Shrikrishna Isloor, Anthony R. Fooks, R. Sharada and S. Abdul Rahman

Status of OIE Twinning Programme on – Strengthening diagnosis of rabies in India

OIE twinned KVAFSU-CVA Rabies Diagnosis Laboratory ,
Dept.of Microbiology, Veterinary college, KVAFSU,
Hebbal, Bengaluru

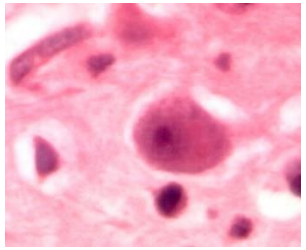
Where are we in India .....

SAARC

Veterinary College, Bengaluru

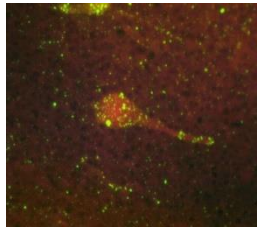
Progress in Diagnostic systems for animal Rabies – Veterinary college, Bangalore, India

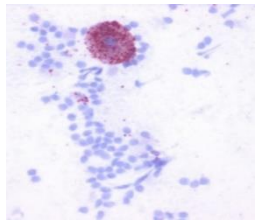
1. **Prior to 2013:** Seller's staining only

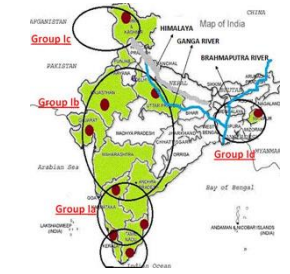


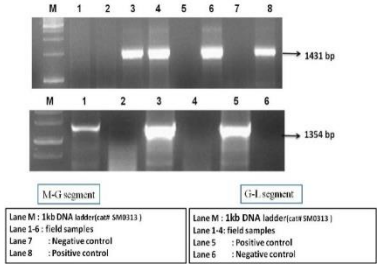
2. **KVAFSU-CVA Rabies Diagnosis Lab. 2013:**

Virus

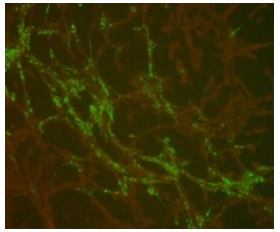








Vaccinal antibodies



3. OIE Twinning programme - 2016: Strengthening of diagnosis of rabies in India

KVAFSU- CVA - CRUCELL RABIES DIAGNOSTIC LABORATORY

OIE LABORATORY TWINNING PROJECT
2016 - 2019

Animal & Plant Health Agency

CDC Centers for Disease Control and Prevention

Animal and Plant Health Agency (APHA)
United Kingdom

Centers for Disease Control and Prevention (CDC), Atlanta, GA, USA

The World organization for animal Health (OIE) Laboratory Twinning Programme

WORLD ORGANISATION FOR ANIMAL HEALTH

- A **global programme**
- OIE reference centres build expertise for important animal diseases
- Priority regions identified through twinning with national laboratories
- **Improve the global capacity for disease detection, prevention and control** through better governance of veterinary services.

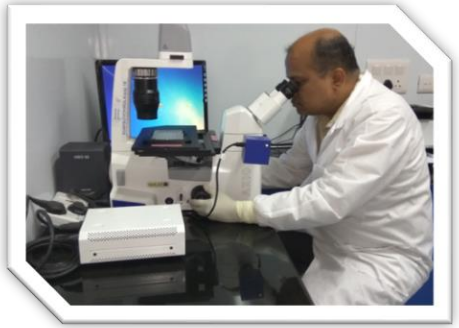
Specific mandate of OIE twinning:

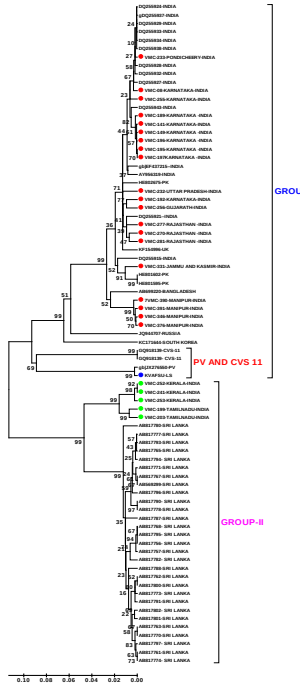
- **Training in all Quality assurance systems**

