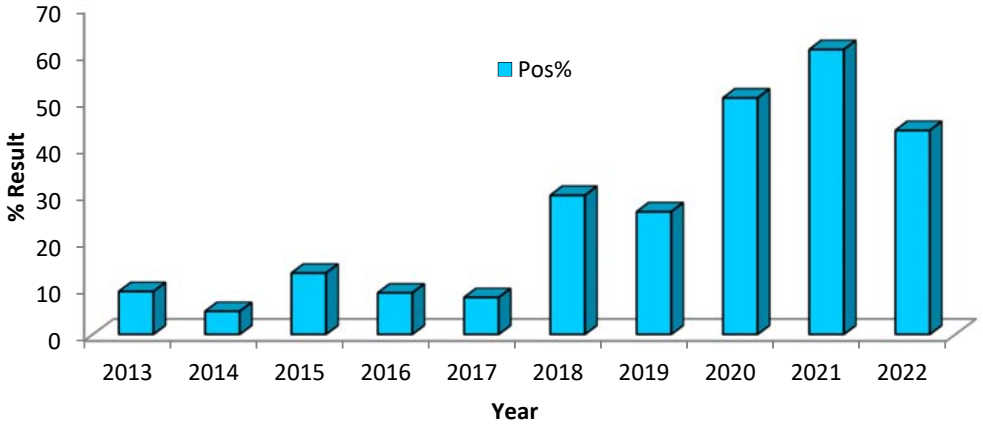
* Test requested for pre-export samples from the UAE to Singapore, Hong Kong, Japan and Australia

** From UAE horses

Table 19: Results of Equine Protozoal Myeloencephalitis (EPM) by Western Blot method

Year	EPM by Western Blot method						
	Sarcocystis neurona				*Neospora hughesi*		
	Total	Pos	Neg	Dubious	Total	Pos	Neg
2018	9	0	9	0	0	0	0
2019	2	0	2	0	0	0	0
2020	1	0	1	0	0	0	0
2021	1	0	1	0	0	0	0
2022	**1**	**0**	**1**	**0**	**0**	**0**	**0**

Fig. 8: Results of *Trypanosoma evansi* antibody ELISA in camels over last 10 years



CAMEL					
Year	*Trypanosoma evansi*				
	Total	Pos.	Pos.%	Neg.	Dubious
2013	878	82*	**9.3**	629	131
2014	141	7*	**5.0**	128	6
2015	83	11*	**13.3**	70	2
2016	124	9*	**9.0**	110	5
2017	75	6*	**8.0**	69	-
2018	87	26*	**29.9%**	60	1
2019	515	136*	**26.4%**	342	37
2020	263	133**	**50.6%**	127	3
2021	133	81	**60.9%**	50	2
2022	775	339	**43.7%**	416	20

* Mainly imported camels

** UAE camels

Table 20a: Serological results of camel brucellosis (RBT)

Year	Brucellosis Rose Bengal Test (RBT)			
	Total	**Pos**	**Neg**	**Dub.**
2016	7,730	**706 (9.1%)**	7,001	23
2017	5,887	**1,220 (20.7%)**	4,665	2
2018	7,843	**198 (2.5%)**	7,644	1
2019	2,720	**78 (2.9%)**	2,639	3
2020	1,520	**38 (2.5%)**	1,481	1
2021	260	**12 (4.6%)**	253	0
2022	**764**	**17 (2.2%)**	**747**	**0**

Table 20b: Serological results of camel brucellosis (CFT)

Year	Brucellosis (CFT)			
	Total	**Pos**	**Neg**	**Dub.**
2016	324	142 (43.8%)	170	12
2017	2,153	480 (22.3%)	1,641	32
2018	114	47 (41.2%)	65	2
2019	198	39 (19.7%)	157	2
2020	92	8 (8.7%)	83	1
2021	19	7 (36.8%)	12	0
2022	27	12 (44.4%)	15	0

Table 20c: Serological results of brucellosis in other species

Year	RBT (Brucellosis)					
	Sheep/Goat			(Bovine, Deer, Black Buck, Oryx, Ibex, Gazelle, Gerenuk, Human)		
	Total	**Pos**	**Neg**	**Total**	**Pos**	**Neg**
2016	480	**1**	479	116	**28***	88
2017	496	**4**	492	181	**22***	159
2018	322	**12**	310	1,781**	**13***	1,768
2019	259	**1**	258	1,315**	**31***	1,284
2020	49	**0**	49	59	**0**	59
2021	44	**0**	44	62	**0**	62
2022	**27**	**3**	**24**	**418**	**5***	**413**

* Mostly Bovine and Gazelle; ** Mostly Bovine and Human

Table 21: Serological results of MERS-CoV (ELISA)

Year	MERS-CoV (ELISA)							
	Camel				Human			
	Total	Pos	Neg	Dub.	Total	Pos	Neg	Dub.
2019	403	98 (24.3%)	305	0	14	1	11	2
2020	66	43 (65.2%)	17	6	-	-	-	-
2021	337	273 (81.0%)	54	10	-	-	-	-
2022	**1**	**1 (100%)**	**0**	**0**	**-**	**-**	**-**	**-**

Table 22: Serological tests done for other diseases

Year	Q-Fever ELISA *(Coxiella burnetii)*				Johne's Disease ELISA *(Mycobacterium paratuberculosis)*			
	Oryx, Addax, Gazelle, Goat, Bovine				Bovine, Goat, Sheep, Oryx, Gazelle, Camel			
	Total	Pos	Neg	Dub.	Total	Pos	Neg	Dub.
2019	1,198	**157**	988	53	80	9	70	1
2020	42	**4**	37	1	54	6	47	1
2021	66	**17**	48	1	101	36	63	2
2022	**2**	**0**	**2**	**0**	469	30	436	3

Year	Bovine, Goat, Sheep, Oryx, Gazelle			
	Test	Total	Pos	Neg
2020	FMD NS ELISA*	13	0	13
	FMD Liquid Phase ELISA**	2	2	0
2021	FMD NS ELISA*	13	5	8
	FMD Liquid Phase ELISA**	0	0	0
2022	FMD NS ELISA*	**287**	**66**	**221**
	FMD Liquid Phase ELISA**	**0**	**0**	**0**

* detects antibodies against field virus; ** detects antibodies against vaccine strain

Table 23: Serological tests done on falcons and other avian species

Year	*Mycoplasma* Antibody ELISA				
	Total	Species	Pos	Neg	Dub.
2019	5	*M. gallisepticum*	0	5	0
		M. synoviae	0	5	0
2020	20	*M. gallisepticum*	0	20	0
		M. synoviae	20	0	0
2021	2	*M. gallisepticum*	2	0	0
		M. synoviae	0	2	0
2022	**2**	*M. gallisepticum*	**0**	**2**	**0**
		M. synoviae	**1**	**1**	**0**

Year	Newcastle Disease Antibody ELISA				Avian Leukosis virus Antigen detection ELISA		
	Total	Pos	Neg	Dubious	Total	Pos	Neg
2018	19	**9***	9	1	**-**	**-**	**-**
2019	12	**3***	9	0	-	-	-
2020	12	**6***	6	0	1	0	0
2021	25	**5***	20	0	-	-	-
2022	**72**	**23***	**47**	**2**	**-**	**-**	**-**

*Also vaccinated

Table 24: Serological tests done for exporting pet animals

Year	Test	Species	Total	Pos	Neg
2021	*Brucella canis* (RSAT)	Canine	171	3	168
	Trypanosoma evansi (CATT)	Canine	125	0	125
	Dirofilaria immitis (Heartworm ELISA)	Canine	33	0	33
		Feline	9	0	9
2022	*Brucella canis* (RSAT)	Canine	**104**	**0**	**104**
	Trypanosoma evansi (CATT)	Canine	**67**	**0**	**67**
	Dirofilaria immitis (Heartworm ELISA)	Canine	**37**	**0**	**37**
		Feline	**25**	**0**	**25**

Table 25: Serological survey of 150 camels for 7 different diseases

Tests	Total	Pos		Neg
		Count	%	
WNV cELISA	150	46	30.7 %	104
FMD 3ABC ELISA	150	0	0.0 %	150
Tryps Ab ELISA	150	29	19.3 %	121
Brucella ELISA	150	9	6.0 %	141
CCHF ELISA	150	90	60.0 %	60
PPR	150	0	0.0 %	150
Anaplasma	150	0	0.0 %	150

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Table 26: Consignments and total number of specimens

Species	Number Consignments				Number Specimens			
	2021		2022		2021		2022	
Camels	1,517	32.2%	**1,632**	30.5%	5,753	42.8%	**6,211**	38.7%
Equine	411	8.7%	**516**	9.7%	831	6.2%	**1,207**	**7.5%**
Bovine	697	14.8%	**755**	14.1%	1,296	9.6%	**1,619**	**10.1%**
Canine	532	11.3%	**588**	11.0%	684	5.1%	**735**	4.6%
Feline	503	10.7%	**614**	**11.5%**	582	4.3%	**716**	**4.5%**
Falcons	74	1.6%	**79**	1.5%	210	1.6%	**216**	1.3%
Others*	973	20.7%	**1,160**	**21.7%**	4,098	30.5%	**5,328**	**33.2%**
Total	**4,707**		**5,344**		**13,454**		**16,032**	

* See Table 27

Year	Consignments	Specimens
2001	3,802	13,536
2002	4,887	18,093
2003	4,975	17,533
2004	3,788	14,493
2005	3,923	16,248
2006	4,204	20,146
2007	3,934	19,481
2008	3,636	20,211
2009	4,031	19,706
2010	3,165	8,870
2011	3,344	9,554
2012	3,240	9,090
2013	3,279	9,322
2014	3,869	12,575
2015	3,961	12,134
2016	4,010	11,943
2017	4,807	14,398
2018	5,484	16,499
2019	5,378	17,015
2020	5,056	15,511
2021	4,707	13,454
2022	**5,344**	**16,032**

Table 27: Consignments and total number of specimens of 'Others' from Table 26

Species	Consignments	Specimens	Species	Consignments	Specimens
Avian	69	291	Quail	32	262
Bustard	154	952	Rabbit	19	26
Chicken	172	1,246	Raccoon	1	1
Cockatoo	1	1	Reptile	10	11
Crocodile	1	4	Rhea	7	33
Crown Crane	1	5	Rhinoceros	1	2
Dolphin	21	28	Rodent	7	24
Donkey	6	12	Sheep	41	112
Dugong	1	1	Snake	1	1
Elephant	2	2	Stork	1	1
Fish	25	72	Swan	3	13
Fox	9	13	Tortoise	2	6
Francolin	2	13	Turtle	12	27
Gazelle	95	376	Wallaby	4	9
Giraffe	7	24	Wildebeest	1	1
Goat	12	52	Air Settle Plates	8	103
Guinea Fowl	2	20	Alfalfa	1	1
Hippopotamus	1	2	Blood agar plates	3	3
Hornbill	1	1	Blood Culture	8	16
Human	10	10	Culture Medium	1	1
Ibis	1	6	Date Syrup	1	1
Insect	1	3	Feed	27	48
Lagomopha	2	2	Food	102	218
Lizard	1	1	Hay	3	18
Loris	1	1	Honey	71	111
Monkey	1	1	Oil	1	1
Ostrich	3	13	Powder	1	1
Owl	2	4	Slide	2	2
Parrot	16	67	Water	82	283
Peacock	4	14	Wood Shaving	1	16
Penguin	14	127	Others*	23	367
Pheasant	13	68	**Total (2022)**	**1,160**	**5,328**
Pigeon	18	143	Total (2021)	973	4,098
Pocket pets	2	2			
Primates	12	32			

*Material not mentioned

Table 28: Submissions by the following senders

Sender	Consignments		Specimens	
	Count	%	Count	%
Emirates Industries for Camel Milk and Products	971	18.2	4,480	27.9
Wadi Al Safa Wildlife Centre	825	15.4	2,314	14.4
Central Veterinary Research Laboratory	208	3.9	921	5.7
Nakhli Dairy Farm	388	7.3	784	4.9
Al Nakhli Poultry Farm	144	2.7	756	4.7
Dr Gul Alam Khan	86	1.6	622	3.9
Dubai Camel Hospital	253	4.7	476	3.0
Dubai Equine Hospital	276	5.2	457	2.9
Two Feet Four Paws Vet. Clinic	61	1.1	302	1.9
QC Yousif Mohamed Ahmed	8	0.1	264	1.6
Dubai Racing Club	48	0.9	220	1.4
Al Barsha Veterinary Clinic	184	3.4	213	1.3
Dr Salman Ahmed	24	0.4	189	1.2
RAK Muncipility	41	0.8	166	1.0
Houbara Breeding Center	27	0.5	156	1.0
Mr Khalifa Saif Magoodi	38	0.7	123	0.8
Umm Suqeim Vet. Centre	107	2.0	119	0.7
Mr Anjad Al Shaikh (JOR)	14	0.3	107	0.7
The City Vet Clinic	86	1.6	101	0.6
Dubai Arabian Horse Stud	4	0.1	93	0.6
Zabeel Vet. Hospital	71	1.3	89	0.6
Sherif El Khadary	10	0.2	86	0.5
Sharjah Equine Hospital	22	0.4	76	0.5
Al Reef Stables	7	0.1	73	0.5
Dr Agustin Anzoategui	5	0.1	69	0.4
Others	1,436	26.9	2,776	17.3
Total (2022)	**5,344**	**-**	**16,032**	**-**
Total (2021)	4,707	-	13,454	-
Total (2020)	5,056	-	15,511	-
Total (2019)	5,378	-	17,015	-
Total (2018)	5,484	-	16,499	-

Table 29: Total number of milk samples and milk products tested

Sample	No. of samples
Raw Milk	2,569
Pasteurized Milk	2,212
Milk Powder	1
Grand Total (2022)	**4,782**
Grand Total (2021)	4,643
Grand Total (2020)	4,953
Grand Total (2019)	4,660

Table 30: Bacteriological results of raw milk samples tested for human consumption

Species	Owner	Location	No. of samples				
			Total	Suitable*		Not suitable	
				Count	%	Count	%
Camel	HH Sh Hamdan Bin Rashid Al Maktoum	Al Safa	927	860	92.8	67	7.2
	HH Sh Hamdan Bin Mohammed Al Maktoum	Nad Al Sheba Camel Farm	13	8	61.5	5	38.5
	HH Sh Mohammed Bin Rashid Al Maktoum	Mahmiya Camel Milking Farm	30	21	70.0	9	30.0
	Others		11	5	45.5	6	54.5
	Total		**981**	**894**	**91.1**	**87**	**8.9**
Bovine	HH Sh Hamdan Bin Rashid Al Maktoum	Al Aweer	618	539	87.2	79	12.8
	Others		4	0	0	4	100.0
	Total		**622**	**539**	**86.7**	**83**	**13.3**
	Grand Total (2022)		**1,603**	**1,433**	**89.4**	**170**	**10.6**
	Grand Total (2021)		1,952	1,677	85.9	275	14.1
	Grand Total (2020)		2,092	1,506	72.0	586	28.0
	Grand Total (2019)		1,613	1,223	75.8	390	24.2

* All milk samples were judged according to the microbiological criteria for raw cow milk as per EC/IDF Regulations (92/46/EEC)

Not suitable: Total Plate Count(TPC) ≥ 50,000 cfu/ml, Coliform count ≥ 20 cfu/ml
Staphylococcus aureus count ≥ 100 cfu/ml, CMT: positive

Table 31: Bacteriology results of pasteurized milk

Species	Year	No. of Samples				
		Total	Suitable*		Not Suitable*	
			Count	%	Count	%
Camel	**2022 (EICMP)**	1,514	1,439	95.0	75	5.0
	2021 (EICMP)	1,511	1,510	99.9	1	0.1
	2020 (EICMP)	1,538	1,529	99.4	9	0.6
Bovine	**2022 (Nakhlee farm)**	638	635	99.5	3	0.5
	2021 (Nakhlee farm)	574	545	94.9	29	5.1
	2020 (Nakhlee farm)	369	333	90.2	36	9.8

* Suitability of samples were judged according to UAE.S/GSO 1016:2015 standards.

