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SEIKEN DENKA SEIKEN CO., LTD.



Bacterial Typing Antisera Handbook



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1. Bacterial Morphology

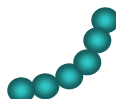
Bacteria can be broadly divided into four types: cocci (round), bacilli (rod) and spirilla (spiral).

Cocci

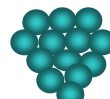
Cocci are spherical, oval, kidney, and chestnut-shaped, and measure approximately 0.5 to 7.0 μ m in diameter. They are classified as monococci, streptococci, diplococci, tetra-generic, sarcina, and staphylococci.



Monococci



streptococci



staphylococci

Bacilli

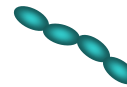
Bacilli are shaped like cylinders or rods. They may be observed individually, in pairs as diplobacilli, or in chains as seen in streptobacilli. These rod-shaped bacteria include rounded, spiral, and rectangular-shaped forms.



Individual bacilli



Diplobacilli



Streptobacilli

Spirillum

Spirilla include spiral and comma-shaped bacteria, where the spiral does not form a complete circle (as seen in *Vibrio*).



Spirilla



Comma-shaped

2. Bacterial Cytological Structure

Somatic antigen (O antigen)

The somatic antigen is a hard elastic layer that covers the outside of the cell to maintain the bacterium's shape and protect its internal structure.

Capsule (K antigen)

A polypeptide mucosal layer made from polysaccharide produced by the bacteria is found in some bacteria. When this mucoidal layer is thick and shows a clear structure, it is referred to as the capsule.

Flagellum (H antigen)

Certain bacilli such as enteric bacteria possess one or more tails, known as flagellum (pl. flagella), by which they are motile. Depending on their number and position, bacteria are grouped into monotrichous, amphitrichous, and peritrichous bacilli. *Vibrio cholera* and *Vibrio parahaemolyticus* are monotrichous while *Escherichia coli* and *Salmonella* are peritrichous.

Cell membrane

This is a thin membrane inside the cell wall, which covers the outside of the cell, composed mainly of lipids and lipoproteins.

Cytoplasm

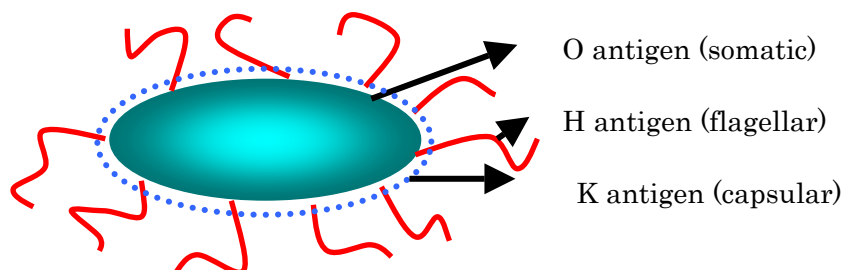
Cytoplasm contains mitochondria-like granules that consist of RNA and TCA cycles, and oxidation-reduction enzymes.

