List of ten best publications highlighting the important discoveries/contributions

#	Year	Published paper	Impact factor	Citation
1	2019	***Yadav PD,** Shete AM, Kumar GA, Sarkale P, Sahay RR, Radhakrishnan C, et al. Nipah Virus Sequences from Humans and Bats during Nipah Outbreak, Kerala, India, 2018. Emerg Infect Dis. 2019 May; 25(5):1003-1006. DOI: 10.3201/eid2505.181076. PMID: 31002049; PMCID: PMC6478210.	16.126	67
2	2020	Agarwal A, Mukherjee A, Kumar G, Chatterjee P, [……] **Yadav PD** et al. Convalescent plasma in the management of moderate covid-19 in adults in India: open label phase II multicentre randomised controlled trial (PLACID Trial). BMJ. 2020 Oct 22; 371:m3939. doi: 10.1136/bmj.m3939. Erratum in: BMJ. 2020 Nov 3; 371:m4232. PMID: 33093056; PMCID: PMC7578662.	96.216	754
3	2021	***Yadav PD,** Ella R, Kumar S. et al. Immunogenicity and protective efficacy of inactivated SARS-CoV-2 vaccine candidate, BBV152 in rhesus macaques. Nat Commun. 12, 1386 (2021). DOI: https://doi.org/10.1038/s41467-021-21639-w	17.694	79
4	2021	Ella R, *Vadrevu KM, Jogdand H, Prasad S, Reddy S, Sarangi V, Ganneru B, Sapkal G, **Yadav PD,** Abraham P, Panda S, Gupta N, Reddy P, Verma S, Kumar Rai S, Singh C, Redkar SV, Gillurkar CS, Kushwaha JS, Mohapatra S, Rao V, Guleria R, Ella K, Bhargava B. Safety and immunogenicity of an inactivated SARS-CoV-2 vaccine, BBV152: a double-blind, randomised, phase 1 trial. Lancet Infect Dis. 2021 Jan 21:S1473-3099(20)30942-7. DOI: 10.1016/S1473-3099(20)30942-7. Epub ahead of print. PMID: 33485468; PMCID: PMC7825810.	71.421	397
5	2021	Ella R, Reddy S, Jogdand H, Sarangi V, Ganneru B, Prasad S, Das D, Raju D, Praturi U, Sapkal G, **Yadav PD.** [...], *Vadrevu KM et al. Safety and immunogenicity of an inactivated SARS-CoV-2 vaccine, BBV152: interim results from a double-blind, randomised, multicentre, phase 2 trial, and 3-month follow-up of a double-blind, randomised phase 1 trial. Lancet Infect Dis. 2021 Mar 8.DOI: https://doi.org/10.1016/S1473-3099(21)00070-0.PMID:33705727.PMCID:PMC8221739.	71.421	323
6	2021	Ella R, Reddy S, Blackwelder W, Potdar V, **Yadav PD** et al. Efficacy, safety, and lot to lot immunogenicity of an inactivated SARS-CoV-2 vaccine (BBV152): interim results of a double-blind, randomised, controlled phase 3 trial. The Lancet. Published online November 11, 2021.https://doi.org/10.1016/S0140-6736(21)02000-6	202.731	290
7	2021	***Yadav PD**, Sahay RR, Agrawal S, Shete A, Adsul B, Tripathy S, Nyayanit DA, Manrai M, Patil DY, Kumar S, Marwah V. Clinical, immunological and genomic analysis of the post vaccinated SARS-CoV-2 infected cases with Delta derivatives from Maharashtra, India, 2021. Journal of Infection. 2022 Apr 7.	38.637	2
8	2021	***Yadav PD**, Sapkal GN, Ella R, Sahay RR, Nyayanit DA, Patil DY, Deshpande G, Shete AM, Gupta N, Mohan VK, Abraham P. Neutralization of Beta and Delta variant with sera of COVID-19 recovered cases and vaccinees of inactivated COVID-19 vaccine BBV152/Covaxin. J Travel Med. 2021 Oct 11;28(7):taab104. doi: 10.1093/jtm/taab104. PMID: 34230972; PMCID: PMC8344909.	39.914	95
9	2022	**Yadav PD***, Sapkal GN, Sahay RR, Potdar VA, Deshpande GR, Patil DY, Nyayanit DA, Shete AM, Shastri J, Awate P, Malhotra B. Substantial immune	39.914	13