Table 32: Bacteriology results of special culture for the isolation of *Mycoplasma* sp. and *Brucella* sp. from milk samples

Test	Species	Year	Total Samples	Detected	Not Detected
Mycoplasma sp.	Bovine	**2022**	**4**	**0**	**4**
		2021	2	1	1
		2020	4	0	4
	Camel	**2022**	**1**	**0**	**1**
	Goat	2020	1	0	1
Brucella sp.	Bovine	**2022**	**64**	**0**	**64**
		2021	0	0	0
		2020	0	0	0
	Camel	**2022**	**5**	**0**	**5**
		2021	0	0	0
		2020	6	0	6

Since September 2019, after achieving ISO 17025:2017 accreditation form EIAC, CVRL has started testing of food samples intended for human consumption. The different types of food analysed in the year 2022 were chicken, eggs, vegetables and rice grains.

The samples are tested following ISO food standards. The samples were judged for suitablility following UAE.S/GSO:1016-2015

Table 33: Food samples tested for human consumption

Year	Consignments	Specimens
2022	**102**	**218**
2021	86	216
2020	59	146

Table 34: *Salmonella* strains isolated from different animal species

Species	*Salmonella* isolates	Species	*Salmonella* Isolates
Avian	4	Rhea	1
Bustard	151	Rodent	1
Camel	144	Tortoise	2
Canine	11	Turtle	3
Cattle	10	**Total (2022)**	**562***
Cheetah	1	Total (2021)	272
Chicken	179	Total (2020)	333
Donkey	1	Total (2019)	328
Equine	9	Total (2018)	352
Falcon	3	Total (2017)	305
Feline	16	Total (2016)	231
Gazelle	8	Total (2015)	295
Ostrich	1	Total (2014)	209
Pheasant	1	Total (2013)	187
Primates	1	Total (2012)	110
Quail	12	Total (2011)	158
Reptile	3	Total (2010)	199

* Isolated strains are not serotyped

Table 35: *Brucella* culture

Country	Specimen	Total	Detected	Not Detected
UAE	Organs	51	**1**	50
	Body fluids	6	**0**	6
	Blood	8	**0**	8
	Milk	68	**0**	68
	Total (2022)	**133**	**1**	**132**
	Total (2021)	71	0	71
	Total (2020)	405	2	403
International	-	-	-	-

Table 36: *Brucella* strains isolated (not from milk)

Species	*Brucella sp.* isolates
Arabian Oryx	1
Total (2022)	**1**
Total (2021)	0
Total (2020)	2
Total (2019)	1
Total (2018)	8*
Total (2017)**	36*
Total (2016)	41*

* All *Brucella melitensis*

Table 37: *Mycoplasma* strains isolated from different animal species

Species	*Mycoplasma sp.* isolates
Bovine	4
Canine	1
Chicken	3
Falcon	9
Feline	1
Total (2022)	**18**
Total (2021)	5*
Total (2020)	10*
Total (2019)	8*
Total (2018)	18*
Total (2017)	4*

* Isolated strains are not serotyped

Table 38: Special Isolates

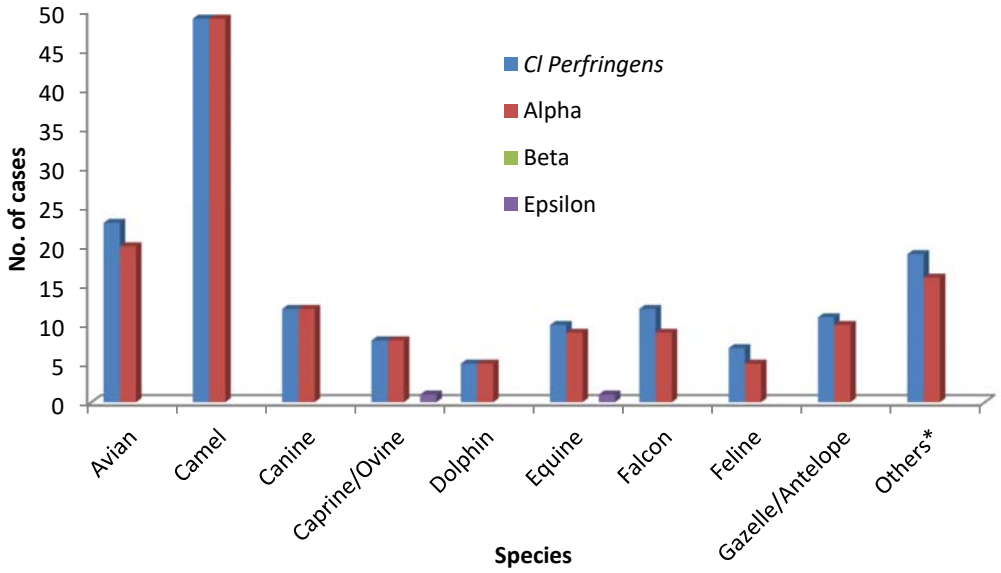
Bacteria:

Bacteria	No. of strains	Source
Aggregatibacter aphrophilus	1	Tamarin (skull swab)
Campylobacter upsaliensis	1	Canine (intestine)
Clostridium bifermentans	11	Bovine, Fish, Camel, Falcon, Cheetah and Arabian Tahr (organs)
Clostridium clostridioforme	1	Equine (lung)
Clostridium limosum	2	Chimpanzee (lung), African Grey Parrot (wound)
Clostridium septicum	7	Bovine, Equine, Camel and Gazelle (swab, organs)
Clostridium sordellii	56	Mainly from Camel, Gazelle and Cattle (organs from postmortem cases and diagnostic samples)
Corynebacterium diphtheriae	67	Penguin (Tracheal swab)
Corynebacterium pseudotuberculosis	14	Camel and sheep (organs, swab)
Ignatzschineria dubaiensis	2	Camel maggots
Lelliottia amnigena	1	Equine (trans tracheal wash)
Rhodococcus equi	4	Feline (fluid, swab)
Riemerella anatipestifer	7	Avian (Tracheal swab)
Taylorella equigenitalis	2	Equine (swab)
Terrisporobacter glycolicus	1	Canine (faeces)
Trueperella pyogenes	30	Mainly Bovine Gazelle and Camel (swabs, organs from postmortem cases)
Vibrio cholerae	9	Camel (Urine, mouth swab, faeces), Equine(Urine), Fish (Intestine), Gazelle (lung)

Fungus:

Fungus	Source
Candida guilliermondii	Equine (strain)
Candida krusei	Baboon, Canine, Hamster (faeces)
Candida lambica	Feed, Macaw (organs)
Candida tropicalis	Canine (faeces, ear swab), Baboon, Hamster, Turtle, Camel (intestine, lung), Dolphin (blowhole swab)
Cryptococcus albidus	Falcon (airsac swab, intestine)
Fusarium moniliforme	Donkey feed from Ethiopia
Malassezia pachydermatis	Canine (ear swab, skin scabs, hair)
Microsporum canis	Canine, Feline (hair)

Fig. 9: Results of enterotoxaemia ELISA for *Clostridium perfringens* and its toxins



*Others: Bovine, Giraffe, Crocodile, Rabbit, Chimpanzee, etc.

Table 39: Number of samples (culture supernatants) confirmed as *Clostridium perfringens* and its toxins

Species	*Cl. perfringens*	Alpha toxin	Beta toxin	Epsilon toxin	Non toxic
Avian	23	20	-	-	3
Camel	49	49	-	-	0
Canine	12	12	-	-	0
Caprine/Ovine	8	8	-	1	0
Dolphin	5	5	-	-	0
Equine	10	9	-	1	0
Falcon	12	9	-	-	3
Feline	7	5	-	-	2
Gazelle/Antelope	11	10	-	-	1
Others*	19	16	-	-	3
Total (2022)	**156**	**143**	**-**	**2**	**12**
Total (2021)	174	163	-	3	11
Total (2020)	374	340	-	3	34

* Others: Bovine, Giraffe, Crocodile, Rabbit, Chimpanzee, etc

Table 40: Feed samples tested for mycotoxins

Toxin test	Consignments		Feed samples and toxin levels detected			
			2021		2022	
Aflatoxin (ELISA)	2021	2022	No. of Samples	≥ 20ppb	No. of Samples	≥ 20ppb
	37	48	63	1	71	4
Fumonisin (ELISA)	2021	2022	No. of Samples	≥ 5ppb	No. of Samples	≥ 5ppb
	13	31	27	0	42	1

Aflatoxin: ≥ 20ppb levels in feed is considered as TOXIC

Fumonisin ≥ 5ppm levels in feed is considered as TOXIC

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Table 41: Total samples processed and vaccines produced

Test	Year	
	2021	2022
Virus isolation (Avian)	915	683
Virus isolation (Mammals)	556	435
Influenza A antigen detection - Rapid Chromatographic Immunoassay (Equine)	311	261
Influenza A antigen detection - Rapid Chromatographic Immunoassay (Avian)	297	356
Camelpox - Virus Neutralisation Test (VNT)	3	3
Canine Distemper Virus - VNT	46	2
Equine Viral Arteritis (EVA) - (VNT)	1,269	1,417
Vesicular Stomatitis Virus - (VNT)	19	5
Equine Piroplasmosis - Immuno Fluorescence Antibody Test (IFAT)	210	237
Leishmania infantum - IFAT	251	223
Babesia gibsoni - IFAT	165	38
Ehrlichia canis - IFAT	129	117
Brucella canis - IFAT	67	23
Babesia canis - IFAT	13	14
Avian Influenza - Haemagglutination Inhibition (HI)	34	75
Newcastle Disease - HI	10	95
Rabies - Immuno Fluorescence Test (IFT)	13	14
Equine Herpes Virus - IFT	3	2
Bovine Herpes Virus – IFT	2	0
Bovine Viral Diarrhoea - IFT	6	0
Canine Distember Virus - IFT	11	6
Infectious Bovine Rhinotracheitis - IFT	6	0
Feline Herpes Virus - IFT	6	6
Bovine Respiratory Syncytial Virus - IFT	7	0
PPR - Antigen capture ELISA	53	112
Rabies antibody Testing - Fluorescence Antibody Virus Neutralisation (FAVN) Test	927	1,555
Total	**5,329**	**5,679**
AHS VNT – for the antibody development study in horses after vaccination with a killed AHS vaccine containing all 9 serotypes	**17**	**25**
VACCINES	**Doses**	**Doses**
Camelpox vaccine (Ducapox) - attenuated	2,130	**520**
Falconpox vaccine - attenuated	5,200	**11,670**
Houbarapox vaccine – attenuated	799	**252**
Avian paramyxovirus type 1 (APMV-1) vaccine- inactivated	1,034	**475**
Avian Influenza H5N1 (AVIN 5) vaccine- inactivated	985	**535**
African Horse Sickness vaccine containing 9 serotypes (Shot I & shot II) – inactivated	1,360	**1,248**

Table 42: List of virus isolated from different animal species

Species	Virus	Number of isolates
AVIAN		
Falcon	APMV-1 virus	2
	Herpes	4
Pigeon	Herpes	15
Houbara	APMV-1 virus	1
	Avian Influenza	6
	Infectious Laryngotracheitis virus	1
Owl	APMV-1 virus	1
Chicken	Avian Influenza	5
	APMV-1 virus	15
	Non-haemagglutinating virus	1
Stone curlew	Pox virus	1
	APMV-1 virus	1
Peacock	Avian Influenza	1
Pheasant	APMV-1 virus	2
Karawan	APMV-1 virus	1
Crowned crane	Avian Influenza	1
Greater Rhea	Avian Influenza	5
Guinea fowl	Avian Influenza	1
	Total	**64**
OTHER SPECIES		
Camel	MERS Coronavirus	7
	Camelpox virus	2
Equine	West Nile virus	1
Gazelle	Foot-and-mouth disease virus (FMD)	3
Feline	Feline Herpes virus	1
	CPE producing unknown virus	1

Table 43: List of Avian Influenza Virus isolates from different avian species

Species	Number of birds	Strains
Houbara	6	H5N1
Chicken	5	H5N8
Peacock	1	Sub typing not done
Crowned crane	1	H5N1
Greater Rhea	1	H5N1
Guinea fowl	1	H5N1

Table 44: Influenza A antigen detection by Rapid Chromatographic Immunoassay

Table 44a: Equine results

Year	Consignments	Samples	Positive	Negative
2018	54	294	0	294
2019	380	2,502	0	2,502
2020	237	1,428	0	1,428
2021	59	311	0	311
2022	**50**	**261**	**0**	**261**

Table 44b: Avian results

Year	Samples	Positive	Negative	Inconclusive
2018	535	19 (3.6%)	516	0
2019	383	24 (6.3%)	359	0
2020	250	17 (6.8%)	233	0
2021	297	10 (3.4%)	286	1
2022	**356**	**29 (8.1%)**	**324**	**3**