Spores

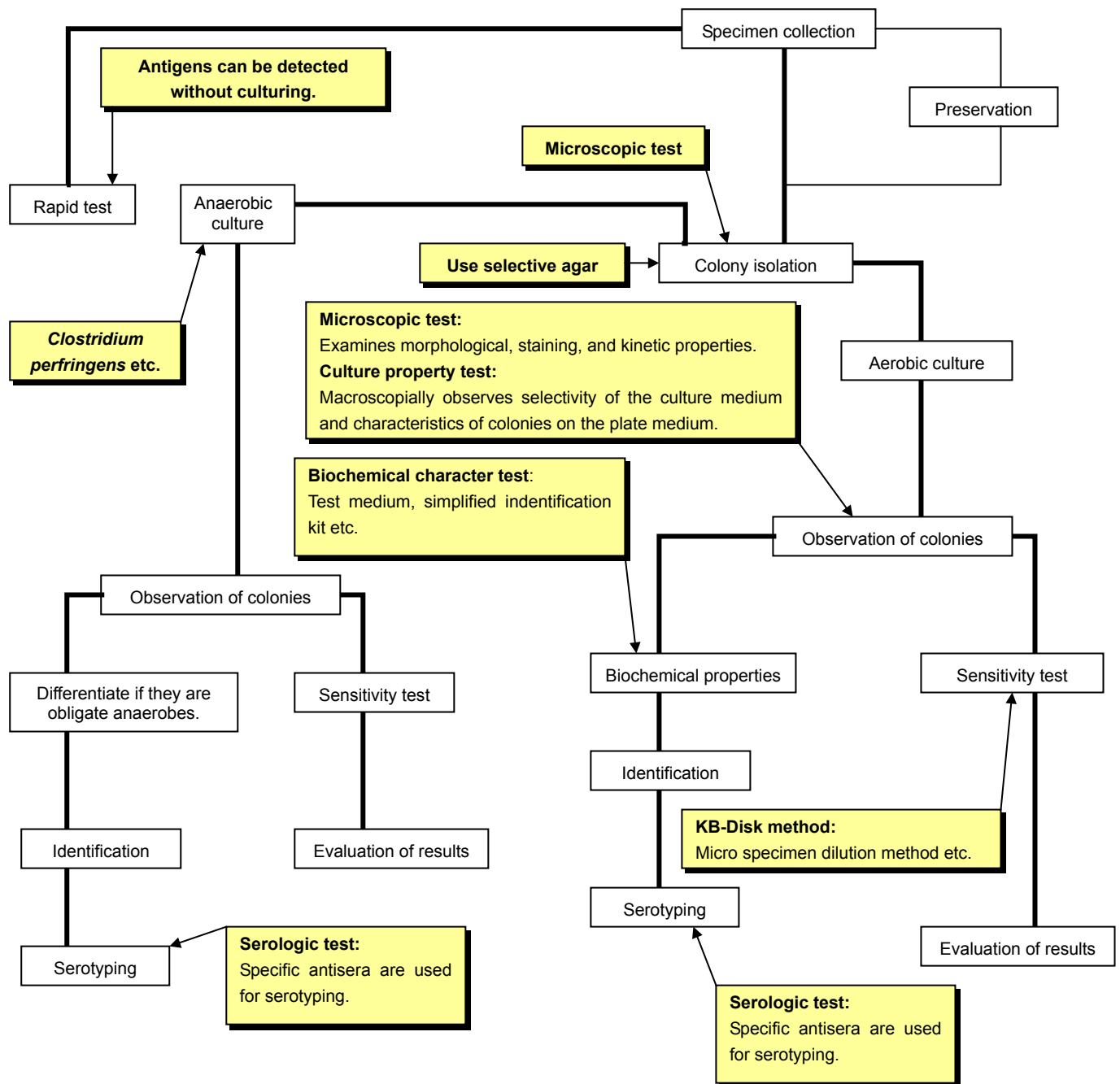
Certain bacteria create round or oval resistant structures internally, according to their environment. These structures are called spores, which are resistant to high temperature, medicine, and physiochemical stimulation such as drying, etc.

3. Antigens Reacting with Denka Antisera

Denka Seiken manufactures antisera that react with O, H, and K antigens. Each product in our lineup reacts with one or more of these respective antigens depending on bacterial strain. The diagram below illustrates bacterial antigen regions.