- **Improving surveillance in rabies in animals-**

  Knowledge transfer and training

  - ✓ Antigen detection methods
  - ✓ Molecular diagnostic methods





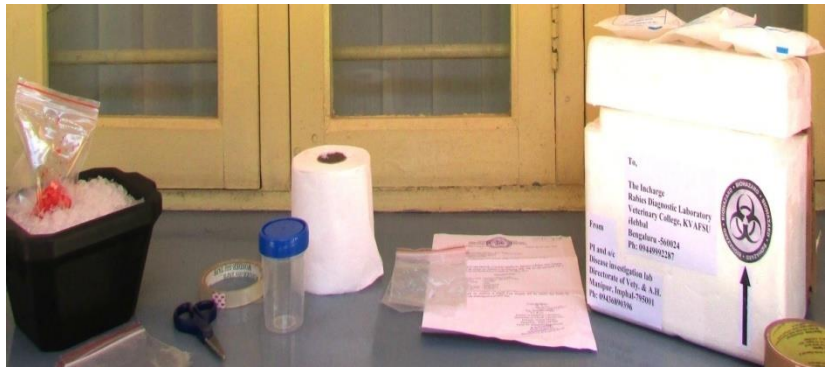
- **Proficiency testing**

- **Virus characterization and molecular epidemiology**

OIE TRAININGS/ WORKSHOPS

First Workshop

Sample receipt/collection / registration / storage and recording



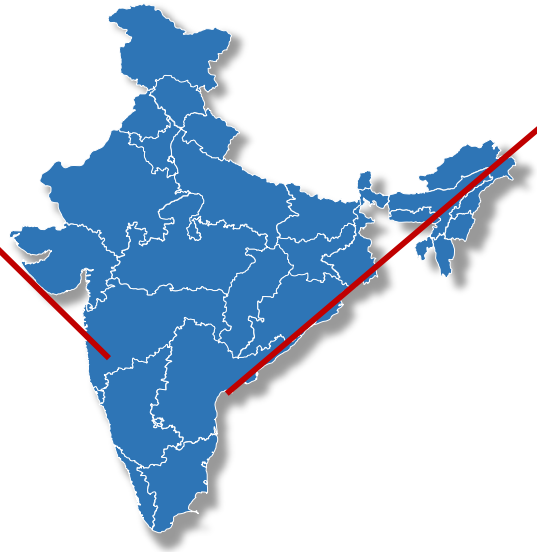
Second workshop

dRIT-DFA-Nested PCR training

Fourth workshop