Table 45: Results of samples tested for Equine Piroplasmosis IFAT

Parasite	Year	Total	Positive	Negative	Dubious
T.equi	2020	166	65 (39.2%)	100	1
	2021	210	82 (39.0%)	128	0
	2022	**237**	**56 (23.6%)**	**177**	**4**
B.caballi	2020	166	2 (1.2%)	164	0
	2021	210	0	210	**0**
	2022	**237**	**0**	**237**	**0**

Table 46: Results of Virus Isolation for Avian Export

Year	Test	Species	Samples	Pos.	Neg.
2021	APMV-1 virus isolation	Falcon	162	1	161
		Cockatiel	2	0	2
	Avian Influenza virus (H5, H7, H9) isolation	Falcon	188	0	188
		African grey parrot	1	0	1
		Indian ring neck	1	0	1
		Macaw	1	0	1
		Bulbul	1	0	1
2022	APMV-1 virus isolation	Avian	3	0	3
		Falcon	156	1	155
	Avian Influenza virus (H5, H7, H9) isolation	Avian	2	0	2
		Falcon	155	0	155
		Parrot	10	0	10

Table 47: Results of Indirect Immunofluorescence Antibody testing (IFAT) for exporting pet animals

Year	Test	Species	Samples	Pos.	Neg.	Dubious
2021	*Babesia gibsoni*	Canine	164	1	163	0
		Feline	1	0	1	0
	Leishmania infantum	Canine	250	3	247	0
		Feline	1	0	1	0
	Ehrlichia canis	Canine	129	2	126	1
	Brucella canis	Canine	67	0	67	0
	Babesia canis	Canine	12	0	12	0
		Feline	1	0	1	0
2022	**Babesia gibsoni*	Canine	**38**	**1**	**37**	**0**
	Leishmania infantum	Canine	**222**	**5**	**217**	**0**
		Feline	**1**	**0**	**1**	**0**
	Ehrlichia canis	Canine	**117**	**6**	**111**	**0**
	Brucella canis	Canine	**23**	**0**	**23**	**0**
	Babesia canis	Canine	**14**	**0**	**14**	**0**

* Testing was discontinued due to the non-availability of test kits.

Table 48: Avian Influenza Haemagglutination Inhibition (HI) results

Year	HI for Avian Influenza (H5, H7 and H9N2)		
	Samples	Positive	Negative
2018	26	0	26
2019	68	0	68
2020	81	77 (95.1%)	4
2021	72	9 (12.5%)	63
2022	**75**	**5 (6.7%)**	**70**

Table 49: Newcastle disease- Haemagglutination Inhibition (HI) results

Year	Samples	Positive	Negative
2018	18	11 (61.1%)	7
2019	62	20 (32.3%)	42
2020	96	95 (99.0%)	1
2021	10	0	10
2022	**95**	**73 (76.8%)**	**22**

Table 50: Immunocapture ELISA for Peste des petits ruminants (PPR)

Year	Species	Samples	Positive (PPR)	Negative
2021	Caprine	6	1	5
	Gazelle/Antelope	37	2	35
	Sheep	10	2	8
	Total	**53**	**5**	**48**
2022	Bovine	5	0	5
	Caprine	65	0	65
	Gazelle/Antelope	30	0	30
	Sheep	1	0	1
	Mixed	11	0	11
	Total	**112**	**0**	**112**

Table 51: Immuno Fluorescence Test (IFT) results

Year	Virus	Samples	Neg.	Positive	
				Count	Species
2021	Rabies	13	13	**0**	
	Equine Herpes Virus (EHV)	3	3	**0**	
	Bovine Viral Diarrhoea (BVD)	6	6	**0**	
	Canine Distemper Virus (CDV)	11	10	**1**	Canine
	Infectious Bovine Rhinotracheitis (IBR)	6	6	**0**	
	Bovine Respiratory Syncitial Virus (BRSV)	7	6	**1**	Dik Dik
	Feline Herpes virus	6	6	**0**	
	Bovine Herpes virus	2	2	**0**	
2022	Rabies	14	11	**3***	Canine, Equine
	Equine Herpes Virus (EHV)	2	2	**0**	
	Bovine Viral Diarrhoea (BVD)	0	0	**0**	
	Canine Distemper Virus (CDV)	6	5	**1**	Canine
	Infectious Bovine Rhinotracheitis (IBR)	0	0	**0**	
	Bovine Respiratory Syncitial Virus (BRSV)	1	0	**0**	
	Feline Herpes virus	6	6	**0**	
	Bovine Herpes virus	0	0	**0**	

* Canine – Small Animal Rescue, Kabul, Afghanistan; Equine – Sharjah Equine Hospital

Table 52: Results of Virus Neutralisation Test (VNT)

Virus	Year	Species	Samples	Positive	Negative	Doubtful
Vesicular Stomatitis Virus	2019	Equine	5	0	5	-
	2020	Equine	9	0	9	-
	2021	Equine	6	2	4	-
	2022	**Equine**	**3**	**0**	**3**	**-**
		Oryx	**1**	**0**	**1**	**-**
		Zebra	**1**	**0**	**1**	**-**
Camelpox	2021	Camel	4	2	2	-
	2022	**Camel**	**3**	**2**	**1**	**-**
Canine Distemper	2021	Canine	46	16	30	-
	2022	**Canine**	**2**	**2**	**0**	**-**
Encephalomyocarditis	2021	Elephant	1	0	1	-
	2022	-	-	-	-	-
Equine Viral Arteritis	2021	Equine	1,269	10	1,259	-
	2022	Equine	**1,417**	**2**	**1,414**	**1**

Table 53: Rabies antibody testing by Fluorescent Antibody Virus Neutralization (FAVN) test

Year	Species	Total	Titre value (IU/ml)	
			<0.5	>=0.5*
2020	Canine	430	46	384
	Feline	443	10	433
	Equine	19	4	15
	Hyena	2	2	0
	Primate	3	1	2
	Wild Feline	4	0	4
	Total	**901**	**63 (7.0%)**	**838**
2021	Canine	512	71	441
	Equine	2	2	0
	Feline	411	7	404
	Honey Badger	1	0	1
	Human	1	0	1
	Total	**927**	**80 (8.6%)**	**847**
2022	Canine	961	94	867
	Feline	592	14	578
	Ferret	1	1	0
	Lapine	1	0	1
	Total	**1,555**	**109 (7.0%)**	**1,446**

* A test titre of 0.5 lU/ml or above indicates that the animal has an acceptable rabies antibody level.

Vaccines (Viral and Bacterial)

Over the years, CVRL has been very successful in producing vaccines to protect the avian population against Falconpox and Houbarapox, and the camel population against Camelpox.These vaccines have been distributed locally within the UAE on demand.

Since 2010, CVRL has been producing $Clostridium\ perfringens$ A α-toxin camel hyperimmune immunoglobulin (Ducabulin) as an active treatment for camels suffering from $Clostridium\ perfringens$ A enterotoxaemia. This hyperimmune immunoglobulin solution is used as a prophylaxis as well as therapy against $Clostridium\ perfringens$ A α-toxin enterotoxaemia, and also boosts the camel's immunity.

All of these vaccines (Falconpox, Houbarapox, Ducapox, African Horse Sickness, DuPa- Avian paramyxovirus type 1, Caseous lymphadenitis – CLA vaccine), along with Ducabulin, have now been approved and registered with the UAE Ministry of Climate Change and Environment thereby authorizing CVRL to distribute them across the whole of the Middle East and East Africa.

Over the last 8 years, around 62,790 doses of Falconpox, 22,750 doses of Houbarapox and 24,117 doses of Ducapox vaccines have been distributed throughout the Middle East on demand.

Table 54: Vaccine Distribution of year 2022

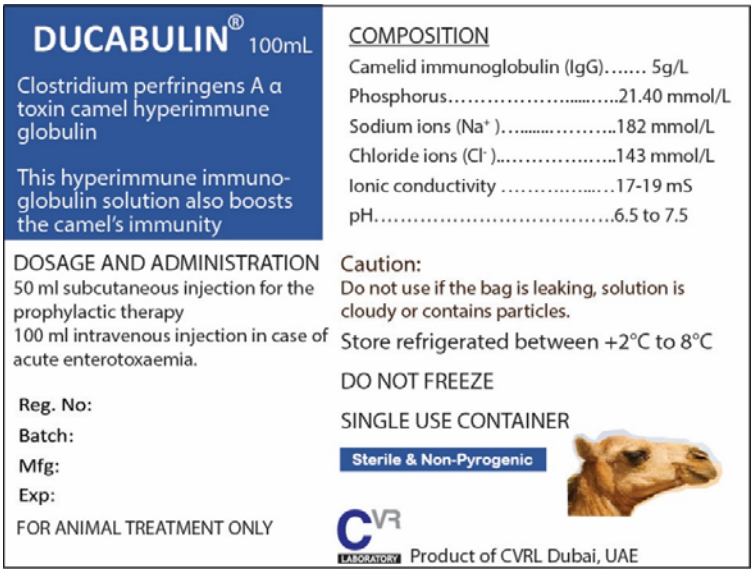
Vaccine	Quantity
Avian paramyxovirus type 1(APMV-1) inactivated vaccine (DuPa)	475 Doses
Falconpox vaccine (attenuated)	11,670 Doses
Houbarapox vaccine (attenuated)	252 Doses
Camelpox vaccine (Ducapox) (attenuated)	520 Doses
AHS inactivated vaccine for Kenya and Sudan	1,248 Doses
Papillomavirus vaccine	49 Doses
AVIN 5 (Avian Influenza H5N1 inactivated vaccine)	535 Doses
Caseous lymphadenitis – CLA (*Corynebacterium pseudotuberculosis*) vaccine	320 Doses
Escherichia coli oral vaccine for trial in Camel calves	3000 ml

Camelid Antibody Facility Unit

Dromedaries were immunized with *Clostridium perfringens* A α-toxoid and camelid hyperimmune plasma was collected. Subsequent processing of plasma yielded purified camelid IgG. The purified IgGs were then further concentrated to 5g/L and filled in 100ml sterile transfer bags.

The price of DUCABULIN (*Cl. perfringens* A α toxin camel hyperimmune globulin) can be found under "Services" in CVRL website www.cvrl.ae.

This product is highly purified and consists of pure immunoglobulins which also boosters the animal's immunity. Another advantage of this product is that it is derived from bacterial strains isolated from camels in the UAE.



Product Label

Advantages of camelid antibodies

- They are much smaller than conventional antibodies, hence named Nanobodies (10 times smaller than conventional antibodies). They penetrate into any tissue much faster, easier and deeper due to their size.
- Nanobodies can even penetrate the brain-blood-barrier
- Nanobodies are heat resistant
- Nanobodies bind forcefully with their antigen

"BIOJUICE" for treatment of acidotic camels

CVRL launched a Biojuice project which was great news for all camel owners in the U.A.E. Though we have initiated this project in 2018, the extensive production of biojuice started in June 2019. Biojuice is fluid taken from rumen or compartment 1 of ruminating animals (sheep, cattle, camel) to save racing camels life from compartment 1 (C1) acidosis due to wrong diet (too much carbohydrate, protein, cow milk, dates, uncrushed barley).

Biojuice is now available at Dubai Camel Hospital for purchase. A total number of 407 liters were prepared at CVRL and sent to Dubai Camel Hospital in Marmoom during the year 2022.

CVRL monitors the following parameters on biojuice before supplying to Dubai Camel Hospital:

- pH (must be between 6-7)
- *Salmonella* and *Clostridia* (should be absent)
- Presence of Gram negative bacteria (should be more than 70%)

One-liter bottle of biojuice contains C1 fluid which includes billions of bacteria and protozoa. Acidotic camels need to drink 3-5 liters as treatment for reversing C1 acidosis.

CVRL would like to take this opportunity to thank Dr. Ali Taher Al Hamadi & team, Marmoom and Dr. Mahmoud Yousef Odeh & team, Qusais for their good cooperation and support.

Parasitology Department

Parasitology department performed a total of 3824 tests in 2022 (Tab. 55 and 56). The majority of samples were faecal samples, followed by bird intestines and EDTA blood samples of dogs and cats *for Dirofilaria immitis*.

Remarkable finding was that of the presence of *Cryptosporidium* oocysts in kitten and other young animals. *Giardia* sp. was a concern in 2022 for dogs that went to day care facility in Dubai and got infected resulting in diarrhea. Cases of clinical mange in Arabian oryx in the Marmoom Desert Conservation Resort in Dubai were confirmed by detecting of *Sarcoptes scabiei* in skin scrapings. Also in camels, mange mites were detected in one farm.

Table 55: Numbers of hosts examined for parasites in 2022

	Year					
Host	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Camelids	1,178	1,002	1,241	937	553	**864**
Canids	415	539	799	808	827	**887**
Avians	806	854	1,308	758	619	**779**
Felids	241	339	341	509	357	**603**
Game	326	420	431	198	137	**194**
Equids	241	286	184	92	151	**66**
Sheep, goats	74	42	81	73	54	**64**
Others	365	502	537	384	296	**367**
Total	3,646	3,984	4,922	3,759	2,994	**3,824**

Table 56: Materials sent for parasitological examination in 2022

Material	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Faeces	277	226	357	253	184	190	185	243	221	222	372	331	3,065
Intestines	25	35	24	25	42	29	22	31	20	18	36	29	336
helminths	1	1	2		1		1		2		3	3	14
Skin /feathers	4	9	2	2	22	1	13	4	2	2	7	5	73
Ticks	6	7	4	3	11	5	10	11	5	1	1	1	65
Feed/water/soil	1		18		1		1	1			12	5	39
Blood	22	11	23	14	33	11	18	13	19	29	6	12	211
Cysts	1	1	3		2	1	3	1	2		2	1	17
Flies/ maggots		1	2	1		2							6
Carcasses						2							2
Total	**337**	**291**	**435**	**298**	**296**	**241**	**253**	**304**	**271**	**272**	**439**	**387**	**3,824**

Camelids

Total of 864 camelid samples originated from dromedaries including one alpaca. Faecal floatation was done with 541 camel faecal samples, out of which 372 were negative. The percentage of camel coccidia was: *Eimeria cameli* oocysts (n=86, 15.9 %), *Eimeria dromedarii* (n=15, 2.8%), *Eimeria rajasthani* (n=2, 0.36%), other *Eimeria* spp. as spurious parasites (n=10, 1.8%). There were 10 cases of hydatidosis in adult camels imported from abroad. The following helminth eggs were diagnosed: *Nematodirus* (n=51, 9.4%), *Capillaria* (n=11, 2%), *Trichuris* (n=12, 2.2%), Trichostrongylidae (n=5, 0.9%) and *Moniezia* (n=2, 36%). Seventeen (=7.8%) out of 216 camel calves sent for post mortem had *Cystoisospora orlovi* oocysts and *Cryptosporidium* oocysts were seen in five calves and one pregnant female with intestinal disorders. The camel tick, *Hyalomma dromedarii*, was found on 61 dromedaries sent for necropsy. Five skin scrapings were positive for *Sarcoptes* mites.