4. General Bacteriological Test Algorithm



5. Table of Select Pathogenic Bacteria

Bacteria	Serotype	Antigen identified	Remarks
<i>Alkalescens dispar</i>	OK serum 1 type of polyvalent serum 4 types of monovalent serum	O and K antigen	Related to food poisoning.
<i>Campylobacter</i>	25 types of O serum	O antigen	Antisera for passive hemagglutination Related to food poisoning. <i>C. jejuni</i> invades epidermal cells of the jejunum, ileum, and the large intestine.
<i>Clostridium perfringens</i>	Heat-resistant type A <i>welchii</i> 4 types of polyvalent serum 17 types of monovalent serum	O antigen	Related to food poisoning. Symptoms include enteritis, etc.
<i>Escherichia coli</i>	O serum 8 types of polyvalent serum 43 types of monovalent serum H serum 22 types	O and H antigen	Related to food poisoning. Symptoms differ according to type. (Example) Enterohemorrhagic <i>E. coli</i>: Verotoxins damage mucosal epitheliocytes. Diarrhea progresses to bloody diarrhea. Toxins generated: *Shigatoxin (Types 1 and 2) *Heat-resistant enterotoxin *Heat-labile enterotoxin
Toxigenic <i>E. coli</i>	Fimbrial serum 3 types	Fimbrial antigen	For <i>E. coli</i> isolated from animals.
<i>Haemophilus influenzae</i>	6 types of capsular typing serum	K antigen	Related to respiratory infections. Causes child purulent meningitis, bronchitis, otitis media, and endocarditis.
<i>Legionella</i>	10 types of O serum	O antigen	Related to respiratory infections. Causes pneumonia, Pontiac fever, etc.
<i>Listeria monocytogenes</i>	O serum 8 types of serum H serum 4 types of serum	O antigen H antigen	Related to food poisoning. Causes miscarriage, meningitis, child granulomatous sepsis, etc.
<i>Pseudomonas aeruginosa</i>	3 types of polyvalent serum 14 types of monovalent serum	O antigen	Causes opportunistic infection by microbial substitution. May result in sepsis.
<i>Salmonella</i>	O serum 2 types of polyvalent serum 19 types of monovalent serum H serum 17 typing sera 22 types of factor serum 1 type of Vi serum	O, H, and Vi antigen (Phases I and II for H antigen)	Related to food poisoning. (Example) typhoid: Enteritis accompanied by fever, diarrhea, abdominal pain, and roseola on torso, which may be fatal.
<i>Shigella</i>	8 types of polyvalent serum 41 types of monovalent serum Description: <i>Shigella dysenteriae</i> 2 polyvalent, 12 monovalent <i>S. flexneri</i> 1 polyvalent, 9 monovalent <i>S. boydii</i> 4 polyvalent, 18 monovalent <i>S. sonnei</i> 1 polyvalent, 2 monovalent	O antigen	Related to food poisoning. Symptoms include diarrhea, fever, nausea, and puromucous bloody stool. Generates <i>shigella</i> toxins.

Bacteria	Serotype	Antigen identified	Remarks
<i>Staphylococcus aureus</i>	Types: I to VIII	Staphylococcal coagulase antigen	Causes skin infection, food poisoning, osteomyelitis, bacillema, toxic-shock syndrome, acute endocarditis, sepsis, etc. Toxins generated: *Enterotoxin *TSST-1 *Exfoliative toxins
<i>Streptococcus</i>	Group A: T typing 5 types of polyvalent serum 19 types of monovalent serum Group B: 9 types	Group A: T protein Ag Group B: Heat-resistant polysaccharide antigen	Group A: Causes impetigo, necrotic fasciitis, pharyngitis, scarlet fever, etc. Group B: Causes neonatal meningitis, neonatal pneumonia, etc.
<i>Streptococcus pneumoniae</i>	8 types of polyvalent serum 39 types of monovalent serum	K antigen	Capsular typing system Related to respiratory infections. Causes lobar pneumonia, meningitis, sinusitis, otitis media, etc.
<i>Vibrio Cholerae</i>	1 type of polyvalent serum 2 types of monovalent serum	O antigen (factors: a, b, c)	Related to food poisoning. Symptoms include abdominal pain, fever, large amounts of odorless diarrhea (whitish), a drop in blood pressure, dehydration, and rapidly leads to shock. Generates enterotoxins.
<i>Vibrio parahaemolyticus</i>	O serum 11 types of monovalent serum K serum 9 types of polyvalent serum 19 types of monovalent serum	O and K antigen	Related to food poisoning. Symptoms include abdominal pain, accompanied by diarrhea, and purulent bloody stool.
<i>Yersinia enterocolitica</i>	1 type of polyvalent serum 4 types of monovalent serum	O antigen	Causes enteritis accompanied by high fever, and intense pain at the appendix.
<i>Yersinia pseudotuberculosis</i>	6 types of monovalent serum	O antigen	Related to food poisoning. Causes terminal ileitis, appendicitis, gastroenteritis, sepsis, bordetella, bronchiseptica, etc.