Brain sample collection : Conventional V/s Occipital foramen approach

Rabies diagnosis workshops conducted in other states of India



Bidar, Karnataka

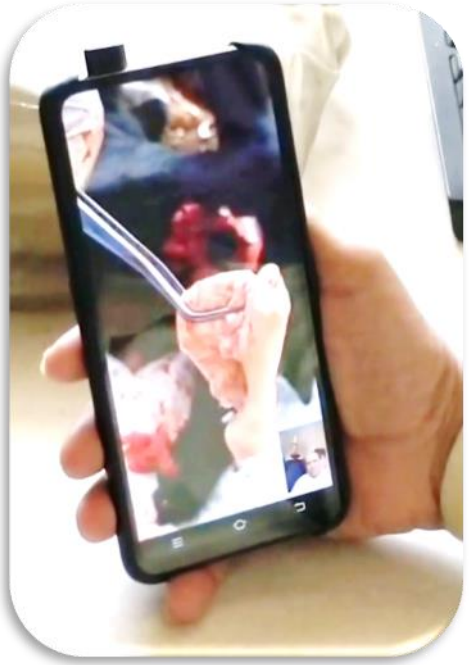
Theerthalli,
Shivamogga, Karnataka

Field diagnosis by trainees…

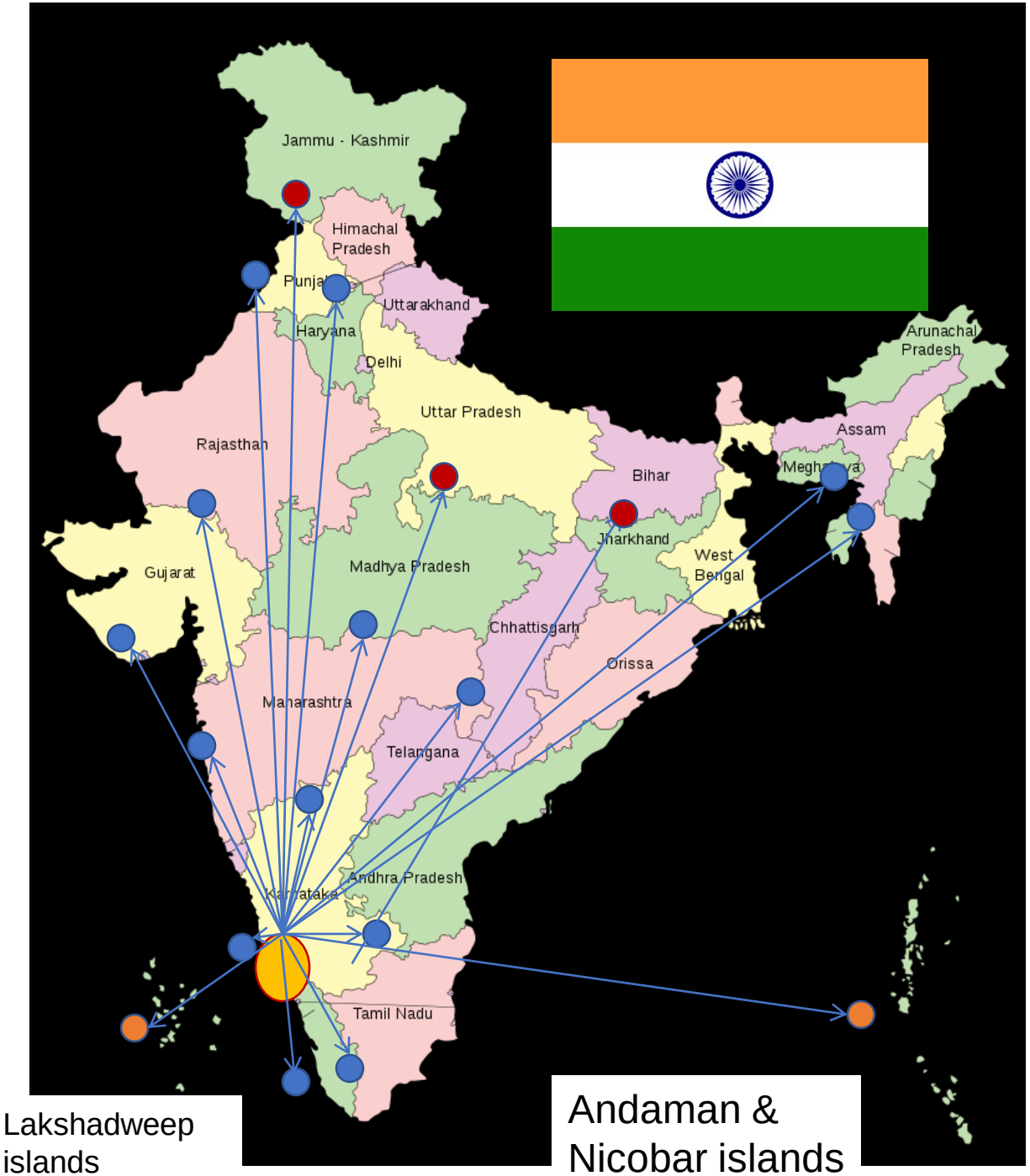
Bangalore Rural

Guwahati, Assam

Impact of Social Media – Brain sample collection: 2019



Network (animal rabies diagnosis in India)



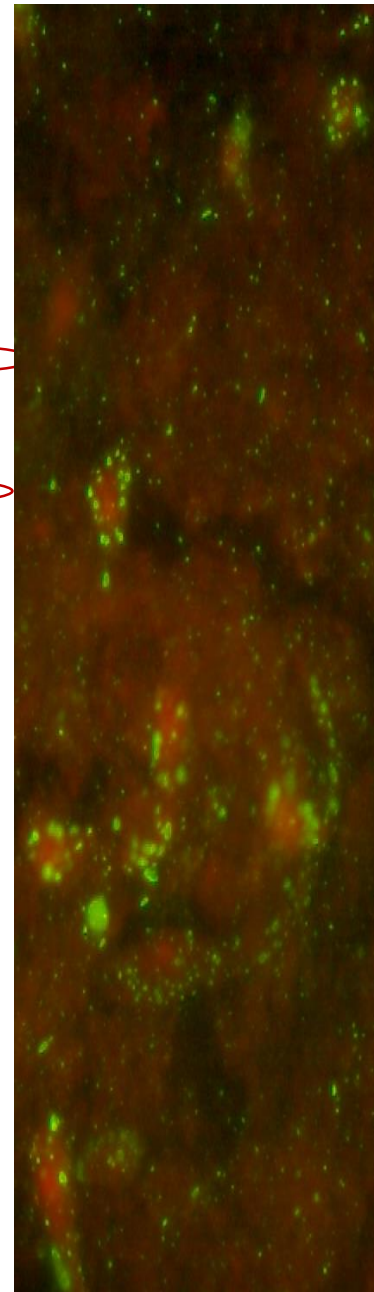
Outcome:

- **Training:** 13 states
- **Samples:** 15 states & 2 UTs.

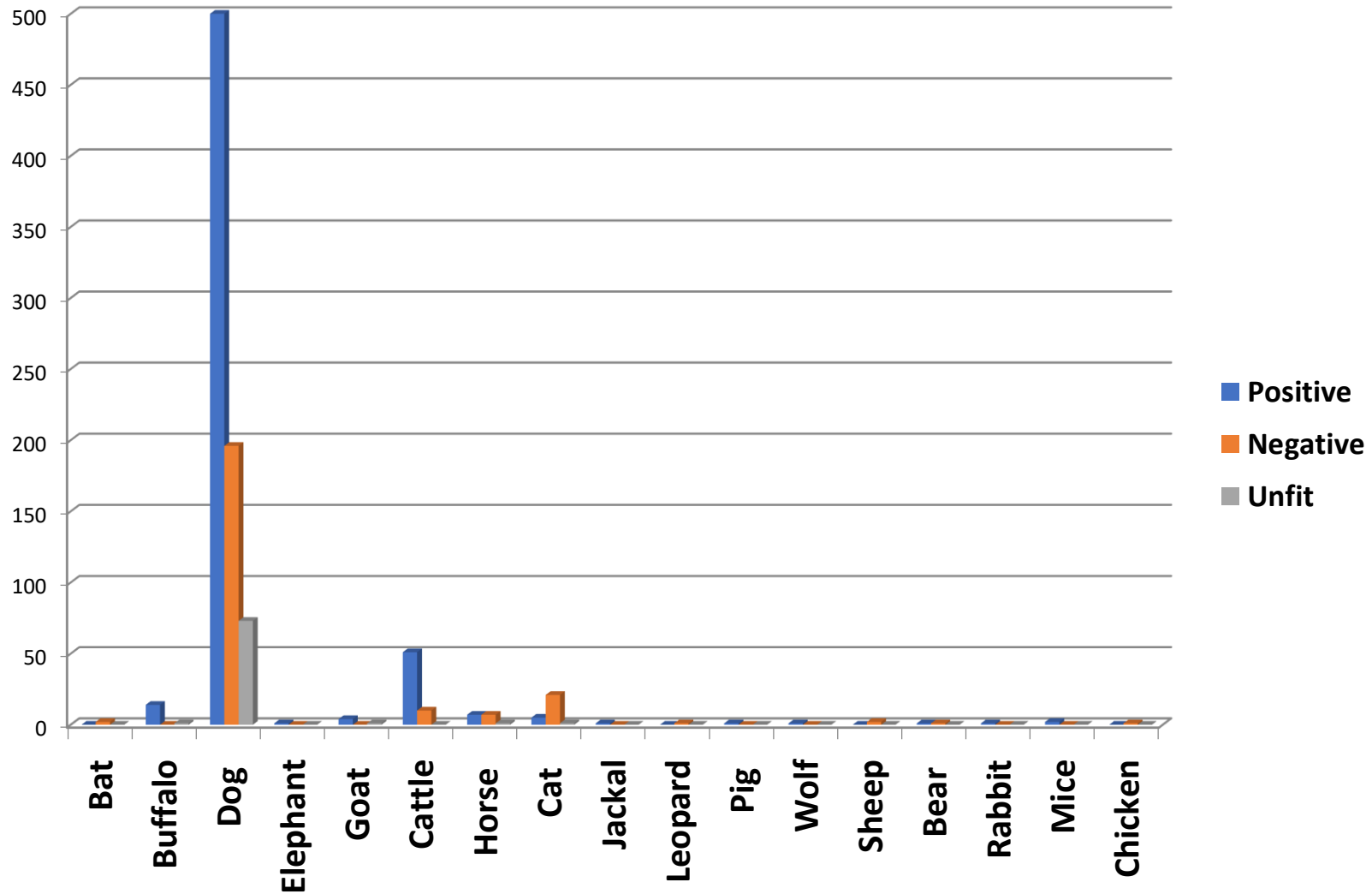
DFA based detection of rabies viral antigen in animals: Jan 2012 to 31 May 2019

