

12-13 March 2020

Accelerated assessment of the risk of disease enhancement with COVID-19 vaccines

A Coalition for Epidemic Preparedness Innovation (CEPI)/Brighton Collaboration (BC) scientific working meeting

Background

- The Coalition for Epidemic Preparedness and Innovation (CEPI) has funded several programs to develop a vaccine against COVID-19 https://cepi.net/news_cepi/cepi-to-fund-three-programmes-to-develop-vaccines-against-the-novel-coronavirus-ncov-2019/). CEPI has partnered with the Brighton Collaboration (BC) to support the safety assessment of its vaccine candidates via the Safety Platform for Emergency vACines (SPEAC) Project (https://cepi.net/news_cepi/cepi-partners-with-brighton-collaboration-to-support-safety-assessment-of-vaccine-candidates-against-emerging-infectious-diseases/)
- Pre-clinical studies of various SARS vaccine candidates have indicated a risk of enhanced disease after challenge with SARS-CoV in previously immunized animals (mice, NHPs).
- The mechanism of enhancement appears to be linked either with the induction of an inappropriate immune response (Th2 dominance) associated with the accumulation of eosinophils in lung lesions, or with an enhanced lung inflammation associated with the formation of virus-antibody immune complexes and a cytokine storm.
- To better understand and hopefully prevent this phenomenon with COVID-19 vaccine candidates, CEPI and BC are organizing an urgent internal scientific consensus meeting

Final agenda (GMT, London)

Day 1: March. 12, 2020	Total Minutes		
12:00-12:20 GMT	20	1	Preliminaries
12:00-12:10	10	1.1	Welcome & Introductions Richard Hatchett (CEPI) Bob Chen (BC)
12:10-12:15	5	1.2	Scope and objectives of the meeting- Jakob Cramer (CEPI)
12:15-12:20	5	1.3	Videoconference logistics – Angel Honrado (WeDO)
12:20-14:30	130	2	Review of existing animal models of disease enhancement Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology)
12:20-12:40 Talk 12:40-12:45 Q&A	20 5	2.1	Lessons from SARS animal models - relevance for COVID-19 I - Review of SARS animal models: young and old mice, mouse adapted virus, hamsters, NHP and ferret model - Outcomes observed in vaccine studies for SARS in mice, hamster and NHP Kanta Subbarao (U of Melbourne)
12:45-13:05 Talk 13:05-13:10 Q&A	20 5	2.2	Lessons from SARS animal models- relevance for COVID-19 II - SARS hACE2 Tg mice model: immunologic aspects and hypothesis related to eosinophils and/or enhanced pathology - Relevant findings from MERS models Stanley Perlman (U of Iowa)
13:10-13:30 Talk 13:30-13:35 Q&A	20 5	2.3	Mouse model of COVID 19 using hACE2 transgenic mice Qin Chuan (Peking Union Medical College)
13:35-14:30	55	2.4	Drafting considerations on COVID-19 animal models; [DRAFT Q&A] Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology)
14:30-14:35	5	3	Break
14:35-16:45	130	4	Potential implication of IgG mediated pathology for vaccine design: role of antigen, adjuvant and immunological markers. Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford)
14:35-14:55Talk 14:55-15:00 Q&A	20 5	4.1	Structure and function of CoV spike protein Ralph Baric (UNC)
15:00-15:20 Talk 15:20-15:25 Q&A	20 5	4.2	Immunogenicity and neutralizing efficacy of truncated spike antigens Barney Graham (NIH)
15:25-15:45Talk 15:45-15:50 Q&A	20 5	4.3	Which immunological/inflammatory markers should we monitor during a first Phase 1 trial, including impact of adjuvants? Arnaud Didierlaurent (Geneva Centre of Vaccinology)
15:50-16:45	55	4.4	Drafting considerations on COVID-19 immunological markers; [DRAFT Q&A] moderator: Corry Dekker (Stanford/BC)
16:45-17:00	15	5	Summary, Prepare for Day 2 Bob Chen (BC)
END OF OFFICIAL MEETING			

Internal meeting			
		6	Session 2+4 Moderators & Rapporteurs update [DRAFT CONSIDERATIONS]; send to PMO for web posting
19:00 –10:00 +1		7	Audience peer review both docs and submit comments via web-based structured form
09:00-12:00+1		8	Triage comments; Session 2 (Arnaud/PH Lambert); Session 4 (Andrew Pollard)