Canids

A total of 887 tests were performed on canine samples. EDTA blood from 89 dogs destined for export was tested for microfilaria by microfiltration or modified Knott's test and one case of *Dirofilaria repens* was detected.

Of 257 canine samples screened for intestinal flagellates, 60 samples were positive. These were 51 samples with *Giardia* sp. and nine with *Trichomonas* like flagellates. Out of 139 faecal samples screened for *Cryptosporidium* oocysts one sample was positive. Other detected endoparasites were: *Cystoisospora canis* (n=16), *C. ohioensis* (n=14), *Toxascaris leonina* (n=8), *Ancyslostoma* sp. (n=4), *Toxocara canis* (n=4), Oxyurid eggs (n=1), Eimeria sp (n=1). One necropsied dog was infected with intestinal trematodes (*Heterophyes heterophyes*).

Felids

A total of 603 tests were done on felid samples. The modified Knott's test with 14 cat blood samples destined for export gave negative results.

Out of 98 *Cryptosporidium* tests done with feline faecal samples, 13 were positive. Trichomonads were detected in four out of 165 examined cat samples. *Giardia* sp. was not detected. Finding of *Toxoplasma* oocysts in faeces of a kitten was remarkable.

Other parasites in felid faeces were: *Cystoisospora felis* (n=16), *C. rivolta* (n-12), *Toxascaris leonina* (n=14), *Toxocara mystax* (n=2), Ancylostoma(n=1), Trichuris(n=1), *Ascaridia* (spurious parasite, n=1). *Joyeuxiella pasqualei* from cat and *Toxascaris leonina* from cheetah were isolated during postmortem.

Avians

779 tests were done on avian samples in 2022. Three pigeons and one spotted dove was positive for *Trichomonas gallinae* in their oral cavity. Two rheas that had eye lid swellings and blindnesswere infected with eye flukes (*Philophthalmus gralli*). 37 chicken were positive for Eimeria spp. (n=37) were the most prevalent parasites in chicken. Helminth parasites recovered from chicken intestine were: *Ascaridia galli* (n=22), *Heterakis gallinarum* (n=13), *Heterakis beramporia* (n=4), *Raillietina* sp. (n=10), *Capillaria* sp.(n=2), *Subulura* sp. (n=2), *Choanotaenia* sp.(n=8), *Paroniella* sp.(n=3).

There was an interesting case of > 100 *Dispharynx nasuta* spirurids recovered from proventriculus of a peacock.

In falcon samples there were two cases of *Avispora megafalconis*, 2 cases of *Porrocaecum* sp. A juvenile trematode found in the bursa of Fabricius of a Peregrine falcon was determined as *Prosthogonimus* sp. A female spirurid nematode (Desportesius sp.) was found in the digestive tract of an Eurasian hobby.

Detected bustard (houbara, Macqueens, Kori and little bustard) parasites were: *Avispora megafalconis* (n=6), *Hartertia rotundata* (n=3), *Hispaniolepis falsata* (n=12), *Ideogenes* sp. (n=3), *Otidiotaenia conoides* (n=1), *Raillietina* sp.(n=2) and *Otidoecus houbarae* (n=2).

Reighardia sternae (pentastomida) found in the airsacs of a blackheaded gull was sent in for species determination.

Peacock lice (*Menacanthus stramineus*) and and Rhea lice (*Struthiolipeurus rheae*) were also isolated in birds in the year 2022.

Equids

Sixty-six samples originated from horses. Out of 17 *Cryptosporidium* screening of faecal samples from foals, two were positive. Two diarrheic faecal samples contained flagellates and ciliate cysts. One horse was positive for strongyle eggs and another for *Parascaris equorum*. All the other equine samples were negative for parasites.

Wild herbivores

A total of 194 samples from different wild herbivores were processed. Six animals had *Cysticercus tenuicollis* metacestodes attached to different sites in the abdomen. Oocysts of *Eimeria* spp. and *Nematodirus*, Trichostrongylidae, *Strongyloides* and *Moniezia* eggs were present in the faeces of these game animals. *Sarcoptes scabiei* mites were found in 10 Arabian oryx. Sucking lice (*Linognathus* sp.) were present in 2 animals and maggots of *Chrysomya albiceps* and *Sarcophaga* sp. were found(one and two gazelles, respectively). Nine animals had tick infestation caused by *Hyalomma dromedarii*, *Hy. detritum* and *Rhipicephalus sanguineus*.

Sheep and goat

Out of 64 sheep and goat samples arrived, one sheep had *Oestrus ovis* larvae in the nasal cavity. *Cryptosporidium* screening was done for four goat kids with diarrhea and two goats were positive. One goat had *Entamoeba* like cyst in its faeces. Other detected parasites were *Eimeria* spp, Trichostrongylidae, Skrjabinema sp. and Strongyloides.

Other hosts

All the other animal groups contributed with 367 samples, among which 56 samples were from bovines. *Eimeria* spp., Trichostrongylidae, flagellates and amoebic cysts were the positive results. Cow blood sample from three farms were positive for *Theileria annulata*. As vector for this blood parasite, *Hyalomma detritus* was identified. *Cryptosporidium* oocysts were detected in a faecal sample of a young okapi.

The exotic tapeworm *Progamotaenia thylogale* was again detected in two Parma wallabies. Dicrocoeliid flukes of the genus *Paradistomum* were found in the gall bladders of a saw scaled viper

and a gecko and nematodes of the genus Tachygonetria were diagnosed in five tortoise samples. The finding of *Trichospirura* eggs in the faeces of marmosets was another interesting finding. A total of 161 farm fish samples in 13 consignments sent for parasite screening resulted in negative results.

Dourine antigen production

We produced a total of 53 vials of dourine antigen in 3 batches and stored in -80 for future use for testing of dourine antibodies in horses by complement fixation test and handed over to Serology Dept.

Research work

Research work in the parasitology department concentrated on life cycle studies of three species of parasitoid wasps. These wasps with filth flies as natural hosts have the potential to be used as alternative method for fly control and can have an importance in the determination of the post mortem interval in criminal forensic investigations. In addition, we were working on air sac nematodes of the genus *Serratospiculum* in falcons. This research was in cooperation with five falcon clinics in Dubai and resulted in a paper in 'Veterinary Parasitology: Regional Studies and Reports'.

Pathology Department

Table 57: Number and species of animals received for necropsy

Species	2020	2021	2022
Camel fetus	223	161	**294**
Camel calf	247	182	**174**
Camel (adult)	134	101	**95**
Equine (adult)	42	47	**53**
Antelope/Oryx/Deer	30	30	**53**
Feline	28	30	45
Canine	27	42	42
Bovine	18	8	42
Gazelle	20	35	35
Ovine/caprine	22	21	22
Other mammals	11	21	17
Large feline/Cheetah	16 (8/8)	12 (7/5)	14 (7/7)
Tahr	8	8	13
Rabbit /Guinea pig/	9	4	11 (9/2)
Marmoset/other Monkey	6	4	6 (4/2)
Wallaby	6	7	4
Mice /Rat	25	4	4
Giraffe	6	1	3
Fox/Ferret	3	1	2
Hippopotamus	4	1	-
Total mammals	**885**	**720**	**889**
Chicken	**290**	**155**	**388**
Quail	**12**	**53**	**67**
Houbara bustard	**95**	**48**	**65**
Pheasant	**12**	**13**	**29**
Pigeon/Dove	**33**	**30**	**23**
Falcon	**21**	**22**	**16**
Ostrich/ Rhea	13	14	15 (3/12)
Parrot	24	8	10
Other Birds	1	11	**9**
Waterfowl	2	4	**6**
Francolin/Partridge	12	11	**4**
other bustards	2	7	4
Owl	3	2	3
Peafowl/Guinea fowl	2	3	2
Total avian	**540**	**381**	**641**
Reptiles/Amphibians	8/-	11	12
Fish	81	65	58
Grand Total	**1515**	**1177**	**1600**

Table 58a: Main diagnosis of dissected mammals

Species	Diagnosis	2021	2022
Horse (adult)	**Fracture/Trauma**	20	**22**
	Exertional myopathy	6	**7**
	Lung bleeding/ EIPH	5	**6**
	Pneumonia	2	**4**
	Clostridiosis	2	**4**
	Peritonitis after GIT-rupture	4	**3**
	Colon Torsion/ Volvulus	2	**2**
	Endotoxic shock	2	1
	Rabies	-	1
	WNF	-	1
Camel (adult)	**Pulmonary Leucosis (SACL)**	**11**	**23**
	Clostridiosis	**16**	**14**
	Ascites due to Liver-dystrophy	**9**	**12**
	Coccidiosis-Eimeria	**9**	**7**
	C1-Acidosis/Overload	**6**	**7**
	Surra-Meningoencephalitis	15	6
	Dystocia/Uterine prolapse	10	4
	Mastitis	5	6
	Abscesses/CLA	5	5
	HD	2	5
	Para-Pox-dermatitis (new)	-	5
	Fracture/ Pelvic fracture	4	4
	Peritonitis	2	4
	Tumor	4	2
	Salmonellosis	4	2
	Pox	1	2
Camel calves	**Septicaemia (*E. coli*)**	**42**	**52**
	Clostridiosis	**21**	**29**
	Pneumonia	**13**	**29**
	Meningitis	**15**	**25**
	Cystoisospora-colitis	12	15
	White muscle disease	6	15
	Perforated gastric ulcer	13	13
	Salmonellosis	9	9
	Colon impaction/faecolith	6	9
	Candida-gastritis	5	5
	Para-Pox-dermatitis (new)	-	5
	Abscesses/CLA	3	5
	Cryptosporidium-enteritis	3	3
	Alpaca-fever	-	3
	Pox	1	2

Table 58b: Diseases of avian

Species	Diagnosis	2021	2022
Falcon	**Clostridiosis**	**4**	**4**
	Vitamin A-deficiency	**5**	**2**
	Herpesvirus-hepatitis	**3**	**2**
	Avian Influenza (AI)	**3**	**2**
	Salmonellosis	**2**	**2**
	Gout due to amyloidosis	2	1
	Septicaemia	1	1
	Trauma/ Lung-bleeding	1	1
	Endoparasites	1	1
	Aspergillosis	1	1
Houbara bustard	**Endoparasites**	**8**	**15**
	Septicaemia	**3**	**10**
	Pseudomonas-pneumonia	**17**	**8**
	Gout	**9**	**8**
	Clostridiosis	**3**	**7**
	Trauma/Fracture	4	6
	Amyloidosis	3	6
	Myopathy	2	5
	Avian Influenza (AI)	-	5
	Paramyxovirus (ND)	1	2
	Aspergillosis	1	2
	Salmonellosis	1	2
	Gastric foreign body	1	1
	Pox	-	1
	ILT	-	1
Chicken	**Avian Influenza (AI)**	**-**	**58**
	Salmonella-infection	**32**	**53**
	Adenovirus-hepatitis	**23**	**22**
	Pasteurellosis	**13**	**20**
	Campylobacter-infection	**15**	**10**
	Endoparasites/worms	11	8
	Gout	12	6
	Colisepticaemia	10	6
	Coccidiosis	5	3
Rhea	**Paramyxovirus (ND)**	**1**	**6**
	Avian Influenza (AI)	**-**	**5**
	Eye fluke	**1**	**1**

Table 59: Samples for Histopathology/Cytology

Species	2020	2021	2022
Mammals			
Canine tissue	224	268	**283**
Feline tissue	110	126	**106**
Smear	40	102	**97**
Skin-biopsy	39	45	**43**
Arabian sand cat	6	7	**32**
Equine tissue	40	49	30
Urine samples	34	21	29
Pleural/Abdominal fluid	20	14	27
Large feline tissue	7	10	17
Tracheal wash, equine	35	12	14
Camelid tissue	31	12	12
Lab-rodents	5	1	11
Tissue of other mammals	16	12	8
Gazelle/Antelope tissue	14	6	7
Uterine biopsy	4	14	7
Bovine tissue	9	4	2
Total mammal tissue	**634**	**703**	**725**
Avian			
Chicken tissue	**5**	**75**	**83**
Falcon biopsy/tissue	**48**	**38**	**34**
Pigeon/Dove tissue	11	7	9
Parrot tissue	**5**	**6**	**8**
Other avian tissue	**12**	**5**	**7**
Houbara/Bustards tissue	5	1	6
Mynah tissue	18	-	-
Bulbul tissue	15	-	-
Total avian tissue	**108**	**132**	**147**
Others:			
Camel udder research project	-	**(1,200)**	**(300)**
Honey for pollen analysis	**60**	**94**	**57**
Reptile tissue	**5**	**4**	**9**
Fish tissue	9	67	42
Plants for pollen analysis	3	-	4
Insects for histology	6	-	-
Total other samples	**83**	**165**	**100**
Grand Total	**814**	**1,000 (2,200)**	**972 (1,272)**

Table 60: Histology/Cytology: number of blocks and slides produced

	2018	2020	2021	2022
Paraffin-blocks	9,700	9,300	8,200	**8,100**
Histology-Slides	12,600	12,400	12,300	**12,200**
Cytology-slides	205	185	155	**135**
IFT – slides	255	85	111	**61**

Table 61: Cremation/Incineration: number of animals/material

Species	2020	2021	2022
Canine (batch)	1,182	1,478	**1,360**
Feline (batch)	591	866	**1,140**
Pet (individual)	268	385	**587**
Subtotal	**2041**	**2,729**	**3,087**
Equine (batch/individual)	105/2	76/2	**8/4**
Camel abortion/placenta	47	75	**43**
Camel calf	5	17	**4**
Bovine	21	14	**4**
Foal	4	3	**2**
Total	**2,239**	**2,884**	**3,152**
Bags/Boxes	1,450	1,480	**1,350**

Taxidermy Department

In 2022 we started to offer a new service to CVRL's clients. Animal Paw Prints were requested in the past as keepsakes from deceased animals and we prepare them occasionally upon request. After consideration it seems like a good idea to offer and advertise them properly as part of our permanent list of services as pet memorials to help owners with their loss, offer a way to honor the beloved pet and create a lasting memory.