State / Species	Andhra Pradesh	ASSAM	Bihar	Gujarat	HP	Haryana	J &K	Karnataka	Kerala	Maharashtra	Manipur	Pondicherry	Punjab	Rajasthan	Tamil Nadu	LD	Madhya Pradesh	AN	Uttar Pradesh	Total	Positive	Negative	Unfit
Bat	-	-	-	-		-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	0	2	0
Buffalo	-	-	-	3	2	-	1	1	-	-	-	-	6	-	-	-	-	-	2	15	14	0	1
Dog	**-**	**3**	**-**	**-**	**2**	**-**	**-**	**618**	**45**	**9**	**35**	**1**	**6**	**16**	**24**	**-**	**-**	**8**	**2**	**769**	**500**	**196**	**73**
Elephant		-	1		-	-			--							-	-	-		1	1	0	0
Goat	-	-	-	-	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-	4	4	0	1
Cattle	1	1	-	4	3	2	-	41	4	-	-	-	4	-	-	-	-	-	1	61	51	10	0
Horse	-	-	-	-	-	-	-	13	-	-	-	-	1	-	1	-	-	-	-	15	7	7	1
Cat	-	-	-	1	-	-	-	14	1	-	1	-	-	-	-	10	-	-	-	27	5	21	1
Jackal	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	1	0	0
Leopard	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	0	1	0
Pig	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	1	0	0
Wolf	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0
Sheep	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	0	2	0
Bear	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	1	1	0
Rabbit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	0	0
Mice	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2	2	0	0
Chicken	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	0	1	0
Total	**1**	**4**	**1**	**8**	**7**	**2**	**1**	**698**	**51**	**9**	**36**	**1**	**19**	**16**	**25**	**10**	**4**	**8**	**5**	**906**	**589**	**241**	**76**
Positive	1	3	1	4	7	2	1	482	18	8	20	1	17	0	16	0	3	0	5	589	-	-	-
Negative	0	1	0	2	0	0	0	208	0	1	10	0	0	0	0	10	1	8	0	241	-	-	-
Unfit	0	0	0	2	0	0	0	8	34	0	6	0	2	16	9	0	0	0	0	76	-	-	-

80 % of brain samples tested are from dogs; 66% of dog samples were positives

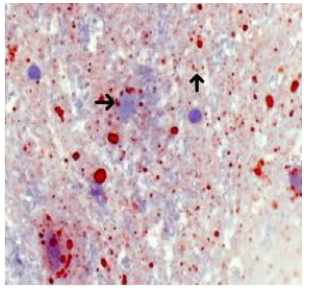


DFA based detection of rabies viral antigen in animals: Jan 2012 to 31 May 2019

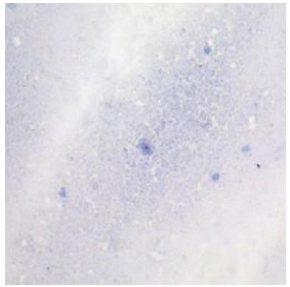


DFA and dRIT correlated well

Sl. No.	Host	Total No. of samples collected					
		No of samples collected	Positive by DFA	Positive by dRIT	Positive by RT-PCR	No of samples unfit for DFA/dRIT	No. of negative samples
1.	Dogs	161	101	101	133	32	28
1.	Cattle	19	14	14	14	1	5
1.	Buffalo	9	9	9	9	-	-
1.	Horses	4	2	2	2	-	2
1.	Cats	3	-	-	2	2	1
1.	Pig	1	1	1	1	-	-
1.	Goat	1	-	-	1	1	-
1.	Jackal	1	1	1	1	-	-
1.	Wolf	1	1	1	1	-	-
	TOTAL	200	129	129	164	36	36