Day 2: March 13, 2020	Total Minutes		
12:00-12:10	10	5	Preliminaries
12:00-12:10	10	5.1	Welcome & Introductions Bob Chen (BC) and Ángel Honrado (WeDo)
12:10-13:40	90	6	Review draft considerations on COVID-19 animal models
12:10-12:20	10	6.1	Summary draft considerations by moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) [DRAFT SUMMARY]
12:20-13:40	80	6.2	Peer review with web audience Moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology) Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
13:40-13:50	10	7	Break
13:50-15:20	90	8	Review draft considerations on COVID-19 immunological markers
13:50-14:00	10	8.1	Summary draft considerations by moderator Corry Dekker (Stanford/BC) [DRAFT SUMMARY]
14:00-15:20	80	8.2	Peer review with web audience Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford) Pending Confirmation Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
(15:20-16:20)	60	8.3	Optional Additional Discussion
15:20-15:50	30	9	Next Steps: Melanie Saville (CEPI)

Annex 1: times for the teleconference by Time Zone

12-13 March 2020, Teleconference (2 sessions, 5-hour each)

MEETING TIME	TIMEZONE
08:00-13:00	EDT (New York)
07:00-12:00	CDT (Chicago)
05:00-10:00	PDT (San Francisco)
12:00-17:00	GMT (London)
13:00-18:00	CET (Brussels)
20:00-01:00+1	CST (Beijing)
23:00-04:00+1	AEDT (Melbourne)

Annex 2: Final agenda (EDT, New York)

Day 1: March. 12, 2020	Total Minutes		
8:00-8:20 EDT	20	1	Preliminaries
8:00-8:10	10	1.1	Welcome & Introductions Richard Hatchett (CEPI) Bob Chen (BC)
8:10-8:15	5	1.2	Scope and objectives of the meeting- Jakob Cramer (CEPI)
8:15-8:20	5	1.3	Videoconference logistics – Angel Honrado (WeDO)
8:20-10:30	130	2	Review of existing animal models of disease enhancement Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology)
8:20-8:40 Talk 8:40-8:45 Q&A	20 5	2.1	Lessons from SARS animal models - relevance for COVID-19 I - Review of SARS animal models: young and old mice, mouse adapted virus, hamsters, NHP and ferret model - Outcomes observed in vaccine studies for SARS in mice, hamster and NHP Kanta Subbarao (U of Melbourne)
8:45-9:05 Talk 9:05-9:10 Q&A	20 5	2.2	Lessons from SARS animal models- relevance for COVID-19 II - SARS hACE2 Tg mice model: immunologic aspects and hypothesis related to eosinophils and/or enhanced pathology - Relevant findings from MERS models Stanley Perlman (U of Iowa)
9:10-9:30 Talk 9:30-9:35 Q&A	20 5	2.3	Mouse model of COVID 19 using hACE2 transgenic mice Qin Chuan (Peking Union Medical College)
9:35-10:30	55	2.4	Drafting considerations on COVID-19 animal models; [DRAFT Q&A] Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology)
10:30-10:35	5	3	Break
10:35-12:45	130	4	Potential implication of IgG mediated pathology for vaccine design: role of antigen, adjuvant and immunological markers. Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford)
10:35-10:55 Talk 10:55-11:00 Q&A	20 5	4.1	Structure and function of CoV spike protein Ralph Baric (UNC)
11:00-11:20 Talk 11:20-11:25 Q&A	20 5	4.2	Immunogenicity and neutralizing efficacy of truncated spike antigens Barney Graham (NIH)
11:25-11:45 Talk 11:45-11:50 Q&A	20 5	4.3	Which immunological/inflammatory markers should we monitor during a first Phase 1 trial, including impact of adjuvants? Arnaud Didierlaurent (Geneva Centre of Vaccinology)
11:50-12:45 Talk	55	4.4	Drafting considerations on COVID-19 immunological markers; [DRAFT Q&A] moderator: Corry Dekker (Stanford/BC)
12:45-13:00	15	5	Summary, Prepare for Day 2 Bob Chen (BC)
END OF OFFICIAL MEETING			