		response in Omicron infected breakthrough and unvaccinated individuals against SARS-CoV-2 variants of concern. Journal of Infection. 2022 May 1;84(5):e80-1.		
10	2022	***Yadav PD**, Reghukumar A, Sahay RR, Sudeep K, Shete AM, Raman A, Pramod VK, Abraham P, Benson R, Sarin SM, Mohandas S. First two cases of Monkeypox virus infection in travellers returned from UAE to India, July 2022. Journal of Infection. 2022 Nov 1;85(5):e145-8.	39.914	28
Cumulative impact factor and citations			**633.988**	**2048**

Highlights of the important discoveries/contributions

1. ***Yadav PD,** Shete AM, Kumar GA, Sarkale P, Sahay RR, Radhakrishnan C, et al. Nipah Virus Sequences from Humans and Bats during Nipah Outbreak, Kerala, India, 2018. Emerg Infect Dis. 2019 May; 25(5):1003-1006. DOI: 10.3201/eid2505.181076. PMID: 31002049; PMCID: PMC6478210.

   Background: Nipah virus (NiV) was first reported from Malaysia in 1999. Additional NiV outbreaks have occurred in Bangladesh and India. NiV is a negative-sense enveloped RNA encoding for 6 genes (nucleocapsid, phosphoprotein, matrix, fusion protein, glycoprotein, and polymerase). Two NiV clades have been proposed: B genotype, predominantly found circulating in Bangladesh, and M genotype in Malaysia and Cambodia. NiV-positive fruit bats (*Pteropusmedius*) were found in West Bengal, Assam, and Haryana states in India, posing a possible source of NiV infection in humans.

   Objective: To isolate the NiV and characterize the human and bat specimens for nipah

   Findings: Two species of bats, *Pteropusmedius* (n = 52) and *Rousettus leschenaulti* (n=12), as well as 5 birds, were trapped from the area near the index case-patient's house. The animals were dissected in the containment laboratory, and organs i.e., lung, spleen/liver, kidney, intestine, brain) were collected. We attempted isolation of nipah virus from 26 specimens from 9 Nipah-confirmed case-patients and 1 NiV-negative patient by processing throat swab, lung tissue, urine, and serum specimens collected during Nipah outbreak from Kozhikode district, Kerala state in May 2018. All human and bat specimens and aNiV isolate were tested by quantitative and nested RT-PCR. We retrieved 4 complete protein encoding regions of NiV using next generation sequencing from a secondary case-patient's throat swab sample (MH396625), lung tissue of a secondary case-patient, and throat swab sample of a recovered case-patient and from a NiV isolate (from a throat swab specimen). In this outbreak, NGS helped identify the circulating NiV in Kerala as B genotype. We found the highest similarity between human NiV complete sequences from Kerala and NiV N gene sequences from Pteropus spp. fruit bats (99.7%–100%), compared with NiV sequences reported from Malaysia, Cambodia, and Bangladesh (85.14%–96.15%). This finding indicates that Pteropus spp. bats were most likely the source for human infection in this outbreak.

2. Agarwal A, Mukherjee A, Kumar G, Chatterjee P, [……] **Yadav PD** et al. Convalescent plasma in the management of moderate covid-19 in adults in India: open label phase II multicentre randomised controlled trial (PLACID Trial). BMJ. 2020 Oct 22; 371:m3939. doi: 10.1136/bmj.m3939. Erratum in: BMJ. 2020 Nov 3; 371:m4232. PMID: 33093056; PMCID: PMC7578662.