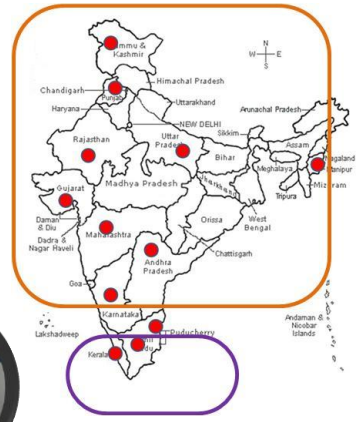
Positive



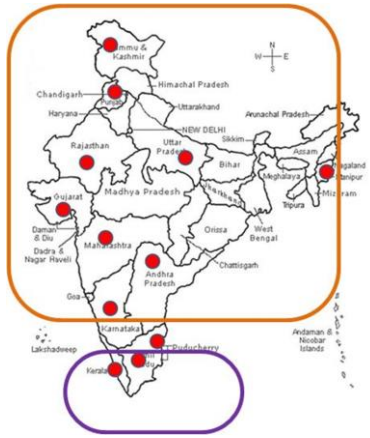
Negative

Molecular characterization:

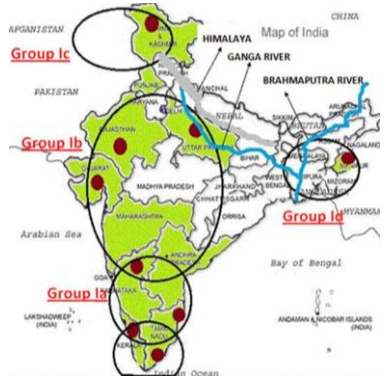
Conventional PCR: N,G gene PCR didn't reveal genetic diversity