They are now available for every animal including birds or fish and we are improving the variety and selection constantly with new shapes and materials to suit everyone's needs.

Otherwise, it has been a very fish centered year with us mounting and casting various specimens. Especially Marlins and Tunas need to be mentioned as some of the bigger projects.

Taxidermist rarely use the original skin of the fish but work with a method of silicone casting and replication to have a long lasting exhibition piece. Our artists will incorporate similar color patterns and markings into each mount to give individuality.

Table 62 : Taxidermy Department paw print overview

Month	No. of Paw print
March	6
April	4
May	17
June	48
July	39
August	34
September	36
October	28
November	46
December	61
Total	**319**

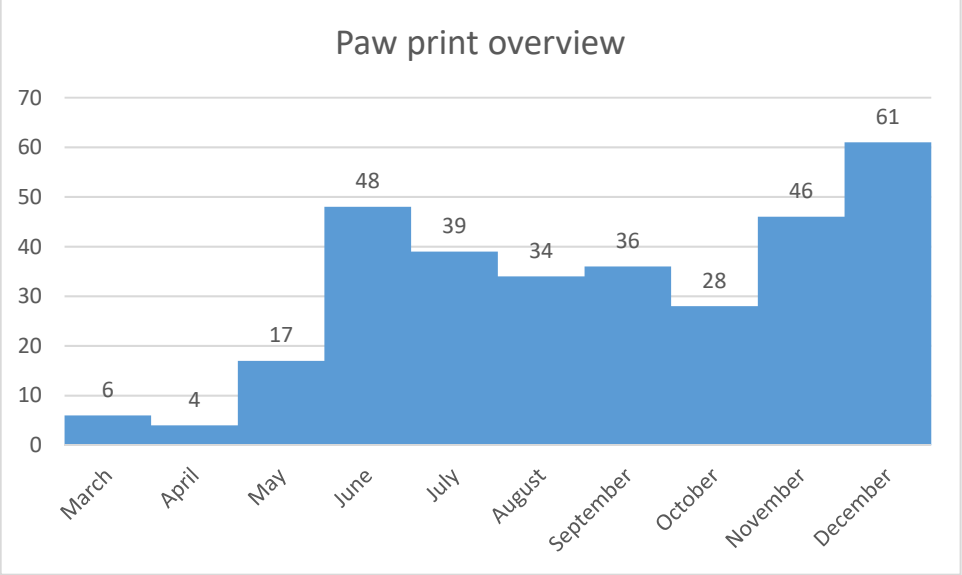


Table 63: Animals kept in storage for taxidermy in 2022

Species	*Scientific classification*	No of animals
Mammals		
Dugong	*Dugong dugon*	**1**
Horse	*Equus ferus caballus*	**2**
Dromedary camel	*Camelus dromedarius*	**6**
Alpacas	*Lama pacos*	**1**
Giraffe	Giraffa camelopardalis	**1**
Arabian oryx	*Oryx leucoryx*	**8**
Barbary sheep	*Ammotragus lervia*	**1**
Markhor	*Capra falconeri*	**1**
Addax	*Addax nasomaculatos*	**2**
Blackbuck	*Antelope cervicapra*	**1**
Gazelle sp.	*Gazella sp.*	**2**
Domani	*Gazella gazella*	**22**
Reem	*Gazella leptoceros*	**34**
Arabian gazelle	*Gazella arabica*	**1**
Bongo	*Tragelaphus eurycerus*	**1**
Scimatar horned oryx	*Oryx dammah*	**1**
Mouflon	*Ovis gmelini*	**1**
Arabian tahr	*Arabitragus jayakari*	**2**
Himalayan tahr	*Hemitragus jemlahicus*	**1**
Nubian ibex	*Capra nubiana*	**2**
Lion	*Panthera leo*	**1**
African leopard (black)	*Panthera pardus*	**1**
Cheetah	*Acinonyx jubatus*	**3**
Domestic cat	*Felis catus*	**2**
Sand cat	*Felis margarita*	**1**
Raccoon	*Procyon lotor*	**1**
Wallaby	*Notamacropus sp.*	**1**
Dormouse	*Myoxidea sp.*	**2**
Mara	*Dolichotis patagonum*	**1**
Chimpanzee	*Pan troglodytes*	**2**
Orangutan	*Pongo sp.*	**1**
Western lowland gorilla	*Gorilla gorilla gorilla*	**1**
Macaque	*Macaca sp.*	**1**

Species	*Scientific classification*	No of animals
Indian roundleaf bat	*Hipposideros lankadiva*	**1**
Sugar glider	*Petaurus breviceps*	**1**
Mix carpet		**8**
Birds		
Blue-necked ostrich	*Struthio molybdophanes*	**1**
Greater rhea	*Rhea americana*	**1**
Blue and gold macaw	*Ara ararauna*	**1**
Red-shouldered macaw	*Diopsittaca nobilis*	**1**
Sacred ibis	*Threskiornis aethiopicus*	**1**
Budgerigar	*Melopsittacus undulatus*	**1**
Alexandrine parakeet	*Psittacula eupatria*	**1**
Red breasted parakeet	*Psittacula alexandri*	**1**
Pin-tailed sandgrouse	*Pterocles alchata*	**2**
White-eared bulbul	*Pycnonotus leucotis*	**1**
Red-vented bulbul	*Pycnonotus cafer*	**1**
Barn owl	*Tyto alba*	**1**
Bonelli's eagle	*Aquila fasciata*	**1**
Lappet-faced vulture	*Torgos tracheliotos*	**1**
Gyr falcon	*Falco rusticolus*	**4**
Saker falcon	*Falco cherrug*	**1**
Indian roller	*Coracias benghalensis*	**1**
Common myna	*Acridotheres tristis*	**1**
Crow	*Corvus sp.*	**1**
Lavender waxbill	*Estrilda caerulescens*	**1**
Orange-cheeked waxbill	*Estrilda melpoda*	**1**
Red siskin	*Spinus cucullatus*	**1**
House sparrows	*Passer domesticus*	**1**
Pigeon	*Columbidae sp.*	**1**
Houbara	*Chlamydotis undulata*	**7**
Peacock	*Pavo cristatus*	**1**
Yellow necked francolin	*Pternistis leucoscepus*	**3**
Arabian bustard	*Ardeotis arabs*	**1**
Grey crown crane	*Balearica regulorum*	**1**

Species	*Scientific classification*	No of animals
Gento penguin	*Pygoscelis papua*	**1**
Reptile		
African spurred tortoise	*Centrochelys sulcata*	**1**
Loggerhead sea turtle	*Caretta caretta*	**1**
Green sea turtle	*Chelonia mydas*	**3**
Sea turtle	*Chelonioidea*	**2**
Annulated sea snake	*Hydrophis cyanocintus*	**1**
Fish		
Blue Marlin	*Makaira mazara*	**1**
Fish unknown		**3**
Ray sp.	*Mobula sp*	**2**
Black tip reef shark	*Carcharhinus melanopterus*	**2**
Bull shark	*Carcharhinus leucas*	**4**
Pig eye shark	*Carcharhinus amboinensis*	**2**
Mollusk		
Octopus	*Octopus vulgaris*	**1**
Total		**183**

CVRL is now WOAH (previously known as OIE) Reference Laboratory for:

Glanders
Camel Pox
Brucellosis (*Brucella abortus, B. melitensis, B. canis)*
MERS (Middle East Respiratory Syndrome)
Every year CVRL has to submit annual reports to the WOAH on its activities it has undertaken regarding these 4 diseases.

Publications:

1. **Wernery, U. (2022)**
   Rickettsiales and *Coxiella burnetii* infections in camelids: A review.
   Journal of Camel Practice and Research 29(1), 1-16

2. **Yaghmour, F., C. Wilson, P. Azmanis, A.K. Vettan, J. Kinne and U. Wernery (2022)**
   Speargun impalement of a green sea turtle from Kalba, Sharjah, United Arab Emirates.
   Indian Ocean Turtle Newsletter No. 35

3. **Joseph, S., J. King, F. Pfaff, N.G. Patteril, S.K. Elizabeth, N. E. Thurgood, R. Muhammed and U. Wernery (2022)**
   Pigeons are the source of inclusion body herpesvirus hepatitis in falcons.
   Poster presentation for the German Standard Group Avian Medicine Symposium, 19th November, Dubai, UAE.

4. **Hoffman, B., S. Joseph, N.G. Patteril, M. R. Caveney, S.K. Elizabeth, R. Muhammed, R. Wernery and U. Wernery (2022)**
   Comparative genome analysis of all nine African Horse Sickness serotypes isolated from equine fatalities in Kenya and South Africa.
   Journal of Equine Veterinary Science 119, 104137

5. **Milovanović, M., K. Dietze, S. Joseph, U. Wernery, A. Kumar, J. Kinne, N.G. Patteril and B. Hoffmann (2022)**
   The experimental infection of goats with small ruminant Morbillivirus originated from Barbary sheep.
   Pathogens 11, 991. DOI:10.3390/pathogens11090991

6. **Serroni, A., S. Ulisse, M. Iorio, C. Laguardia, L. Testa, G. Armillotta, M. Caporale, R. Salini, D. Lelli, U. Wernery, R. Raghavan, M.T. Mercante and M. Di Ventura (2022)**
   Development of a competitive enzyme-linked immunosorbent assay based on purified recombinant viral protein 7 for serological diagnosis of epizootic haemorrhagic disease in camels.
   Journal of Tropical Medicine doi: 10.1155/2022/5210771

7. **Schuster, R.K., P. Azmanis, J. Naldo, P. Wencel, G. Alkepti, C. Hebel and C.S. Seti (2022)**
   On *Serratospiculum* (Nematoda; Dicheilonematidae) species occurring in hunting falcons in the United Arab Emirates in respect with their origin.
   Veterinary Parasitology 37, https://doi.org/10.1016/j.vprsr.2022.100818.

8. **Santos, M.A.B., J.A.M. Roldan, R.P. Lia, G. Annoscia, R. Schuster, A. Varcasia, G. Sgroi, D. Modry and D. Otranto (2022)**
   Description of *Joyeuxiella pasqualei* (Cestoda: Dipylidiidae) from an Italian domestic dog, with a call for further research on its first intermediate host.
   Parasitology149(13), 1769-1774

9. **Nilson, S.M., B. Gandolfi, R.A. Grahn, J.D. Kurushima, M.J. Lipinski, E. Randi, N.E. Waly, C. Driscoll, H.M. Escobar, R.K. Schuster, S. Maruyama, N. Labarthe, B.B. Chomel, S.K. Ghosh, H. Ozpinar, H.C. Rah, J. Millán, J. Mendes-de-Almeida, J.K. Levy, E. Heitz, M.A. Scherk, P.C. Alves, J.E. Decker, L.A. Lyons (2022)**
   Genetics of randomly bred cats support the cradle of cat domestication being in the Near East.
   Heredity (Edinb) 129(6), 346-355

10. **Schuster, R.K. and S. Sivakumar (2022)**
    Natural infection of preimaginal stages of flies of the Sarcophagidae Family with *Brachymeria Podagrica* and *Dirhinus Himalayanus* (Hymenoptera: Chalcididae) in the United Arab Emirates.
    Environ Analysis and Ecology studies 10(2), 1134-1139

11. **Wernery, U., R. Raghavan, N.M. Paily, Sh.M. Thomas, B. Johnson and Sh. Jose (2022)**
    Camelid Brucellosis – Clinical feature, excretion pattern, serological and bacteriological diagnosis: Review.
    Journal of Camel Practice and Research 29(3), 1-4

12. **Appelt, S., A.M. Rohleder, D. Jacob, H. von Buttlar, E. Georgi, K. Mueller, U. Wernery, J. Kinne, M. Joseph, S. V. Jose and H.C. Scholz (2022)**
    Genetic diversity and spatial distribution of *Burkholderia mallei*. PLOS Neglected Tropical Diseases. 17(7), e0270499. https://doi.org/10.1371/journal.pone.0270499

13. **Schuster, R.K, M. Rodriguez, R. Raghavan, M. Ringu, F. Al Mheiri and U. Wernery (2022)**
    Surra in the UAE: Do we have drug resistant *Trypanosoma evansi?* – Part 1.
    Journal of Camel Practice and Research 29(3), 329-332

14. **Schuster, R.K, K. Noeckler, L. Hoffmann, D. Grossklaus and U. Tiedemann (2022)**
    Nachruf Prof. Dr. Dr. h.c. mult. Theodor Hiepe.
    Deutsches Tieraerzteblatt 70,1449

15. **Wernery, U., S. Joseph, M. Rodriguez, N.M. Paily, S.M. Thomas and R. Raghavan (2022)**
Duration of MERS - Coronavirus antibodies in a small closed dromedary camel herd in Dubai.
Journal of Camel Practice and Research 29(3), 287-289

Total no. of scientific papers published since the foundation of CVRL until 2022: **749**

Thesis:

1. **Marina Rodriguez (2022)**
Immune response of horses to inactivated African horse sickness vaccines. Doctor Medicinae Veterinariae (Dr. med. Vet.), Leipzig University, Germany

International Scientific Collaborators

1. **Prof. Dr. med. vet. Gerd Sutter**
German Center for Infection Research (DZIF), Institute for Infectious Diseases and Zoonoses, LMU University of Munich, Germany

2. **Prof. Patrick CY Woo**
The University of Hong Kong
Department of Microbiology, Hong Kong

3. **Matthias Lenk**
Collection of Cell Lines in Veterinary Medicine (CCLV)
Dept. of Experimental Animal Facilities an Biorisk Management
Friedrich-Loeffler-Institut, Insel Riems, Germany

4. **Dr. Christine Fast**
Institute of Novel and Emerging Infectious Diseases
Institut für neue und neuartige Tierseuchenerreger (INNT)
Friedrich-Loeffler-Institut, Insel Riems, Germany

5. **Prof. Dr. Christian Drosten**
Director, Institute of Virology,
Charite Universitätsmedizin Berlin, Germany

6. **Dr. Karine LAROUCAU**
Paris-Est University, ANSES, Laboratory for Animal Health, Bacterial Zoonosis Unit, 14 rue Pierre et Marie Curie, 94701 Maisons-Alfort Cedex, France
Unité Zoonoses Bactériennes, Laboratoire de Santé Animale
Agence Nationale de Sécurité Sanitaire de l'alimentation, de l'environnement et du travail (ANSES), France