Background: Convalescent plasma is a source of antiviral neutralising antibodies. Other immune pathways, such as antibody dependent cellular cytotoxicity, complement activation, or phagocytosis are putative mechanisms through which convalescent plasma might exert its therapeutic effect in patients with covid-19. Here, we have investigated the effectiveness of using convalescent plasma to treat moderate coronavirus disease 2019 (covid-19) in adults in India. A total of 464 adults (≥18 years) admitted to hospital (screened 22 April to 14 July 2020) with confirmed moderate covid-19 (partial pressure of oxygen in arterial blood/ fraction of inspired oxygen (PaO2 /FiO2) ratio between 200 mm Hg and 300 mm Hg or a respiratory rate of more than 24/min with oxygen saturation 93% or less on room air): 235 were assigned to convalescent plasma with best standard of care (intervention arm) and 229 to best standard of care only (control arm). Participants in the intervention arm received two doses of 200 mL convalescent plasma, transfused 24 hours apart. The presence and levels of neutralizing antibodies were not measured a priori; stored samples were assayed at the end of the study.

Objective: To assess the effectiveness of using convalescent plasma to treat moderate coronavirus disease 2019 (covid-19) in adults in India.

Findings: Progression to severe disease or all cause mortality at 28 days after enrolment occurred in 44 (19%) participants in the intervention arm and 41 (18%) in the control arm (risk difference 0.008 (95% confidence interval −0.062 to 0.078); risk ratio 1.04, 95% confidence interval 0.71 to 1.54). Convalescent plasma was not associated with a reduction in progression to severe covid-19 or all cause mortality. This trial has high generalizability and approximates convalescent plasma use in real life settings with limited laboratory capacity. A priori measurement of neutralizing antibody titres in donors and participants might further clarify the role of convalescent plasma in the management of covid-19.

3. *__Yadav PD,__ Ella R, Kumar S. et al. Immunogenicity and protective efficacy of inactivated SARS-CoV-2 vaccine candidate, BBV152 in rhesus macaques. Nat Commun. 12, 1386 (2021). DOI: https://doi.org/10.1038/s41467-021-21639-w

Background: Inactivated viruses have been traditionally used for vaccine development and such vaccines have been found to be safe and effective for the prevention of many diseases. ICMR partnered with Bharat Biotech International Limited to develop an inactivated vaccine for SARS CoV-2. Three whole virion inactivated vaccine candidates BBV152A[3µg + Aluminium hydroxide (Algel)-Imidazoquinoline (IMDG)], BBV152B (6µg+Algel-IMDG) and BBV152C (6µg+Algel) were developed by Bharat Biotech International Limited, Hyderabad in collaboration with ICMR-National Institute of Virology, Pune using β-propiolactone (BPL) inactivation method. The BBV152 vaccine candidate along with aluminium hydroxide adjuvant alone or with aluminum hydroxide chemisorbed with imidazoquinoline was found to be immunogenic and safe.

Objective:

- To assess the immunogenicity and protective efficacy of the vaccine candidate in rhesus macaques

Findings: Twenty macaques were divided into four groups of five animals each. One group was administered a placebo, while three groups were immunized with three different vaccine candidates of BBV152 at 0 and 14 days. All the macaques were challenged with SARS-CoV-2 fourteen days after the second dose. The protective response was observed with increasing SARS-CoV-2 specific IgG and neutralizing antibody titers from 3rd-week post-immunization. Viral clearance was observed from bronchoalveolar lavage fluid, nasal swab, throat swab and lung tissues at 7 days post-infection in the vaccinated groups. No evidence of pneumonia was observed by histopathological examination in vaccinated groups, unlike the placebo group which exhibited interstitial pneumonia and localization of viral antigen in the alveolar epithelium and macrophages by immunohistochemistry. This vaccine candidate BBV152 has completed Phase I/II (NCT04471519) clinical trials in India and is presently in phase III, data of this study substantiates the immunogenicity and protective efficacy of the vaccine candidates.