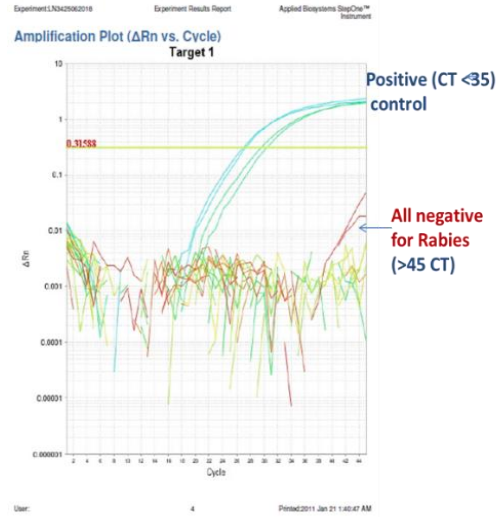
G- Gene



N- Gene

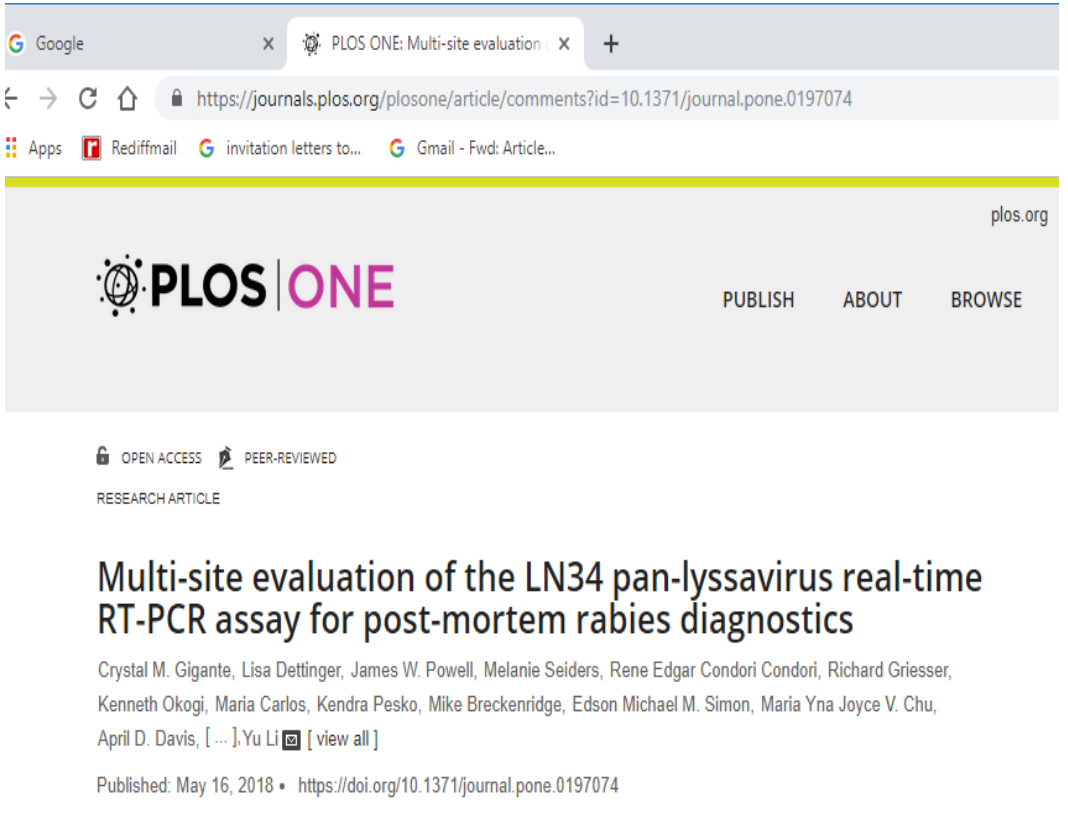


G-L intergenic sequence



Real-Time PCR: LN 34 assay

- **A multi-site evaluation of the LN34 assay in 14 laboratories.** A total of 2,978 samples (1,049 DFA positive) from the Americas, Europe, Africa and Asia were tested.
- High sensitivity (99.90%), specificity (99.68%) compared to DFA
- **Detects viral RNA in fresh, frozen, archived, deteriorated and formalin-fixed brain tissue.** (Crystal *et al.,* 2018)



Review Article
Journal of Veterinary Medicine and Research

First Case Report of Rabies in a Wolf (Canis Lupus Pallipes) from India

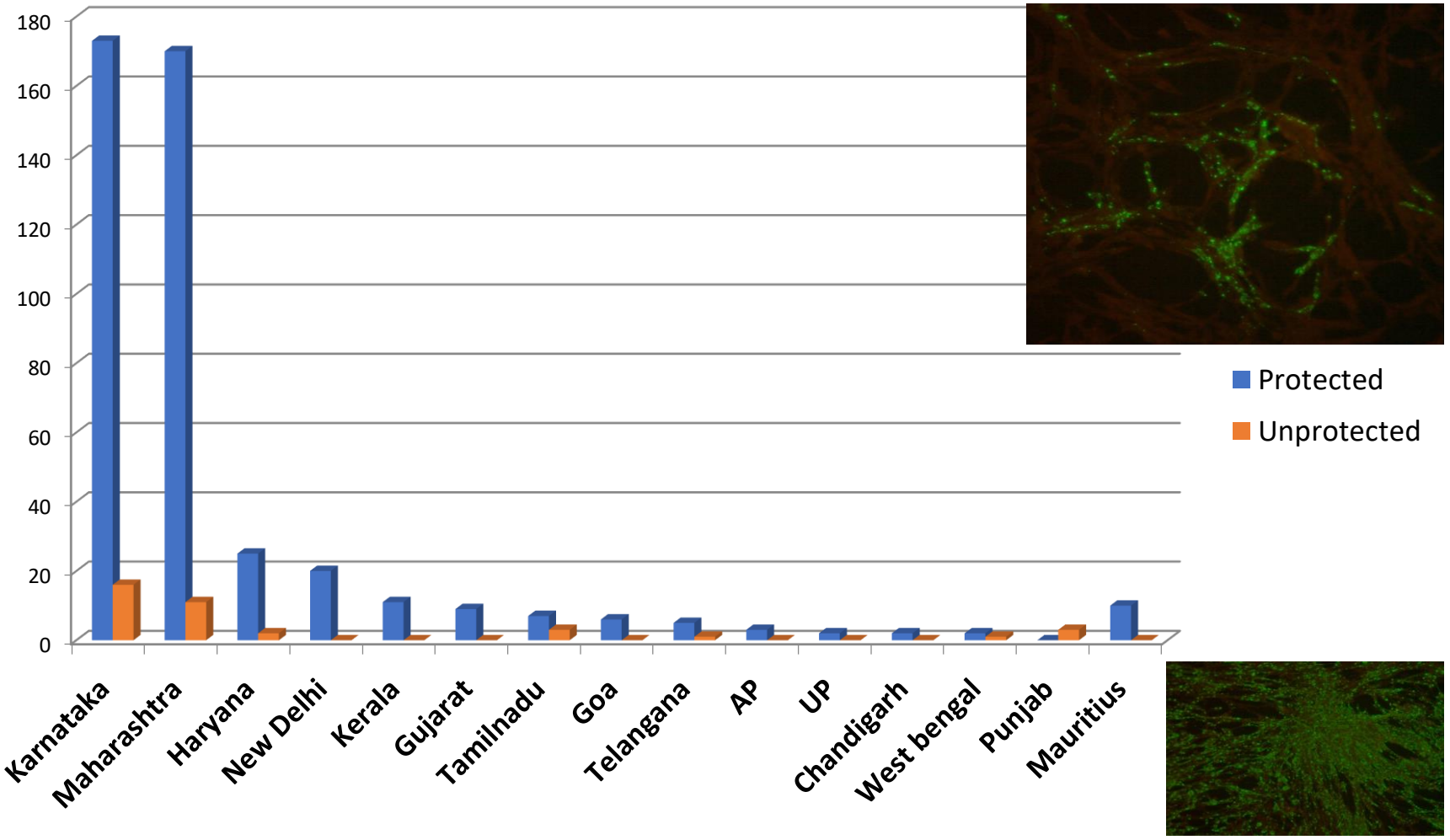
Isloor S[1], Marissen WE[2], Veeresh BH[1], NithinPrabhu K[1], Kuzmin IV[3], Rupprecht CE[3,4]* Satyanarayana ML[1], Deepti B R[1], Sharada R[1], Neelufer MS[1], Yathiraj S[1] and Abdul Rahman S[1]