Internal meeting			
	120	6	Session 2+4 Moderators & Rapporteurs update [DRAFT Q&A] + [DRAFT SUMMARY]; send to PMO for web posting
15:00 –20:00		7	Audience peer review both docs and submit comments via web-based structured form
05:00-8:00		8	Triage comments; Session 2 (Arnaud/PH Lambert); Session 4 (Andrew Pollard)

Day 2: March 13, 2020	Total Minutes		
8:00-8:10	10	5	Preliminaries
8:00-8:10	10	5.1	Welcome & Introductions Bob Chen (BC) Ángel Honrado
8:10-9:40	90	6	Review draft considerations on COVID-19 animal models
8:10-8:20	10	6.1	Summary draft considerations by moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) [DRAFT SUMMARY]
8:20-9:40	80	6.2	Peer review with web audience Moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology) Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
9:40-9:50	10	7	Break
9:50-11:20	90	8	Review draft considerations on COVID-19 immunological markers
9:50-10:00	10	8.1	Summary draft considerations by moderator Corry Dekker (Stanford/BC) [DRAFT SUMMARY]
10:00-11:20	80	8.2	Peer review with web audience Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford) Pending Confirmation Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
11:20-11:50	30	9	Optional Additional Discussion

Annex 3: Final agenda (CDT, Chicago)

Day 1: March. 12, 2020	Total Minutes		
7:00-7:20 CDT	20	1	Preliminaries
7:00-7:10	10	1.1	Welcome & Introductions Richard Hatchett (CEPI) Bob Chen (BC)
7:10-7:15	5	1.2	Scope and objectives of the meeting- Jakob Cramer (CEPI)
7:15-7:20	5	1.3	Videoconference logistics – Angel Honrado (WeDO)
7:20-9:30	130	2	Review of existing animal models of disease enhancement Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology)
7:20-7:40 Talk 7:40-7:45 Q&A	20 5	2.1	Lessons from SARS animal models - relevance for COVID-19 I - Review of SARS animal models: young and old mice, mouse adapted virus, hamsters, NHP and ferret model - Outcomes observed in vaccine studies for SARS in mice, hamster and NHP Kanta Subbarao (U of Melbourne)
7:45-8:05 Talk 8:05-8:10 Q&A	20 5	2.2	Lessons from SARS animal models- relevance for COVID-19 II - SARS hACE2 Tg mice model: immunologic aspects and hypothesis related to eosinophils and/or enhanced pathology - Relevant findings from MERS models Stanley Perlman (U of Iowa)
8:10-8:30 Talk 8:30-8:35 Q&A	20 5	2.3	Mouse model of COVID 19 using hACE2 transgenic mice Qin Chuan (Peking Union Medical College)
8:35-9:30	55	2.4	Drafting considerations on COVID-19 animal models; [DRAFT Q&A] Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology)
9:30-9:35	5	3	Break
9:35-11:45	130	4	Potential implication of IgG mediated pathology for vaccine design: role of antigen, adjuvant and immunological markers. Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford)
9:35-9:55 Talk 9:55-10:00 Q&A	20 5	4.1	Structure and function of CoV spike protein Ralph Baric (UNC)
10:00-10:20 Talk 10:20-10:25 Q&A	20 5	4.2	Immunogenicity and neutralizing efficacy of truncated spike antigens Barney Graham (NIH)
10:25-10:45 Talk 10:45-10:50 Q&A	20 5	4.3	Which immunological/inflammatory markers should we monitor during a first Phase 1 trial, including impact of adjuvants? Arnaud Didierlaurent (Geneva Centre of Vaccinology)
10:50-11:45 Talk	55	4.4	Drafting considerations on COVID-19 immunological markers; [DRAFT Q&A] moderator: Corry Dekker (Stanford/BC)
11:45-12:00	15	5	Summary, Prepare for Day 2 Bob Chen (BC)

END OF OFFICIAL MEETING

Internal meeting			
		6	Session 2+4 Moderators & Rapporteurs update [DRAFT Q&A] + [DRAFT SUMMARY]; send to PMO for web posting
14:00 –19:00		7	Audience peer review both docs and submit comments via web-based structured form
04:00-07:00		8	Triage comments; Session 2 (Arnaud/PH Lambert); Session 4 (Andrew Pollard)