4. Ella R, *Vadrevu KM, Jogdand H, Prasad S, Reddy S, Sarangi V, Ganneru B, Sapkal G, **Yadav PD,** Abraham P, Panda S, Gupta N, Reddy P, Verma S, Kumar Rai S, Singh C, Redkar SV, Gillurkar CS, Kushwaha JS, Mohapatra S, Rao V, Guleria R, Ella K, Bhargava B. Safety and immunogenicity of an inactivated SARS-CoV-2 vaccine, BBV152: a double-blind, randomised, phase 1 trial. Lancet Infect Dis. 2021 Jan 21:S1473-3099(20)30942-7. DOI: 10.1016/S1473-3099(20)30942-7.

Background: To mitigate the effects of COVID-19, a vaccine is urgently needed. A whole-virion inactivated SARS-CoV-2 vaccine (BBV152) was formulated with a toll-like receptor 7/8 agonist molecule adsorbed to alum (Algel-IMDG) or alum (Algel).We did a double-blind, multicentre, randomised, controlled phase 1 trial to assess the safety and immunogenicity of BBV152 at 11 hospitals across India. Healthy adults aged 18–55 years who were deemed healthy by the investigator were eligible. Individuals with positive SARS-CoV-2 nucleic acid and/or serology tests were excluded. Participants were randomly assigned to receive either one of three vaccine formulations (3 μg with Algel-IMDG, 6 μg with Algel-IMDG, or 6 μg with Algel) or an Algel only control vaccine group. Two intramuscular doses of vaccines were administered on day 0 (the day of randomisation) and day 14. Primary outcomes were solicited local and systemic reactogenicity events at 2 h and 7 days after vaccination and throughout the full study duration, including serious adverse events. Secondary outcome was seroconversion (at least four-fold increase from baseline) based on wild-type virus neutralisation. Cell-mediated responses were evaluated by intracellular staining and ELISpot. The trial is registered at ClinicalTrials.gov (NCT04471519).

Objective: Assessment of safety and immunogenicity of an Inactivated SARS-CoV-2 Vaccine-BBV152 in Phase 1 Trial

Findings: Between July 13 and 30, 2020, 827 participants were screened, of whom 375 were enrolled. Among the enrolled participants, 100 each were randomly assigned to the three vaccine groups, and 75 were randomly assigned to the control group (Algel only). After both doses, solicited local and systemic adverse reactions were reported by 17 (17%; 95% CI 10·5–26·1) participants in the 3 μg with Algel-IMDG group, 21 (21%; 13·8–30·5) in the 6 μg with Algel-IMDG group, 14 (14%; 8·1–22·7) in the 6 μg with Algel group, and ten (10%; 6·9–23·6) in the Algel-only group. The most common solicited adverse events were injection site pain (17 [5%] of 375 participants), headache (13 [3%]), fatigue (11 [3%]), fever (nine [2%]), and nausea or vomiting (seven [2%]). All solicited adverse events were mild (43 [69%] of 62) or moderate (19 [31%]) and were more frequent after the first dose. One serious adverse event of viral pneumonitis was reported in the 6 μg with Algel group, unrelated to the vaccine. Seroconversion rates (%) were 87·9, 91·9, and 82·8 in the 3 μg with Algel-IMDG, 6 μg with Algel-IMDG, and 6 μg with Algel groups, respectively. CD4+ and CD8+ T-cell responses were detected in a subset of 16 participants from both Algel-IMDG groups. BBV152 led to tolerable safety outcomes and enhanced immune responses. Both Algel-IMDG formulations were selected for phase 2 immunogenicity trials.