6. Bacterial Typing Antisera Product Range By Company

Product	Denka	Difco*	Murex**
<i>Alkalescens-Dispar</i>	5	1	1
<i>Bordetella parapertussis</i>		1	1
<i>Bordetella pertussis</i>	1	1	1
<i>Brucella</i>		1	2
<i>Campylobacter jejuni</i>	25		
<i>Clostridium perfringens</i>	21		6
<i>Escherichia coli</i>	73	2	18
Toxigenic <i>E.coli</i>	3		
<i>Haemophilus influenzae</i>	6	7	6
<i>Legionella pneumophila</i>	10		
<i>Listeria monocytogenes</i>	12	3	
<i>Neisseria meningitidis</i>		11	7
<i>Proteus</i> (febrile)			3 control, 3 susp.
<i>Pseudomonas aeruginosa</i>	17		
<i>Salmonella</i>	61	87	69
<i>Salmonella</i> Phase Induction	17		
<i>Shigella</i>	49	7	42
<i>Staphylococcal</i> Coagulase	8		
<i>Streptococcus haemolyticus</i>	A24, B9	6	
<i>Streptococcus pneumoniae</i>	47		
<i>Vibrio cholerae</i> O1	3	3	3
<i>C.cholerae</i> O139 Bengal	1		
<i>Vibrio parahaemolyticus</i>	85		
<i>Yersinia enterocolitica</i>	5		
<i>Yersinia pseudotuberculosis</i>	6		

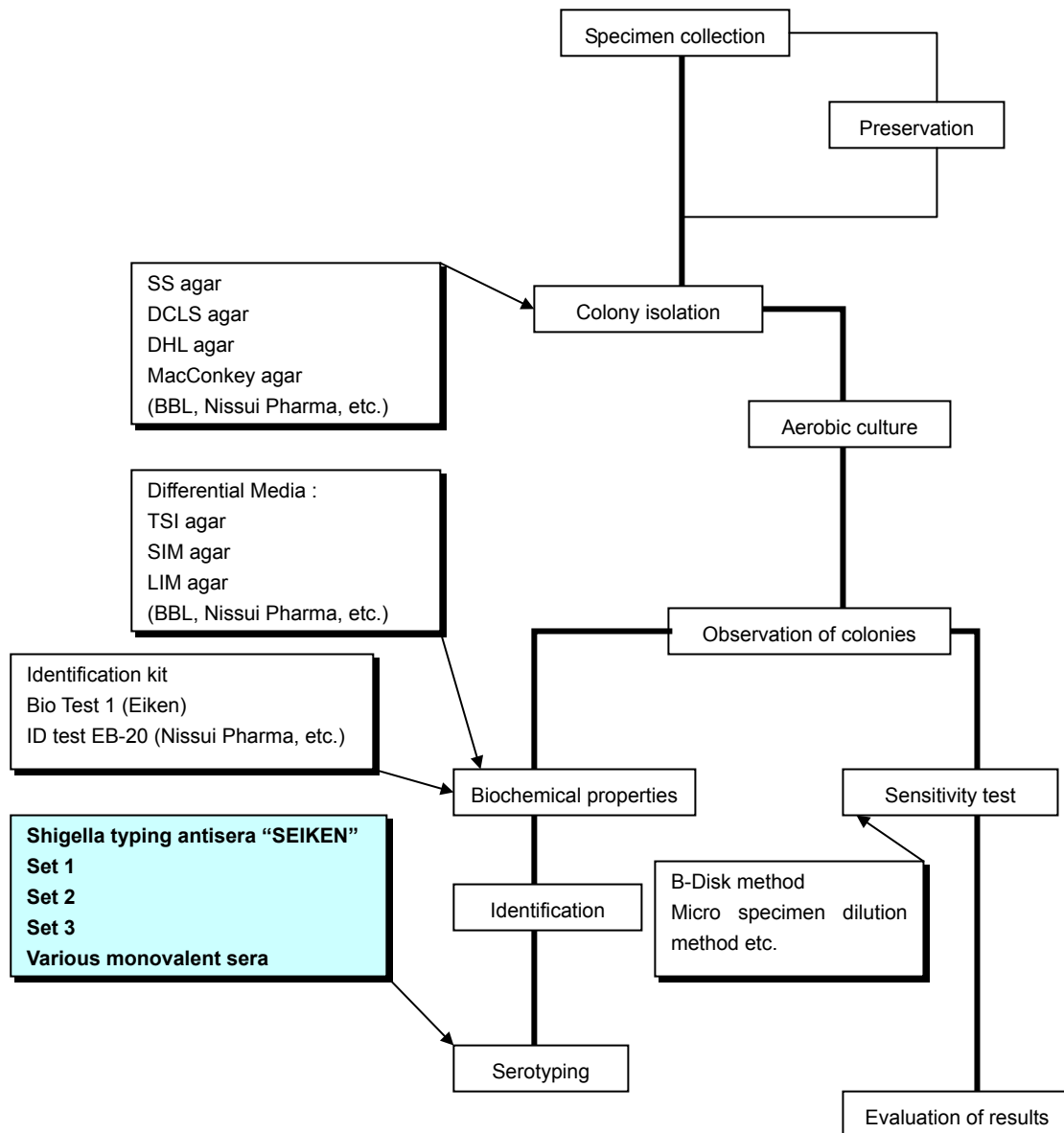
DIFCO* information taken from flyer of reintroducing classic antisera, current Feb. 2004.