Day 2: March 13, 2020	Total Minutes		
7:00-7:10	10	5	Preliminaries
7:00-7:10	10	5.1	Welcome & Introductions Bob Chen (BC) Ángel Honrado
7:10-8:40	90	6	Review draft considerations on COVID-19 animal models
7:10-7:20	10	6.1	Summary draft considerations by moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) [DRAFT SUMMARY]
7:20-8:40	80	6.2	Peer review with web audience Moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology) Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
8:40-8:50	10	7	Break
8:50-10:20	90	8	Review draft considerations on COVID-19 immunological markers
8:50-9:00	10	8.1	Summary draft considerations by moderator Corry Dekker (Stanford/BC) [DRAFT SUMMARY]
9:00-10:20	80	8.2	Peer review with web audience Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford) Pending Confirmation Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
10:20-10:50	30	9	Optional Additional Discussion

Annex 4: Final agenda (PDT, San Francisco)

Day 1: March. 12, 2020	Total Minutes		
5:00-5:20 PDT	20	1	Preliminaries
5:00-5:10	10	1.1	Welcome & Introductions Richard Hatchett (CEPI) Bob Chen (BC)
5:10-5:15	5	1.2	Scope and objectives of the meeting- Jakob Cramer (CEPI)
5:15-5:20	5	1.3	Videoconference logistics – Angel Honrado (WeDO)
5:20-7:30	130	2	Review of existing animal models of disease enhancement Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology)
5:20-5:40 Talk 5:40-5:45 Q&A	20 5	2.1	Lessons from SARS animal models - relevance for COVID-19 I - Review of SARS animal models: young and old mice, mouse adapted virus, hamsters, NHP and ferret model - Outcomes observed in vaccine studies for SARS in mice, hamster and NHP Kanta Subbarao (U of Melbourne)
5:45-6:05 Talk 6:05-6:10 Q&A	20 5	2.2	Lessons from SARS animal models- relevance for COVID-19 II - SARS hACE2 Tg mice model: immunologic aspects and hypothesis related to eosinophils and/or enhanced pathology - Relevant findings from MERS models Stanley Perlman (U of Iowa)
6:10-6:30 Talk 6:30-6:35 Q&A	20 5	2.3	Mouse model of COVID 19 using hACE2 transgenic mice Qin Chuan (Peking Union Medical College)
6:35-7:30	55	2.4	Drafting considerations on COVID-19 animal models; [DRAFT Q&A] Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology)
7:30-7:35	5	3	Break
7:35-9:45	130	4	Potential implication of IgG mediated pathology for vaccine design: role of antigen, adjuvant and immunological markers. Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford)
7:35-7:55 Talk 7:55-8:00 Q&A	20 5	4.1	Structure and function of CoV spike protein Ralph Baric (UNC)
8:00-8:20 Talk 8:20-8:25 Q&A	20 5	4.2	Immunogenicity and neutralizing efficacy of truncated spike antigens Barney Graham (NIH)
8:25-8:45 Talk 8:45-8:50 Q&A	20 5	4.3	Which immunological/inflammatory markers should we monitor during a first Phase 1 trial, including impact of adjuvants? Arnaud Didierlaurent (Geneva Centre of Vaccinology)
8:50-9:45	55	4.4	Drafting considerations on COVID-19 immunological markers; [DRAFT Q&A] moderator: Corry Dekker (Stanford/BC)
9:45-10:00	15	5	Summary, Prepare for Day 2 Bob Chen (BC)
END OF OFFICIAL MEETING			

Internal meeting			
		6	Session 2+4 Moderators & Rapporteurs update [DRAFT Q&A] + [DRAFT SUMMARY]; send to PMO for web posting
12:00 –17:00		7	Audience peer review both docs and submit comments via web-based structured form
02:00+1-05:00		8	Triage comments; Session 2 (Arnaud/PH Lambert); Session 4 (Andrew Pollard)