5. Ella R, Reddy S, Jogdand H, Sarangi V, Ganneru B, Prasad S, Das D, Raju D, Praturi U, Sapkal G, **Yadav PD.** [...], *Vadrevu KM et al. Safety and immunogenicity of an inactivated SARS-CoV-2 vaccine, BBV152: interim results from a double-blind, randomised, multicentre, phase 2 trial, and 3-month follow-up of a double-blind, randomised phase 1 trial. Lancet Infect Dis. 2021 Mar 8.DOI: https://doi.org/10.1016/S1473-3099(21)00070-.PMID:33705727.PMCID:PMC8221739.

Background: In order to determine the safety and immunogenicity of whole-virion inactivated SARS-CoV-2 vaccine (BBV152), We did a double-blind, randomised, multicentre, phase 2 clinical trial to evaluate the immunogenicity and safety of BBV152 in healthy adults and adolescents (aged 12–65 years) at nine hospitals in India. Participants with positive SARS-CoV-2 nucleic acid and serology tests were excluded. Participants were randomly assigned (1:1) to receive either 3 μg with Algel-IMDG or 6 μg with Algel-IMDG. Two intramuscular doses of vaccine were administered on day 0 and day 28. The primary outcome was SARS-CoV-2 wild-type neutralising antibody titres and seroconversion rates (defined as a post-vaccination titre that was at least four-fold higher than the baseline titre) at 4 weeks after the second dose (day 56), measured by use of the plaque-reduction neutralisation test (PRNT50) and the microneutralisation test (MNT50). The primary outcome was assessed in all participants who had received both doses of the vaccine. Cell-mediated responses were a secondary outcome and were assessed by T-helper-1 (Th1)/Th2 profiling at 2 weeks after the second dose (day 42). Safety was assessed in all participants who received at least one dose of the vaccine. In addition, we report immunogenicity results from a follow-up blood draw collected from phase 1 trial participants at 3 months after they received the second dose (day 104).

Objective: Assessment of safety and immunogenicity of an Inactivated SARS-CoV-2 Vaccine-BBV152 in Phase 2 trial and persistence of immune response in follow up of Phase 1

Findings: Between Sept 5 and 12, 2020, 921 participants were screened, of whom 380 were enrolled and randomly assigned to the 3 μg with Algel-IMDG group (n=190) or 6 μg with Algel-IMDG group (n=190). Geometric mean titres (GMTs; PRNT50) at day 56 were significantly higher in the 6 μg with Algel-IMDG group (197·0) than the 3 μg with Algel-IMDG group (100·9). Seroconversion based on PRNT50 at day 56 was reported in 171 (92·9%) of 184 participants in the 3 μg with Algel-IMDG group and 174 (98·3%) of 177 participants in the 6 μg with Algel-IMDG group. GMTs (MNT50) at day 56 were 92·5 in the 3 μg with Algel-IMDG group and 160·1 in the 6 μg with Algel-IMDG group. Seroconversion based on MNT50 at day 56 was reported in 162 (88·0%) of 184 participants in the 3 μg with Algel-IMDG group and 171 (96·6%) of 177 participants in the 6 μg with Algel-IMDG group. The 3 μg with Algel-IMDG and 6 μg with Algel-IMDG formulations elicited T-cell responses that were biased to a Th1 phenotype at day 42. No significant difference in the proportion of participants who had a solicited local or systemic adverse reaction in the 3 μg with Algel-IMDG group (38 of 190) and the 6 μg with Algel-IMDG group (40 of 190) was observed on days 0–7 and days 28–35; no serious adverse events were reported in the study. From the phase 1 trial, 3-month post-second-dose GMTs (MNT50) were 39·9 in the 3μg with Algel-IMDG group, 69·5 in the 6 μg with Algel-IMDG group, 53·3 in the 6 μg with Algel group, and 20·7 in the Algel alone group. In the phase

1 trial, BBV152 induced high neutralising antibody responses that remained elevated in all participants at 3 months after the second vaccination. In the phase 2 trial, BBV152 showed better reactogenicity and safety outcomes, and enhanced humoral and cell-mediated immune responses compared with the phase 1 trial.