7. **Dr. Miklós Gyuranecz**
Institute for Veterinary Medical Research
Centre for Agricultural Research, Hungarian Academy of Sciences Budapest,Hungary

8. **Prof. Dr. Martin Pfeffer**
Institute of Animal Hygiene and Veterinary Public Health
University of Leipzig , Germany

9. **Dr. Darryl Falzarano**
Research Scientist II
Vaccine and Infectious Disease Organization –
International Vaccine Centre (VIDO-InterVac), University of Saskatchewan, Canada

10. **Prof. Dr. Peter Timony**
Gluck Equine Research Center
Lexington, KY, USA

11. **WOAH (previously known as OIE)**
Organisation Mondiale de la Santé Animale
World Organisation for Animal Health Organización Mundial de Sanidad Animal

12. **Dr. Bum Tae Kim**
Center for Convergent Research of Emerging Virus Infection (CEVI)
Korea Research Institute of Chemical Technology (KRICT)

13. **Prof. Dr. Piet A. van Rijn**
Wageningen Bioveterinary Research Department of Virology, Lelystad, Netherland

14. **Dr. Bernd Hoffman**
Friedrich-Loeffler-Institut, Insel Riems, Germany

Manuscripts reviewed for leading veterinary journals

Dr. Ulrich Wernery – 5

Prof. R.K. Schuster – 12

Dr. Joerg Kinne – 2

Dr. Sunitha Joseph - 5

Conferences / meetings attended by CVRL staff:

Sponsorship:

- March 29 - 31, 2022
  CVRL was the camelids partner in sponsoring the 37th World Veterinary Association Congress (WVAC), Exhibiting at WVAC2022 by a comprehensive platform targeting the promotion of multiple CVRL departments and Showcasing our products and services.
  37th World Veterinary Association Congress (WVAC), ADNEC - Abu Dhabi, UAE

Dr. U. Wernery

- March 31, 2022
  Lecture on 'Zoonotic Diseases in Camelids'.
  37th World Veterinary Association Congress (WVAC), ADNEC - Abu Dhabi, UAE

- May 10 - 11, 2022
  Presentation on 'Standard tests for diagnosis of major Equine diseases'.
  OIE 3rd Regional Webinar on: OIE international standards and tools to facilitate international movement of (competition) horses, procedures supporting the publication of self-declarations of animal health status and the official recognition of African Horse Sickness (AHS) free status.
  Virtual meeting at CVRL Conference room

- September 15, 2022
  Lecture on 'Brucellosis in Camelids' at the 15th Annual Workshop 2022 of the EU Brucellosis National Reference Laboratories, Giulianova, Italy
  Virtual meeting (Microsoft Teams) at CVRL Conference room

Dr. Sunitha Joseph

- November 19, 2022
  Poster Presentation on 'Pigeons are the source of inclusion body herpesvirus hepatitis in falcons'.
  The GSG Avian Medicine Symposium, in Dubai, UAE

Dr. Marina Rodriguez

- March 29 - 31, 2022
  Lecture on "Development of an inactivated African Horse Sickness vaccine containing all nine serotypes".
  37th World Veterinary Association Congress (WVAC), ADNEC - Abu Dhabi, UAE

- October 11 - 12, 2022
  Lecture on "Efficacy of an inactivated African Horse Sickness vaccine containing all nine serotypes".
  Federation of European Equine Veterinary Associations. FEEVA Disease Surveillance. Network VIth Summit. Zagreb, Croatia.
  Veterinary colleague, Zagreb, Croatia.

- December 1, 2022
  Lecture "Update in African Horse Sickness inactivated vaccine".
  EU National Reference Laboratories. Annual meeting. African Horse Sickness and Bluetongue.
  Virtual meeting (Zoom) at CVRL Conference room.

Ms. Fatma Graiban

- February 17, 2022
  Representation of UAE University CAVM Department of Veterinary Medicine at Expo 2020 UAEU Pavilion.
  Expo, Dubai, UAE

- September 26, 2022
  Attended Abu Dhabi International Hunting and Equestrian Exhibition (ADIHEX).
  ADNEC - Abu Dhabi, UAE

- October 17, 2022
  Attended workshop of the final review of the draft national guide for research and studies of hazardous materials accidents and operations organized by National Crisis and Emergency Management Authority (NCEMA).
  Virtual meeting (Matrx) at Vienna, Austria.

- October 28 - 29, 2022
  Attended the 15th European College of Equine Internal Medicine (ECEIM) Congress.
  Rome, Italy.

Ms. Sweena Liddle

- September 28 - 29, 2022
  Attended the workshop hosted by Evident/Olympus on equipment training.
  Paramount Hotel, Business bay, Dubai, UAE

Dr. U. Wernery, Prof. Rolf Shuster, Dr. Sunitha Joseph, Dr. Marina Rodriguez & Ms. Fatma Graiban

- January 31, 2022
  Field visit of CVRL team for a consultation in camel abortion cases.
  Dubai, UAE.

Dr. U. Wernery, Prof. Rolf Shuster, Dr. Vijay Baskar, Dr. Sunitha Joseph & Ms. Fatma Graiban

- February to October, 2022
  Field visit of CVRL team for an inspection visit of mange in Oryx
  Dubai, UAE.

Dr. Vijaya Baskar, Dr. Sunitha Joseph, Ms. Bobby Johnson, Ms. Nissy Georgy & Ms. Shanty Jose

- February 1 - 2, 2022
  Attended - Biosafety and Biosecurity
  Virtual meeting (Zoom) at CVRL Conference room

Dr. U. Wernery, Dr. Marina Rodriguez & Ms. Fatma Graiban

- February 02, 2022
  Field visit of CVRL team for a consultation in FMD suspected cases.
  Dubai, UAE.

Dr. Vijay Bhaskar, Dr. Sunitha Joseph, Ms. Rekha Raghavan, Ms. Shruti Thomas, Ms. Saritha Sivakumar, Ms. Sweena Liddle, Ms. Nayana Paily, Ms. Jyothi Anandh, Mr. Zulfiqar Ali & Mr. Abdul Khadar Nissarudeen

- March 29 - 31, 2022
  Assisted & attended World Veterinary Association Congress (WVAC)
  37th World Veterinary Association Congress (WVAC), ADNEC - Abu Dhabi, UAE

Dr. U. Wernery & Ms. Fatma Graiban

- March 31, 2022
  Coordinator for Equids and Camelids .
  37th World Veterinary Association Congress (WVAC), ADNEC - Abu Dhabi, UAE

Dr. U. Wernery, Dr. Sunitha Joseph, Dr. Vijay Baskar, Dr. Marina Rodriguez & Ms. Fatma Graiban.

- May 09, 2022
  Field visit of CVRL team for a consultation in FMD and PPR suspected cases.
  Dubai, UAE.

Dr. U. Wernery, Dr. Sunitha Joseph & Ms. Fatma Graiban

- May 12, 2022
  Trip to Ethiopia and the Histoplasma capsulatum var farciminosum (HCF) Project.
  Virtual meeting (Zoom) at CVRL Conference room

Dr. Marina Rodriguez & Ms. Fatma Graiban

- June 28, 2022
  Attended "Animal Welfare with emphasis on Dromedary Camels" webinar organized by The WOAH Sub-Regional Representation Office in Abu Dhabi.
  Virtual meeting (Zoom) at CVRL Conference room

Dr. Sunitha Joseph, Ms. Rekha Raghavan & Ms. Bobby Johnson

- September 14 - 15, 2022
  Attended 15th Annual Workshop 2022 of the EU Brucellosis National Reference Laboratories, Giulianova, Italy
  Virtual meeting (Microsoft Teams) at CVRL Conference room

Dr. Sunitha Joseph, Ms. Shyna Korah, Ms. Rubeena Muhamed, Ms. Nicola Elaine, Ms. Shanty Jose, Ms. Bobby Johnson, Ms. Jeeba John, Ms. Sherry Jose, Ms. Reena Thomas, Ms. Rekha Raghavan, Ms. Shruti Thomas, Ms. Nayana Paily, Mr. Shanmugaraja & Ms. Ringu Mareena

- September 22, 2022
  Attended Eppendorf Pippette Calibration Workshop.
  CVRL, Dubai, UAE

Dr. Sunitha Joseph, Ms. Nissy Georgy, Ms. Shyna Korah, Ms. Rubeena Muhamed & Ms. Nicola Elaine

- September 28 - 29
  Attended the WOAH Sub-Regional webinar - 'Towards enhanced rabies control in UAE'.
  Virtual meeting at CVRL Conference room

Ms. Bobby Johnson, Ms. Marina Joseph, Ms. Sherry Jose, Ms. Shanty Jose, Ms. Jeeba John, Ms. Nicola Elaine, Ms. Safna Anas & Ms. Reena Thomas

- November 22, 2022
  Attended - The world antimicrobial awareness week 2022 on the topic 'The Scientific Basis of Antimicrobial Resistance' held by WOAH Sub-regional representation office, Abu Dhabi
  Virtual meeting at CVRL Conference room

Dr. Sunitha Joseph & Ms. Fatma Graiban

- December 27, 2022
  The National Emergency and Crisis Management Agency – Abu Dhabi conducted a workshop for the manual for the mechanism of dealing with biological waste (the source of infection - (version 4).
  Abu Dhabi, UAE

Science meetings/ Guest speaker at CVRL

1. **Prof. Dr. Piet A. van Rijn**, Department of Virology, Wageningen Bioveterinary Research, Netherlands.
   Scientific lecture titled " Development of DISA/DIVA vaccine with special emphasis to African Horse Sickness vaccines" at CVRL Conference room on January 26.
   - AHS DISA/DIVA vaccines with special emphasis to African Horse Sickness (AHS)
   - The DISA/DIVA vaccine platform for Bluetongue
   - Recombinant PPRV expressing eGFP to study pathogenesis in goats
   - Vector competence: the role of NS3/NS3a protein of orbiviruses

2. **Dr. Laurie Marker**, Executive Director and Founder of Cheetah Conservation Fund (CCF), Otjiwarongo, Namibia.
   Lecture titled "Cheetah conservation" at CVRL Conference room on February 11.

3. **Ms. Lelise Dhugaa,**
   Visit of The Commissioner, Oromia Tourism Commission (OTC), Addis Ababa, Ethiopia on March 17.

4. **Dr. Uwe Fischer**, Deputy Head of Institute, Laboratory Head, Federal Research Institute for Animal Health, Germany.
   Scientific lecture on Fish Diagnostics at CVRL Conference room on April 1.

5. **Mr. Mohammed Ahmed Al Qassimi**, University of Glasgow,
   - Scientific lecture on “The Microstructure of the Immune system and the pathogenesis of *H. capsulatum*” in response to Ms. Fatma’s investigation at CVRL Conference room on May 19.

   - Scientific lecture on “The general diagnosis of anemia in animals” at CVRL Conference room on December 29.

6. **Visit of 5 representatives from Chemical Defence Command department**
   Ministry of Defence, Abu Dhabi, UAE on September 14.

7. **Mr. Legese Begashaw**, Tour Manager at Nativeland Tours, Addis Ababa, Ethiopia
   Talk on Ethiopian history and many more topics at CVRL Conference room on December 8.

Training Courses

Training is an important aspect of our responsibilities as an OIE reference laboratory towards the scientific community; hence each year we run a number of courses for people who are associated with the health of animals.

Medical and biotechnology students from abroad benefit from being part of a leading research and diagnostic centre, being supervised by internationally recognized experts in various fields and have access to excellent research facilities, training, seminars, academic journals and library.

On-site free accommodation for visiting females and males are available at CVRL.

Interns worked at CVRL in 2022

1. Mohammed Al Saadi (03 Jan 22 - 09 Jan 22)
   UAE University, Veterinary student
2. Annika Mueller (20 Jan 22 - 21 Feb 22)
   University of Veterinary Medicine, Vienna - Austria
3. Amal Salem Khamis Hamad Alsamahi (07 Mar 22 - 29 Apr 22)
   UAE University, Biochemistry
4. Khuloud Ahmed Ali Salim AL-Ali (07 Mar 22 - 29 Apr 22)
   UAE University, Biochemistry
5. Fatma F.F. S. Sayedsharaf (07 Mar 22 - 29 Apr 22)
   UAE University, Biology
6. Aya Abdallah Mahmoud Rahimi (07 Mar 22 - 29 Apr 22)
   UAE University, Biology
7. Salwa Badidi (07 Mar 22 - 29 Apr 22)
   UAE University, Biology
8. Hend Khaled Shaban Abdelwahab (07 Mar 22 - 29 Apr 22)
   UAE University, Biology
9. Sabira Ayesha Bokhari (02 Jun 22 - 08 Jul 22)
   University of Sharjah
10. Mariya Syed (02 Jun 22 - 08 Jul 22)
    University of Sharjah
11. Anas Abdulla (02 Jun 22 - 08 Jul 22)
    University of Sharjah
12. Malak Mahmoud (02 Jun 22 - 08 Jul 22)
    University of Sharjah
13. Safna Siraj (06 Jun 22 - 17 Jun 22)
    Sh. Ahmad bin Mohammed's vet clinic

14. Aysha Almeheiri (06 Jun 22 - 17 Jun 22)
Veterinarian, Dubai Municipality

15. Reem Ahmad Alsaffar (01 Jul 22 - 31 Jul 22)
UAE University, Veterinary student

16. Jouri Chraiteh (01 Jul 22 - 31 Jul 22)
University of Sharjah

PhD Thesis, Master and Bachelor:

Each year we take on number of graduates who do research towards higher degree. Information about studentships can be found on our website www.cvrl.ae.