Day 2: March 13, 2020	Total Minutes		
5:00-5:10	10	5	Preliminaries
5:00-5:10	10	5.1	Welcome & Introductions Bob Chen (BC) Ángel Honrado
5:10-6:40	90	6	Review draft considerations on COVID-19 animal models
5:10-5:20	10	6.1	Summary draft considerations by moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) [DRAFT SUMMARY]
5:20-6:40	80	6.2	Peer review with web audience Moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology) Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
6:40-6:50	10	7	Break
6:50-8:20	90	8	Review draft considerations on COVID-19 immunological markers
6:50-7:00	10	8.1	Summary draft considerations by moderator Corry Dekker (Stanford/BC) [DRAFT SUMMARY]
7:00-8:20	80	8.2	Peer review with web audience Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford) Pending Confirmation Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
8:20-8:50	30	9	Optional Additional Discussion

Annex 5: Final agenda (CST, Beijing)

Day 1: March. 12, 2020	Total Minutes		
20:00-20:20 CST	20	1	Preliminaries
20:00-20:10	10	1.1	Welcome & Introductions Richard Hatchett (CEPI) Bob Chen (BC)
20:10-20:15	5	1.2	Scope and objectives of the meeting- Jakob Cramer (CEPI)
20:15-20:20	5	1.3	Videoconference logistics – Angel Honrado (WeDO)
20:20-22:30	130	2	Review of existing animal models of disease enhancement Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology)
20:20-20:40 Talk 20:40-20:45 Q&A	20 5	2.1	Lessons from SARS animal models - relevance for COVID-19 I - Review of SARS animal models: young and old mice, mouse adapted virus, hamsters, NHP and ferret model - Outcomes observed in vaccine studies for SARS in mice, hamster and NHP Kanta Subbarao (U of Melbourne)
20:45-21:05 Talk 21:05-21:10 Q&A	20 5	2.2	Lessons from SARS animal models- relevance for COVID-19 II - SARS hACE2 Tg mice model: immunologic aspects and hypothesis related to eosinophils and/or enhanced pathology - Relevant findings from MERS models Stanley Perlman (U of Iowa)
21:10-21:30 Talk 21:30-21:35 Q&A	20 5	2.4	Mouse model of COVID 19 using hACE2 transgenic mice Qin Chuan (Peking Union Medical College)
21:35-22:30	55	2.5	Drafting considerations on COVID-19 animal models; [DRAFT Q&A] Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology)
22:30-22:35	5	3	Break
22:35-00:45+1	130	4	Potential implication of IgG mediated pathology for vaccine design: role of antigen, adjuvant and immunological markers. Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford)
22:35-22:55 Talk 22:55-23:00 Q&A	20 5	4.1	Structure and function of CoV spike protein Ralph Baric (UNC)
23:00-23:20 Talk 23:20-23:25 Q&A	20 5	4.2	Immunogenicity and neutralizing efficacy of truncated spike antigens Barney Graham (NIH)
23:25-23:45 Talk 23:45-23:50 Q&A	20 5	4.3	Which immunological/inflammatory markers should we monitor during a first Phase 1 trial, including impact of adjuvants? Arnaud Didierlaurent (Geneva Centre of Vaccinology)
23:50-00:45+1	55	4.4	Drafting considerations on COVID-19 immunological markers; [DRAFT Q&A] moderator: Corry Dekker (Stanford/BC)
00:45-1:00	15	5	Summary, Prepare for Day 2 Bob Chen (BC)

END OF OFFICIAL MEETING

Internal meeting			
		6	Session 2+4 Moderators & Rapporteurs update [DRAFT Q&A] + [DRAFT SUMMARY]; send to PMO for web posting
3:00 –8:00		7	Audience peer review both docs and submit comments via web-based structured form
17:00-20:00 +1		8	Triage comments; Session 2 (Arnaud/PH Lambert); Session 4 (Andrew Pollard)

Day 2: March 13, 2020	Total Minutes		
20:00-20:10	20	5	Preliminaries
20:00-20:10	10	5.1	Welcome & Introductions Bob Chen (BC) Ángel Honrado (WeDo)
20:10-21:40	90	6	Review draft considerations on COVID-19 animal models
20:10-20:20	10	6.1	Summary draft considerations by moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) [DRAFT SUMMARY]
20:20-21:40	80	6.2	Peer review with web audience Moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology) Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
21:40-21:50	10	7	Break
21:50-23:20	90	8	Review draft considerations on COVID-19 immunological markers
21:50-22:00	10	8.1	Summary draft considerations by moderator Corry Dekker (Stanford/BC) [DRAFT SUMMARY]
22:00-23:20	80	8.2	Peer review with web audience Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford) Pending Confirmation Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
23:20-23:50	30	9	Optional Additional Discussion