6. Ella R, Reddy S, Blackwelder W, Potdar V, **Yadav PD** et al. Efficacy, safety, and lot to lot immunogenicity of an inactivated SARS-CoV-2 vaccine (BBV152): interim results of a double-blind, randomised, controlled phase 3 trial. The Lancet. Published online November 11, 2021.https://doi.org/10.1016/S0140-6736(21)02000-6

Background: We did a double-blind, randomised, multicentre, phase 3 clinical trial in 25 Indian hospitals to evaluate the efficacy, safety, and immunological lot consistency of BBV152 vaccine. Healthy adults (age 18–98 years) randomised 1:1 using a computer-generated randomisation scheme received two intramuscular doses of vaccine or placebo administered four weeks apart. The primary outcome was laboratory-confirmed symptomatic COVID-19, occurring at least 14 days after the second dose. Secondary outcomes were efficacy in sub-groups for age (18–< 60 years and ≥ 60 years) and in participants with pre-existing stable medical conditions. We also evaluated safety, reactogenicity, and consistency of immune responses for three consecutive manufacturing lots.

Objective: To evaluate the Efficacy, safety, and immunogenicity of BBV152 vaccine under phase 3 trial.

Findings: Between November 16, 2020 and January 7, 2021 we recruited 25,798 participants who were randomized to BBV152 or placebo groups; 24,419 received two doses of BBV152 (n = 12,221) or placebo (n = 12,198). In a case-driven analysis, 130 cases of symptomatic COVID-19 were reported in 16,973 (0·77%) participants with follow-up at least two weeks after the second vaccination; 24 occurred in the vaccine group and 106 in placebo recipients giving an overall vaccine efficacy of 77·8%. Sixteen cases, one vaccinee and 15 placebo recipients, met the severe symptomatic COVID-19 case definition giving a vaccine efficacy of 93·4%. Efficacy against asymptomatic COVID-19 was 63·6%. BBV152 conferred 65·2% protection against the SARS-CoV-2 Variant of Concern, B.1.617.2 (Delta). BBV152 was well tolerated with no clinically or statistically significant differences in the distributions of solicited, unsolicited, or serious adverse events between vaccine and placebo groups. No cases of anaphylaxis or vaccine-related deaths were reported. BBV152 was immunogenic and highly efficacious against symptomatic and asymptomatic COVID-19 variant associated disease, particularly against severe disease in adults.

7. ***Yadav PD**, Sahay RR, Agrawal S, Shete A, Adsul B, Tripathy S, Nyayanit DA, Manrai M, Patil DY, Kumar S, Marwah V. Clinical, immunological and genomic analysis of the post vaccinated SARS-CoV-2 infected cases with Delta derivatives from Maharashtra, India, 2021. Journal of Infection. 2022 Apr 7.

Background: Globally, the breakthrough infection mainly found to occur due to waning immune response post natural infection/vaccination or the immune evasion of the VOCs. India has experienced the devastating second wave of the pandemic with emergence of Delta variant from April 2021. The variant has accounted for major breakthrough and re-infection cases in various countries irrespective of the vaccine platforms. The Maharashtra state found to be the highly affected state with major number of COVID-19 cases recorded during March-June 2021 particularly from Mumbai and Pune cities with the high community transmission. The nationwide study on breakthrough infections post-vaccination in India demonstrated 87% of breakthroughs occurred due to the Delta variant. The higher frequency of breakthrough infections after complete vaccination has raised the question about the effectiveness of vaccine in controlling the SARS-CoV-2 infection specifically against the VOCs. Here, we report the reported from seven hospital sites of Mumbai and Pune, Maharashtra state, India.