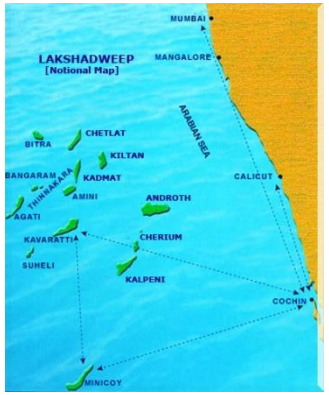
[1]*CVA-Crucell-KVAFSU Rabies Diagnostic Laboratory, Animal and Fisheries Sciences University, India*

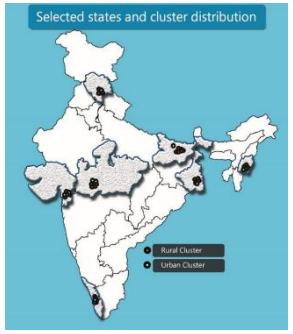
[2]*Departments of Microbiology and Immunology, University of Oklahoma Health Sciences Center, USA*

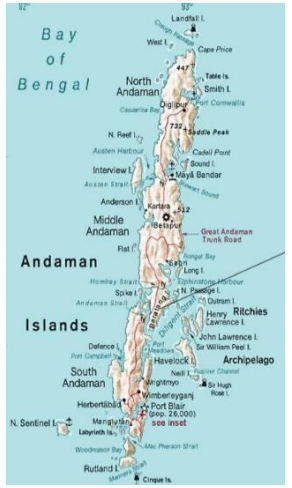
[3]*Global Alliance for Rabies control, Ross University School of Veterinary Medicine, USA*

RFFIT of Dogs for international transportation (Jan. 2012 to May 2019)









WHO-APCRI survey on Rabies in India- Island survey in 2017

For the first time cat brain samples from Lakshadweep and dog brain samples from Andaman tested and found negative so far

POST GRADUATE RESEARCH SUPPORT

2013	➢ Molecular characterization: RT-PCR in animals
2014	➢ N gene –Molecular epidemiology and Development of LAMP ➢ Status of antirabies vaccinal antibodies in dogs
2015	➢ Recombinant G protein for seromonitoring of vaccinal antibodies in dogs ➢ Genetic Variability of G-L Intergenic region sequences of Indian RABV
2016	➢ Development of RFFIT for assessment of vaccinal efficacy in dogs
2017	➢ Comparative Evaluation Of LFA, LAMP with DFA and modified DFA
2018	➢ Development of in-house ELISA for vaccinal antibodies

…….with these activities, looking forward to be associated with the SAARC region in "Strengthening diagnosis of rabies in animals, its' prevention and control" .

Thanks to CVA - KVAFSU- OIE and WHO