1. M.G. Müller: Studies on bumble foot in hunting falcons in the United Arab Emirates, Munich 1999
2. S. Gierse: The most important infectious diseases in falcons (*Falconidae*) and the importance of their quarry, Munich 2001
3. E.A. Albrecht: Production of camel milk. First experience in machine milking of dromedaries, Göttingen 2003 (Master)
4. C.P. Finke: Substantial quality parameters of camel meat (*Camelus dromedarius*)- physico-chemical and sensory examinations, Munich 2005
5. T. Stahl: Vitamin content and fatty acids in camel milk, Hannover 2005
6. V. Eberlein: Hygienic status of camel milk in Dubai (United Arab Emirates) under two different milking management systems, Munich 2007
7. F. Gerlach: Coccidiosis in dromedaries (*Camelus dromedarius*), Berlin 2008
8. F. Szulzewsky: Production of quail-chicken chimera by blastoderm cell transfer, Berlin 2009 (Master)
9. M.R. Hampel: Increasing fatal AA amyloidosis in hunting falcons and how to identify the risk: a report from the United Arab Emirates. Inaugural-Dissertation /Doctor Thesis, Zurich 2009
10. Maria Daniela von Hieber: Investigation of occurrence and persistence of brucellosis in chronically infected dromedary dams (*Camelus dromedarius*) and their calves, Ulm 2010 (Master)
11. M.H. Halbrock**:** Zytobakteriologische Untersuchungen von Milch bei maschinen-und handgemolkenen Kamelen (*Camelus dromedarius*) in Dubai, Munich 2010
12. Claudia Anke Kaiser: The role of copper and Vitamin A – Deficiencies leading to neurological signs in captive cheetahs (*Acinomyx jubatus*) and lions (*Panthera leo*) in the United Arab Emirates, Inaugural-Dissertation /Doctor Thesis, Zurich 2014
13. Alexandra Damerau: Development and establishment of an *Aspergillus fumigatus* antibody ELISA for the early diagnosis of Aspergillosis in falcon, Berlin 2015 (Master)
14. Max Berlin: Development of a CLA vaccine for dromedaries, Berlin 2015 (Master)
15. Sina Tönges: Test to detect *Habronema muscae* in horses, Berlin 2015 (Master)

Revenue:

	2020	2021	2022
CVRL	13,031,178	13,429,976	15,958,291

Amount in Dhs

Research Projects for 2023

1. Antibody development in horses after vaccination against African Horse Sickness with an inactivated vaccine containing all 9 serotypes in one injection using different adjuvants
2. Development of a DISA/DIVA vaccine to protect horses from African Horse Sickness
3. Improvement of CVRL's Caseous Lymphadenitis (CLA) vaccine for dromedaries
4. Identification of pathogenic genes in E. coli strains from camel calves at institute in Czech Republic
5. Surra in camels: different medical treatments due to resistancy against some drugs
6. Evaluation of a brucellosis milk ring test (MRT) for use in camels for the OIE brucellosis chapter
7. Equine Histoplasmosis – Isolation and development of an antibody ELISA
8. Parasitoid wasps as a biological control against fly pestilence
9. Research on non-Orf Parapoxvirus infection in dromedary camels

Dr. Dr. habil. U. Wernery
(Scientific Director)

CVRL Service Charges (2023)

Test	Price (AED)
Analytical Chemistry	
Trace Elements	
Copper from serum	50
Lead from EDTA blood	100
Selenium from serum	100
Trace elements and minerals from tissue (Cu, Zn, Fe, Pb) [each]	170
Zinc from serum	50
Bile Acid	
Bile Acid	150
Vitamins	
Vitamin A, Vitamin E, Vitamin C (each) from serum	100
Vitamin B1 from blood	100
Water	
Complete element analysis - water	1000
Water - single element	100
Feed	
Complete element analysis - feed	1000
Feed - single element	300
Heavy metals in feed (Cadmium, Chromium, Cobalt and Lead)	400
Honey	
Carbohydrates	200
Complete mineral analysis	1000
Heavy metals in honey (Cadmium, Chromium, Cobalt and Lead)	400
HMF (Test for adulteration)	50
Water content	50
Dates	
Carbohydrates	200
Complete mineral analysis	1000
Bacteriology	
Test	**Price (AED)**
Routine bacterial culture (Aerobic and Anaerobic)	150
Special bacterial culture (Aerobic, Anaerobic and Salmonella)	200
Antibiotic sensitivity test per isolate (Antibacterial susceptibility test)	80
Blood culture (additional charge for bottle)	100 (50)
Gram stain with interpretation	50
Ziehl - Neelsen stain	50

Special Isolation and Identification	
Anaerobic culture	110
Brucella culture (additional charge for identification by PCR, refer www.mbg.ae for tests and service charges)	250
Campylobacter culture	150
Clostridium botulinum culture with mouse bio-assay	1500
Listeria culture	110
Methicillin-Resistant Staphylococcus aureus (MRSA) culture and identification	150
Mycobacterium culture only (additional charge for identification by PCR, refer www.mbg.ae for tests and service charges)	200
Mycoplasma culture	175
Salmonella culture	120
Taylorella equigenitalis (CEM) culture	350/swab
Yersinia culture	110
Feed and Water	
Feed and water analysis (includes total aerobic bacterial count, presence of anaerobic bacteria and Salmonella)	200
Feed and water analysis - Fungus culture	100
Feed - Mycotoxin analysis - ELISA (Aflatoxin, Fumonisin)	250 per toxin
Water - Legionella culture without PCR [Non-Accredited test]	350
Milk Analysis Sterile containers can be collected from CVRL	
Pasteurized Milk Analysis - Total Plate Count and Coliform count only	100
Routine Milk Analysis - Total Plate Count, Coliform count, mastitis pathogen identification and CMT	120
Extended Milk Analysis - Total Plate Count, Coliform count, Staphylococcus aureus count, mastitis pathogen identification, CMT, MRT)	200
Total Plate Count	50
Total Coliform Count	80
E. coli enumeration [Non - Accredited test]	100
Staphylococcus aureus enumeration	100
Antibiotic sensitivity test per isolate (Antibacterial susceptibility test)	80
CMT (California Mastitis Test) [Non - Accredited test]	30
MRT (Milk Ring Test) [Non - Accredited test]	30
Milk-SCC (Somatic Cell Count) [Non - Accredited test]	50
Milk Culture for detection of other bacterial species - Refer 'Analysis of food intended for human consumption'	-
Milk - Brucella culture (additional charge for identification by PCR, refer www.mbg.ae for tests and service charges)	250
Total protein in milk [Non - Accredited test]	40
Fat content in milk [Non - Accredited test]	40
Lactose in milk [Non - Accredited test]	40

SNF (solids - not - fat) in milk [Non - Accredited test]	40
Vitamin C in milk [Non - Accredited test]	100
Miscellaneous services (upon pre-approval only)	
Sterilization of milking containers	100/ Autoclave cycle
Cleaning and refilling of udder cleaning disinfectant tissue buckets	50/Bucket
Sterile milking gloves	75/pk
Analysis of food intended for human consumption	
Total Plate count	80
Enterobacteriaceae - enumeration [Non - Accredited test]	100
Total Coliform Count	100
E. coli enumeration [Non - Accredited test]	120
E. coli O157:H7 detection [Non - Accredited test]	150
Staphylococcus aureus - enumeration	100
Salmonella species - detection	150
Serotyping of strains for Salmonella Typhimurium	60/Strain
Serotyping of strains for Salmonella Enteritidis	60/Strain
Listeria monocytogenes - detection	175
Campylobacter species - detection	200
Vibrio species and Aeromonas species - detection [Non - Accredited test]	150
Yersinia enterocolitica - detection [Non - Accredited test]	150
Bacillus cereus - detection [Non - Accredited test]	100
Lactobacillus species - detection [Non - Accredited test]	150
Fungus/Yeasts - enumeration	100
Antibiotic residue analysis (Quantitative) - [Non - Accredited test] Quinolones, Ceftiofur, Thiamphenicol, Streptomycin, Tylosin, Tetracycline. Please contact lab through e-mail: cvrl@cvrl.ae for further details	500/Sample for 6 analytes
Mycology	
Culture and identification of fungus, excluding dermatophytes	100
Culture and identification of fungus, including dermatophytes	120
Anti-fungal sensitivity test per isolate for yeast only	80
Fungal identification	50
KOH mount preparation	50
Air quality testing	
Plate evaluation for bacteria	100
Plate evaluation for fungus	100
Supplementary tests	
Mouse bioassay, e.g. for Surra, bacterial toxins for diseases like botulism, tetanus	200
pH evaluation of body fluids	25

Skin allergic test (Tuberculin and Mallein) - prior notification is required	500
Urine strip	15
Haematology - Biochemistry	
Avian haematology test (CBC & WBC)	100
Single haematology test (CBC & WBC) except avian haematology	50
Complete biochemistry and haematology	150
Blood smear examination	50
3 Electrolytes (Na, K, Cl)	60
Single parameter e.g. Calcium, Phosphorus etc. (each)	20
Amyloid (SAA)	100
Fibrinogen	100
Erythrocyte sedimentation rate (ESR)	25
Vitamin B12	200
Vitamin D	100
Reticulocyte	50
Ferritin	75
Diabetic Profile	
Fructosamine	50
Hormones (for all species)	
Progesterone	200
Testosterone	200
Estradiol	200
T3	200
T4	200
Cortisol	200
Parasitology	
Faecal floatation (Basic parasite screening)	20
Faecal floatation and Giardia/Motile protozoa screening (Animal with diarrhoea)	50
Faecal floatation, Giardia/Motile protozoa and Cryptosporidium screening (Diarrhoea in young/immunocompromised animal)	90
Faecal egg count (Enumeration)	50
Cryptosporidium screening (Negative staining)	40
Cryptosporidium screening (Modified acid-fast staining)	60
Faecal sedimentation - Simple faecal sedimentation (Concentration test for Trematodes and Cestodes)	40
Faecal sedimentation - Modified Sodiumacetate - Acetic acid - Formaldehyde faecal sedimentation (Concentration test for Protozoa cysts and oocysts)	50
Giardia/Motile protozoa screening (Normal and Iodine smear)	30

Trichomonas screening (smear)	30
Ectoparasites screening (KOH smear) and parasite identification	50
Water screening for algae/parasite stages (Centrifugation and microscopy)	50
Sewage water screening for helminth eggs and larvae	75
Soil screening for helminth eggs and larvae	75
Feed screening for arthropods, helminth eggs and larvae	100
Muscle screening (Gross and compressorium examination and digestion for Sarcocystis, Trichinella etc.)	100
Intestine screening (Examination and parasite identification, floatation)	70
Intestine screening (Examination and parasite identification, floatation and smear)	90
Organs/cyst/tissue screening (Examination and parasite identification)	50
Parasite identification	50
Microfilaria/Dirofilaria Microfiltration test	75
Microfilaria/Dirofilaria Knott test	50
Blood parasite (Direct smear)	50
Nematode larvae isolation (Baermann technique) and identification	60
Pathology	
Post mortem/necropsy only (including incineration; without tests for histology, bacteriology, virology, serology and parasitology)	
Pets (rabbit, cat, dog)	100 - 300
Small animals (camel-calf, sheep, goat, small game)	200 - 400
Large animals (camel, horse, cow, game)	600 - 900
Very large animals (giraffe, hippo, elephant)	1 AED/kg
Special (lot of sampling)/Forensic necropsy	1000 extra
Birds (falcon, parrot, ostrich etc.)	80 - 400
Full post mortem (including incineration, histopathology, bacteriology, parasitology and virology if needed) In some cases, the price may go up	
Pets (rabbit, cat, dog)	200 - 1000
Small animals (camel-calf, sheep, goat, small game)	300 - 2000
Large animals (camel, horse, cow, game)	800 - 2500
Very large animals (giraffe, hippo, elephant)	1000 - 5000
Special (lot of sampling)/Forensic necropsy	1000 extra
Birds (falcon, parrot, ostrich etc.)	100 - 1500
Poultry (chicken, quail, etc.)	50 - 1000
Transportation / Incineration / Cremation	
Transportation of large carcass	200/hour
Incineration according to size	250 - 900
Pet Incineration / Disposal (No ashes back)	
Small (Up to 1 kg)	75
1 to 5 Kg	100

5 to 10 Kg	200
10 to 25 Kg	300
25 to 40 Kg	400
Above 40 Kg	500
Pet Cremation - Ashes back (Urns are available at CVRL)	
Small (up to 1 kg)	150
1 to 5 Kg	300
5 to 10 Kg	400
10 to 25 Kg	600
25 to 40 Kg	800
Above 40 Kg	900
Individual Cremation: Cat/Dog/Pet (Maximum 30 Kg)	1200
Individual cremation plus witness: Cat/Dog/Pet (Maximum 30 Kg)	1500
Individual Cremation: Equine	4000
Paw print (in sand or clay)small animal (up to 60kg)	100
Paw print (in sand or clay) big animal	150
Animal name on paw print	50
Histology - Cytology	
Cytology Smear/fluid	30
Cytology biopsy/tumor	50
Histology each cassette incl. 1 x H&E slide	30
Histopathology each organ/paraffin block	60
Histopathology biopsy/tumor each slide	100
Serology	
Tests for Equines	
African Horse Sickness (AHS) - Ab cELISA	200
AHS - Serum titration/sample	450
Anaplasma phagocytophilum Ab ELISA	200
Dourine - Complement fixation test (CFT)	250
Equine Infectious Anaemia (EIA) - Agar Gel Immunodiffusion test (AGID/Coggins)	200
EIA - Ab cELISA	200
Equine Herpes Virus 1& 4 (EHV1 & EHV4) - Ab ELISA	300
Equine Rhinitis A Virus - Virus Neutralisation Test (VNT)	200
Equine Viral Arteritis (EVA) - VNT	200
EVA - Ab ELISA	200
Equine Piroplasmosis (*Babesia caballi* + *Theileria equi*) - Ab cELISA	280
Equine Piroplasmosis (*Babesia caballi* + *Theileria equi*) - Indirect fluorescent antibody test (IFAT)	280