Objective: To evaluate clinical, immunological, cytokine and genomic analysis of SARS-CoV-2 infected cases post vaccination with Covaxin/Covishield

Findings: The oro/nasopharyngeal [OP/NP] samples, blood samples were collected from the Covaxin or Covishield vaccinated individuals at the time of SARS-CoV-2 infection (n=448) categorized into four groups: Covaxin (single dose, n=9; CVSD), Covaxin (double dose, n=40, CVDD), Covishield (single dose, n=149, CSSD), and Covishield (double dose, n=240, CSDD) and recovery (n=256) during April to August 2021. Complete SARS-CoV-2 genome (>98%) could be retrieved from 224 samples [CVDD (n=5), CVSD (n=22), and CSDD (n=74), CSSD (n=123)] using next generation sequencing. Majority of the cases characterized with variant Delta & Delta derivatives (AY) & all delta variants belong to clade GK. Delta AY.50 (n=72) was the major SARS-CoV-2 lineage in infected cases followed by Delta B.1.617.2 (n=58) and other delta derivatives. The Delta variant predominated in moderate and severe SARS-CoV-2 cases as compared to the mild cases which also had other variants including B.1, Kappa and Beta. In summary, we report SARS-CoV-2 breakthrough infections predominated by the Delta variant from the western part of India. Most of the cases being mild and all have recovered uneventfully with a very low fatality of 0.4%. The infections were associated with prolonged PCR positivity and low level of the IgG and neutralizing antibody titres at the time of the infection post vaccination, emphasizing the need for the booster dose.

8. **<u>*Yadav PD</u>**, Sapkal GN, Ella R, Sahay RR, Nyayanit DA, Patil DY, Deshpande G, Shete AM, Gupta N, Mohan VK, Abraham P. Neutralization of Beta and Delta variant with sera of COVID-19 recovered cases and vaccinees of inactivated COVID-19 vaccine BBV152/Covaxin. J Travel Med. 2021 Oct 11;28(7):taab104. doi: 10.1093/jtm/taab104. PMID: 34230972; PMCID: PMC8344909.

Background: Various reports have been published on the neutralization efficacies with the sera of the currently available COVID-19 vaccines against Alpha, Beta, Gamma and Dela variants. However, the immune escape of Beta variant has been serious concern for the COVID-19 vaccination programme. Another reason of global concern is the recent emergence and detection of highly transmissible Delta variant from India and various other countries. The neutralization potential of the BBV152 has been already studied with the B.1, Alpha, Zeta and Kappa found to be effective against these variants. Here, we assessed the neutralization of sera from COVID19 recovered cases (n = 20) post 5–20 weeks of infection and vaccinees 28 days after two doses of BBV152 (n = 17) against Beta, Delta variants and compared with prototype B.1.

Objective: To evaluate the neutralization potential of BBV152 vaccine against Beta and Delta variant.

Findings: Geometric mean titre (GMT) for vaccinees sera against B.1, Beta and Delta variants were found to be 187.5, 61.57 and 68.97 respectively. The GMT ratio of B.1 to Beta and Delta variants was 3.0 and 2.7. Similarly, GMT titers in sera of recovered cases against B.1, Beta and Delta variants were 97.8, 29.6 and 21.2 respectively. The GMT ratio of B.1 to Beta and Delta variants was 3.3 and 4.6. Sera of vaccinees and recovered cases had shown a significant reduction in neutralization titre for Beta and Delta variants in comparison to B.1 (P value: < 0.0001). Our study demonstrated that despite a reduction in neutralization titers with BBV152 vaccinees sera against Beta and Delta variants, its neutralization potential is well established.

9. **Yadav PD***., Sapkal G, Sahay RR, Potdar V, Deshpande G, Patil DY, Nyayanit DA, Shete AM, Shastri J, Awate P, Malhotra B, Abraham P. Substantial immune response in Omicron infected breakthrough and unvaccinated individuals against SARS-CoV-2 variants of concerns. 2022. Journal of Infection.DOI:https://doi.org/10.1016/j.jinf.2022.02.005

Background: The recent emergence of highly mutated Omicron variant has been intimidating in terms of sudden rise in the number of cases and escape immunity leading to breakthrough and re-infections cases across the globe. Even with the aggressive vaccinations campaigns in India, the country has observed the third wave of the pandemic. This suggests the waning immune response post vaccination or immune evasion with the Omicron variant. A recent study reported that the COVID-19 recovered cases are 16 times more likely to be reinfected with Omicron than Delta variant. However, the understanding the characteristics of reinfection and correlation with immune response is of much significance.