Annex 6: Final agenda (AEDT, Melbourne)

Day 1: March. 12, 2020	Total Minutes		
23:00-23:20 AEDT	20	1	Preliminaries
23:00-23:10	10	1.1	Welcome & Introductions Richard Hatchett (CEPI) Bob Chen (BC)
23:10-23:15	5	1.2	Scope and objectives of the meeting- Jakob Cramer (CEPI)
23:15-23:20	5	1.3	Videoconference logistics – Angel Honrado (WeDO)
23:20-01:30+1	130	2	Review of existing animal models of disease enhancement Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology)
23:20-23:40 Talk 23:40-23:45 Q&A	20 5	2.1	Lessons from SARS animal models - relevance for COVID-19 I - Review of SARS animal models: young and old mice, mouse adapted virus, hamsters, NHP and ferret model - Outcomes observed in vaccine studies for SARS in mice, hamster and NHP Kanta Subbarao (U of Melbourne)
23:45-00:05+1 Talk 00:05-00:10 Q&A	20 5	2.2	Lessons from SARS animal models- relevance for COVID-19 II - SARS hACE2 Tg mice model: immunologic aspects and hypothesis related to eosinophils and/or enhanced pathology - Relevant findings from MERS models Stanley Perlman (U of Iowa)
00:10-00:30 Talk 00:30-00:35 Q&A	20 5	2.3	Mouse model of COVID 19 using hACE2 transgenic mice Qin Chuan (Peking Union Medical College)
00:35-1:30	55	2.4	Drafting considerations on COVID-19 animal models; [DRAFT Q&A] Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology)
1:30-1:35	5	3	Break
1:35-3:45	130	4	Potential implication of IgG mediated pathology for vaccine design: role of antigen, adjuvant and immunological markers. Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford)
1:35-1:55 Talk 1:40-2:00 Q&A	20 5	4.1	Structure and function of CoV spike protein Ralph Baric (UNC)
2:00-2:20 Talk 2:20-2:25 Q&A	20 5	4.2	Immunogenicity and neutralizing efficacy of truncated spike antigens Barney Graham (NIH)
2:25-2:45 Talk 2:45-2:50 Q&A	20 5	4.3	Which immunological/inflammatory markers should we monitor during a first Phase 1 trial, including impact of adjuvants? Arnaud Didierlaurent (Geneva Centre of Vaccinology)
2:50-3:45	55	4.4	Drafting considerations on COVID-19 immunological markers; [DRAFT Q&A] moderator: Corry Dekker (Stanford/BC)
3:45-4:00	15	5	Summary, Prepare for Day 2 Bob Chen (BC)
END OF OFFICIAL MEETING			

Internal meeting			
		6	Session 2+4 Moderators & Rapporteurs update [DRAFT Q&A] + [DRAFT SUMMARY]; send to PMO for web posting
6:00 –11:00		7	Audience peer review both docs and submit comments via web-based structured form
20:00-23:00		8	Triage comments; Session 2 (Arnaud/PH Lambert); Session 4 (Andrew Pollard)

Day 2: March 13, 2020	Total Minutes		
23:00-23:10	20	5	Preliminaries
23:00-23:10	10	5.1	Welcome & Introductions Bob Chen (BC) Ángel Honrado (WeDo)
23:10-00:40+1	90	6	Review draft considerations on COVID-19 animal models
23:10-23:20	10	6.1	Summary draft considerations by moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) [DRAFT SUMMARY]
23:20-00:40+1	80	6.2	Peer review with web audience Moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology) Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
00:40-00:50	10	7	Break
00:50-02:20	90	8	Review draft considerations on COVID-19 immunological markers
00:50-01:00	10	8.1	Summary draft considerations by moderator Corry Dekker (Stanford/BC) [DRAFT SUMMARY]
01:00-02:20	80	8.2	Peer review with web audience Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford) Pending Confirmation Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
02:20-02:50	30	9	Optional Additional Discussion

Annex 7: Final agenda (CET, Brussels)