Glanders - Complement fixation test (CFT)	250
Neonatal Isoerythrolysis - Agglutination test	75
Neospora - Ab cELISA	200
Sera storage (without testing)	50
Strangles (A + C antigen) - Ab ELISA	250
Trypanosoma evansi (Surra) - Ab ELISA	200
Trypanosoma evansi (Surra) - Card agglutination test for Trypanosomiasis (CAT*)*	50
Vesicular Stomatitis - VNT	200
West Nile Fever - IgG Ab ELISA	200
West Nile Fever - IgM Ab ELISA	500 (≤ 2 samples) 350 (≥ 3 samples)
Tests for other animals	
Abortion Panel : Ab ELISA - IBR, BVDV, BHV - 4 (Bovine)	350
Anaplasmosis - Ab ELISA (Bovine, Sheep)	150 (≥ 5 samples 105/-)
Akabane Ab ELISA (Ovine, Bovine, Caprine)	150 (≥ 5 samples 105/-)
Babesia canis - Indirect fluorescent antibody test (IFAT)	400
Blue Tongue - Ab ELISA (Ruminants)	150 (≥ 5 samples 105/-)
Bovine Leukaemia Virus (BLV) - Ab ELISA (Bovine)	150 (≥ 5 samples 105/-)
Brucella canis - Rapid slide agglutination test (RSAT)	400
Brucella canis - Indirect fluorescent antibody test (IFAT)	400
Brucellosis (*Brucella melitensis/abortus*) - Rose Bengal test (RBT)	25
Brucellosis (*Brucella melitensis/abortus*) - Serum agglutination test (SAT)	75
Brucellosis (*Brucella melitensis/abortus*) - Ab cELISA	150
Brucellosis (*Brucella melitensis/abortus*) - Complement fixation test (CFT)	200
BVDV - Ab ELISA (Ruminants)	250
Camel pox - Virus Neutralisation Test (VNT)	150
Canine Distemper – Virus Neutralization Test (VNT)	250
Capripox (Lumpy Skin Disease) Ab ELISA (Multispecies)	150 (≥ 5 samples 105/-)
Clostridium perfringens Alpha toxin - Ab cELISA (Multispecies)	150
Clostridium perfringens Enterotoxemia - Antigen ELISA (Multispecies)	150
Contagious caprine pleuropneumonia (CCPP - *Mycoplasma capricolum ssp capripneumoniae*) - Ab ELISA	250 (≥ 10 samples 200/-)
Corynebacterium pseudotuberculosis (Caseous Lymphadenitis - CLA) - Ab ELISA (Sheep, Goat, Camel)	150 (≥ 5 samples 105/-)
Dirofilaria immitis - Ag ELISA (Canine, Feline)	250
Ehrlichia canis - Indirect fluorescent antibody test (IFAT)	400
FAVN (Fluorescent antibody virus neutralisation) test for Rabies antibody titer	750
Foot and Mouth Disease (FMD) - Ab ELISA (for field infection) (Ruminants, Porcine)	150 (≥ 5 samples 105/-)

Foot and Mouth Disease (FMD) - Ab ELISA (for field infection) (Bovine, sheep and goat)	65 (≥ 5 samples 50/-)
Feline calicivirus Indirect fluorescent antibody test (IFAT)	400
Feline infectious peritonitis Type -1 (FIP-1) Indirect fluorescent antibody test (IFAT)	400
Feline infectious peritonitis Type -2 (FIP-2) Indirect fluorescent antibody test (IFAT)	400
Neospora caninum Feline calicivirus Indirect fluorescent antibody test (IFAT)	400
Infectious Bovine Rhinotracheitis (IBR) - Ab cELISA (Bovidae)	150 (≥ 5 samples 105/-)
Infectious Bronchitis (IB) - Ab ELISA (Multispecies)	150 (≥ 5 samples 105/-)
Leishmania infantum - Indirect fluorescent antibody test (IFAT)	400
Leptospira interrogans sv Canicola - Microscopic Agglutination Test (MAT)	150
MERS-CoV in camels - Ab ELISA	300 (≥ 5 samples 240/-)
Mycobacterium paratuberculosis (Johns disease) - Ab ELISA (Ruminants, Camel)	150 (≥ 5 samples 105/-)
Neosporosis - Ab cELISA (Bovine, Equine)	200 (≥ 5 samples 140/-)
Peste des Petits Ruminants (PPR) - Ab cELISA (Ruminants)	150 (≥ 5 samples 105/-)
Q Fever - Ab ELISA (Multispecies)	150
Respiratory penta: Ab ELISA - BHV-1, BVDV, BRSV, BPI3, Adeno3 (Ruminants)	350
Rift Valley Fever (RVF) - Ab cELISA (Multispecies)	150 (≥ 5 samples 105/-)
Schmallenberg Virus Ab ELISA (Ovine, Bovine, Caprine)	150 (≥ 5 samples 105/-)
Toxoplasmosis - Ab ELISA (Multispecies including camel)	150 (≥ 5 samples 105/-)
Tryps (*Trypanosoma evansi*) - Ab ELISA (Camel)	110
Tryps (*Trypanosoma evansi*) CATT (Multispecies)	50
Tuberculosis - Immunochromatographic test (Elephant, Camelids, Sealions, Cervids)	250 (≥ 5 samples 225/-)
Tuberculosis - Ab ELISA (Bovine)	250 (≥ 5 samples 225/-)
West Nile Fever - Ab cELISA (Multispecies)	200 (≥ 5 samples 140/-)
Tests For Avians	
Aspergillosis - Ab ELISA	200 (≥ 5 samples 140/-)
Avian Influenza (H5,H7 and H9) - Haemagglutination inhibition (HI) test	75/sample/subtype (≥ 10 samples 65/sample/subtype)
Avian Leukosis Virus Antigen ELISA	100 (≥ 10 samples 75/-)
Infectious Bronchitis (IB) - Ab ELISA (Chicken)	75 (≥ 5 samples 50/-)
Infectious Bursal Disease (Gumboro) - Ab ELISA (Chicken)	75 (≥ 5 samples 50/-)
Mycoplasma synoviae and *Mycoplasma gallisepticum* - Ab ELISA (Chicken/Turkey)	200 (≥ 5 samples 140/-)
Newcastle Disease - Haemagglutination inhibition (HI) test	60/sample (≥ 10 samples 50/-)
Newcastle Disease - Ab ELISA	75 (≥ 5 samples 50/-)

Urgent testing (upon request from customer)	
AHS, EIA (ELISA), Dourine, Glanders, Piroplasmosis (IFAT,cELISA), EHV1&4, Strangles, Neospora, Anaplamosis, West Nile (IgM& IgG)	Additional cost of AED 100/- per sample, per test (only on working days)
EIA (AGID)	Additional cost of AED 100/- per sample, per test (only on working days)
Brucellosis (Ab cELISA & CFT)	Additional cost of AED 100/- per sample, per test (only on working days)

Virology

Virus Isolation - Avian ***** Swabs must be taken in labelled tubes with viral transport medium, which can be collected from CVRL.	
Avian paramyxovirus -1 (Newcastle disease virus)	150
Herpes virus	150
Influenza A virus (All avian Influenza strains including H5, H7 & H9)	150
Pox virus (Houbarapox, Falconpox, Pigeonpox)	150
West Nile Virus (WNV)	200
Virus Isolation-Others ***** Swabs must be taken in labelled tubes with viral transport medium, which can be collected from CVRL.	
African Horse Sickness (AHS) virus	200
Bluetongue virus (BTV)	200
Bovine herpes virus - 1 (Infectious bovine rhinotracheitis - IBR)	200
Bovine Viral Diarrhoea virus (BVDV)	200
Camelpox virus	150
Canine distemper virus (CDV)	200
Canine herpes virus (CHV)	200
Encephalomyocarditis virus (EMCV)	180
Equine Arteritis virus (EAV)	500
Equine Herpes virus (EHV)	180
Equine Influenza virus (EI)	250
Equine Rhinitis A & B virus	180
Foot and Mouth Disease (FMD) virus	200
Feline Herpes Virus	200
MERS Coronavirus (MERS CoV)	200
Peste des Petits Ruminants (PPR) Virus	200
Sheeppox virus/ Goatpox virus	200
West Nile Virus (WNV)	200
Immunofluorescence Test (IFT) Swabs (without any transport medium) must be labelled and transported immediately to CVRL	

Bovine herpesvirus - 1 (Infectious Bovine Rhinotracheitis - IBR)	110
Bovine Respiratory Syncytial Virus (BRSV)	110
Bovine Viral Diarrhea Virus (BVDV)	110
Canine distemper virus (CDV)	110
Canine Herpes (CHV)	110
Equine Herpes virus-1 (EHV)	110
Feline herpesvirus (FHV)	110
Rabies	200
Antigen ELISA	
Avian Leukosis - Ag ELISA (Transport media for cloacal swabs can be collected from CVRL)	150 (≥ 10 samples 75/-)
Hepatitis B (HBsAg) - Ag test	150
Influenza A (Rapid Immunochromatographic Assay)	100
Parvo Virus Antigen test for Dog, Cat and Mink (Rapid Immunochromatographic assay)	140
PPR Antigen Capture ELISA	250
Rota Virus Antigen test (Rapid Immunochromatographic assay)	60

Additional tests	**Price (AED)**
Diagnosis of highly infectious diseases (BSL-3)	500
Semen Analysis	110
Miscellaneous	
Administration fee for reissuance of historical results / Document correction (if applicable)	100/result
Courier charges for external lab services	20% of the total amount
Cremation certificate	100/report
Vaccines	**Price (AED)**
Bacterial Vaccines	
Autovaccine with adjuvants - for inquiries, email cvrl@cvrl.ae	-
Clostridium perfringens A hyperimmune serum (Ducabulin) For purchase enquires, contact Dubai Camel Hospital*	
Corynebacterium pseudotuberculosis - CLA (Caseous lymphadenitis) - PLD vaccine	10/ml
Oral Vaccine - for inquiries, email cvrl@cvrl.ae	-
Viral vaccines	
African Horse Sickness Vaccine (inactivated) - 9 serotypes Exclusive distributor Lillidale Animal Health** [Except Kenya]	
Camelpox vaccine (Ducapox) (attenuated) Exclusive distributor Lillidale Animal Health** [Except for UAE and Oman] Exclusive distributor Al Bashayer Vet.***[For UAE and Oman]	
DuPa (Avian paramyxovirus type 1, inactivated) vaccine Exclusive distributor Lillidale Animal Health**	

Falconpox vaccine (attenuated) Exclusive distributor Lillidale Animal Health**	
Houbarapox vaccine (attenuated) Exclusive distributor Lillidale Animal Health**	
Papilloma viral vaccine - for inquiries, email cvrl@cvrl.ae	-
Biojuice (Natural compartment 1 fluid)	
For purchase enquires, contact Dubai Camel Hospital*	
For purchase enquires *Dubai Camel Hospital; Tel: +971-4-832 5550; Email: info@dch.ae **Lillidale Animal Health, Pig Oak Farm, Holt, Wimborne, Dorset, England; Email: enquiries@lillidale.co.uk Tel: 0044 1202 848456; website: www.lillidale.co.uk ***Al Bashayer Vet; Email: albashayer.dubai@gmail.com	
Immunization in Dromedaries	**Price (AED)**
Animal/immunogen	7350
Books	**Price (AED)**
Camel Haematology (1990)	250
Infectious Diseases in Camelids (Arabic)	Free of charge
Camelid Infectious Disorders (2014)	400
A Pictural Guide to Parasites of Old World Camelids (2021)	150
Molecular Biology	
Please refer www.mbg.ae for tests and service charges	

Taxidermy

(Mounting prices for animals supplied by customer)

Price includes tanning, mounting and normal platforms.
Special positions, extra platforms and open-mouthed mounts will be priced accordingly.

Birds We charge 20% extra for birds in special positions with open wing	**Price (AED)**
Falcon	2,000 - 4,000
Eagle, Vulture	3,000 - 8,000
Buzzard, Hawk	2,000
Chicken, Pheasant	2,500 - 4,000
Duck, Gull	2,000
Flamingo, Crane	3,000 - 6,000
Houbara bustard	2,500
Stone Curlew	1,500
Partridge	1,500
Parrot	2,000 - 4,000
Peacock	4,000, Open tail 12,000
Pigeon	2,000
Songbirds, Canary Birds, Budgies	1,500
Paw print (in sand or clay)small animal (up to 60kg)	100
Paw print (in sand or clay) big animal	150
Animal name on paw print	50

Mammals	**Price (AED)** **(Shoulder mounts)**	**Price (AED)** **(Life - size)**
Fox	2,000	6,000 - 10,000
Dog	2,000 - 5,000	5,000 - 35,000
Hare, Rabbit	800	3,500 - 6,000
Small Gazelles	2,500	15,000
Impala, Gerenuk, Blackbuck	5,000	25,000
Barbary Sheep	10,000	30,000
Ibex	9,000	15,000
Arabian Oryx	4,500	25,000 - 35,000
Lesser Kudu	10,000	30,000
Zebra, Greater Kudu	20,000	80,000
Bongo, Cattle	20,000	200,000
Horse	35,000	200,000 - 300,000
Camel	35,000	300,000 - 400.000

Mammals	**Price (AED)** **(Shoulder mounts)**	**Price (AED)** **(Life - size)**
Giraffe	Half neck 35,000	300,000 - 600,000
Serval Cat, Wild Cat	1,500	12,000 - 15,000
Cheetah	3,000	18,000 - 25,000
Lion, Tiger	5,000	45,000
Leopard, Jaguar	4,000	35,000
Cat (domestic pet)	2,000	6,000 - 15,000
***** TAT (Working days) is based on the animal's size, condition, and waiting list status. We also offer: Horns and Shields, Skulls, Skeletons, Fish, Reptiles, Amphibians, Liquid conservation, Restoration, Replicas and Biological models (Prices on request).		

Complete Test Profile For Pet Travel and Avian Export

*All prices are subject to 5% VAT

AGENT	TEST METHOD	SERVICE CHARGE (AED)
Avian Influenza Type A virus (including H5, H7, H9)	Virus isolation	150
	Haemagglutination Inhibition Test (HI)	75/sample/subtype ≥ 10 samples; 65/sample/subtype
Avian Influenza Type A virus (including H5, H7, H9) and Newcastle Disease Virus (APMV type-1)	Virus isolation	250
Babesia gibsoni	Blood smear	50
Babesia canis	Blood smear	50
	Indirect fluorescent antibody test (IFAT)	400
Brucella canis	Indirect fluorescent antibody test (IFAT)	400
	Rapid Slide Agglutination Test (RSAT)	400
Dirofilaria immitis (Canine and Feline)	Blood smear	50
	Microfiltration test	75
	KNOTT test	50
	ELISA	250
Ehrlichia canis	Blood smear	50
	Indirect fluorescent antibody test (IFAT)	400
Leishmania infantum	Blood smear	50
	Indirect fluorescent antibody test (IFAT)	400
Leptospira interrogans sv Canicola	Microscopic agglutination test (MAT)	150
Newcastle Disease Virus (APMV type-1)	Virus isolation	150
	Haemagglutination Inhibition Test (HI)	60/sample; 50/10 samples
Rabies Detail:(www.cvrl.ae/rabiesantibodytest.php)	Fluorescent Antibody Virus Neutralization Test (FAVN)	750
Trypanosoma evansi	Blood smear	50
	Haematocrit Test	50
	Card Agglutination Test for Trypanosomiasis (CATT)	50