Objective: To evaluate the immune evasion potential of the Omicron in the individuals with natural infection and/or vaccination.

Findings: We have analyzed the IgG and neutralizing antibodies (NAbs) against B.1, Alpha, Beta, Delta and Omicron variants with the sera of individuals (breakthrough infections after two dose of ChAdOx1 nCoV-19, BNT162b2 mRNA and unvaccinated individuals infected with the Omicron variant. The geometric mean titres (GMTs) of the S1-RBD IgG antibodies in the sera of the ChAdOx1 nCoV-19 [1179] and BNT162b2 mRNA [1383] breakthrough individuals showed no significant difference. The GMTs of neutralizing antibodies of ChAdOx1 nCoV-19 breakthrough individuals showed significant fold-reductions compared to B.1 against Alpha (3.23), Beta (2.38), Delta (3.23) and Omicron (4.31) variants respectively. Similarly, BNT162b2 mRNA breakthrough individuals demonstrated significant fold-reduction in GMTs of 1.52 and 7.41 for Delta and Omicron respectively. In contrary, Alpha variant (9.08) was modestly more resistant to neutralization than Beta (0.3), Delta (0.49) and Omciron (0.22) in the unvaccinated individuals compared to B.1. Our study suggests a 3-fold reduction in the NAb titres in BNT162b2 mRNA breakthrough individuals as compared with ChAdOx1 nCoV-19. Our study demonstrated that the individuals infected with Omicron have significant immune response which could neutralize not only the Omicron but also the other VOCs including most prevalent Delta variant.

10. **<u>*Yadav PD</u>**, Reghukumar A, Sahay RR, Sudeep K, Shete AM, Raman A, Pramod VK, Abraham P, Benson R, Sarin SM, Mohandas S. First two cases of Monkeypox virus infection in a traveler returned from UAE to India, July 2022. Journal of Infection. 2022 Nov 1;85(5):e145-8.

Background: The Monkeypox virus (MPXV), belongs to *Orthopoxvirus* genus and *Poxviridae* family which is endemic in Central and West Africa since 1970and now has been reported from various non-endemic countries in 2022.On 23 July, the World Health Organization declared MPXV as a Public Health Emergency of International Concern (PHEIC) considering the global outbreaks in all the six regions in multiple countries. The cases found to occur mainly due to the imported infections from endemic countries and due to further community transmission.

Objective: Detection and genomic characterization of first two cases of MPXV infection with travel history from United Arab Emirates (UAE) to India

Findings: We report the first two confirmed cases of Monkeypox in foreign returnees from United Arab Emirates who presented with fever, myalgia, and vesicular lesions on the genital area with cervical lymphadenopathy. The oropharyngeal & nasopharyngeal swab, EDTA blood, serum, urine, lesion samples from multiple sites (lesion fluid, lesion roof and lesion base) were collected from both the cases on ninth post onset day of illness. The clinical specimens of both the cases were tested with real time PCR for *Orthopoxvirus,* Monkeypox virus (MPXV), West African clade specific MPXV. The specimens oropharyngeal & nasopharyngeal swab, urine, lesion samples from multiple sites (lesion fluid, lesion roof and lesion base) were tested positive for MPXV. The complete genome sequences obtained from skin lesions of case 1 and 2 showed similarity of 99.91 and 99.96% respectively with MPXV_USA_2022_FL001 West African clade. Phylogenetic analysis revealed that the two cases were infected with Monkeypox virus strain A.2 which belongs to clade IIb.