Day 1: March. 12, 2020	Total Minutes		
13:00-13:20 CET	20	1	Preliminaries
13:00-13:10	10	1.1	Welcome & Introductions Richard Hatchett (CEPI) Bob Chen (BC)
13:10-13:15	5	1.2	Scope and objectives of the meeting- Jakob Cramer (CEPI)
13:15-13:20	5	1.3	Videoconference logistics – Angel Honrado (WeDO)
13:20-15:30	130	2	Review of existing animal models of disease enhancement Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology)
13:20-13:40 Talk 13:40-13:45 Q&A	20 5	2.1	Lessons from SARS animal models - relevance for COVID-19 I - Review of SARS animal models: young and old mice, mouse adapted virus, hamsters, NHP and ferret model - Outcomes observed in vaccine studies for SARS in mice, hamster and NHP Kanta Subbarao (U of Melbourne)
13:45-14:05 Talk 14:05-14:10 Q&A	20 5	2.2	Lessons from SARS animal models- relevance for COVID-19 II - SARS hACE2 Tg mice model: immunologic aspects and hypothesis related to eosinophils and/or enhanced pathology - Relevant findings from MERS models Stanley Perlman (U of Iowa)
14:10-14:30 Talk 14:30-14:35 Q&A	20 5	2.3	Mouse model of COVID 19 using hACE2 transgenic mice Qin Chuan (Peking Union Medical College)
14:35-15:30	55	2.4	Drafting considerations on COVID-19 animal models; [DRAFT Q&A] Moderator: Paul-Henri Lambert (Geneva Centre of Vaccinology)
15:30-15:35	5	3	Break
15:35-17:45	130	4	Potential implication of IgG mediated pathology for vaccine design: role of antigen, adjuvant and immunological markers. Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford)
15:35-15:55 Talk 15:55-16:00 Q&A	20 5	4.1	Structure and function of CoV spike protein Ralph Baric (UNC)
16:00-16:20 Talk 16:20-16:25 Q&A	20 5	4.2	Immunogenicity and neutralizing efficacy of truncated spike antigens Barney Graham (NIH)
16:25-16:45 Talk 16:45-16:50 Q&A	20 5	4.3	Which immunological/inflammatory markers should we monitor during a first Phase 1 trial, including impact of adjuvants? Arnaud Didierlaurent (Geneva Centre of Vaccinology)
16:50-17:45	55	4.4	Drafting considerations on COVID-19 immunological markers; [DRAFT Q&A] moderator: Corry Dekker (Stanford/BC)
17:45-18:00	15	5	Summary, Prepare for Day 2 Bob Chen (BC)

END OF OFFICIAL MEETING

Internal meeting			
		6	Session 2+4 Moderators & Rapporteurs update [DRAFT Q&A] + [DRAFT SUMMARY]; send to PMO for web posting
20:00 –01:00 +1		7	Audience peer review both docs and submit comments via web-based structured form
10:00-13:00		8	Triage comments; Session 2 (Arnaud/PH Lambert); Session 4 (Andrew Pollard)

Day 2: March 13, 2020	Total Minutes		
13:00-13:10	10	5	Preliminaries
13:00-13:10	10	5.1	Welcome & Introductions Bob Chen (BC) Ángel Honrado (WeDo)
13:10-14:40	90	6	Review draft considerations on COVID-19 animal models
13:10-13:20	10	6.1	Summary draft considerations by moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) [DRAFT SUMMARY]
13:20-14:40	80	6.2	Peer review with web audience Moderator Paul-Henri Lambert (Geneva Centre of Vaccinology) Rapporteur: Arnaud Didierlaurent (Geneva Centre of Vaccinology) Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
14:40-14:50	10	7	Break
14:50-16:20	90	8	Review draft considerations on COVID-19 immunological markers
14:50-15:00	10	8.1	Summary draft considerations by moderator Corry Dekker (Stanford/BC) [DRAFT SUMMARY]
15:00-16:20	80	8.2	Peer review with web audience Moderator: Corry Dekker (Stanford/BC) Rapporteur: Andrew Pollard (Oxford) Pending Confirmation Videoconference coordinator: Steve Black (BC) [DRAFT Q&A] + [DRAFT SUMMARY]
16:20-16:50	30	9	Optional Additional Discussion