MUREX** information taken from online list accessed July and Dec. 2003.

NOTE: Some products by these manufacturers may no longer be current, and subject to further change.

7. Product Guide/Information

(I) *Shigella*



Shigella Antisera			
Set 1 (2mL x 8 polyvalent, 41 monovalent)	294821	Shigella boydii	
Set 2 (2mL x 8 poly, 11 <i>S.flexneri/sonnei</i>)	294838	Polyvalent C	295309
Set 3 (2mL x 8 polyvalent)	294845	Type 1	295095
Shigella dysenteriae		Type 2	295200
Polyvalent A	294982	Type 3	295224
Type 1	294852	Type 4	295248
Type 2	294906	Type 5	295255
Type 3	294913	Type 6	295262
Type 4	294920	Type 7	295279
Type 5	294937	Polyvalent C1	295194
Type 6	294944	Type 8	295286
Type 7	294951	Type 9	295293
Polyvalent A1	294890	Type 10	295101
Type 8	294968	Type 11	295118
Type 9	294975	Polyvalent C2	295217
Type 10	294869	Type 12	295125
Type 11	294876	Type 13	295132
Type 12	294883	Type 14	295149
Shigella flexneri		Type 15	295156
Polyvalent B	295088	Polyvalent C3	295231
Type I	295002	Type 16	295163
Type II	295019	Type 17	295170
Type III	295026	Type 18	295187
Type IV	295033	Shigella sonnei	
Type V	295040	Polyvalent D	295330
Type VI	295064	Phase I	295316
Group (3)4	294999	Phase II	295323
Group 6	295057		
Group 7(8)	295071		

Purpose: Serotyping of *Shigella*

Features: Available in three separate sets to accommodate the requirements of users. All items are also available in single polyvalent or monovalent vial form, including *Shigella dysenteriae*, *Shigella flexneri*, *Shigella boydii*, and *Shigella sonnei*. (Refer to our complete product list above.)

Note: The serotype for *Shigella flexneri* is determined by the combination of the type and group serum. Determine the appropriate serum by referring to the table included in the product insert. Use only non-selective culture medium.

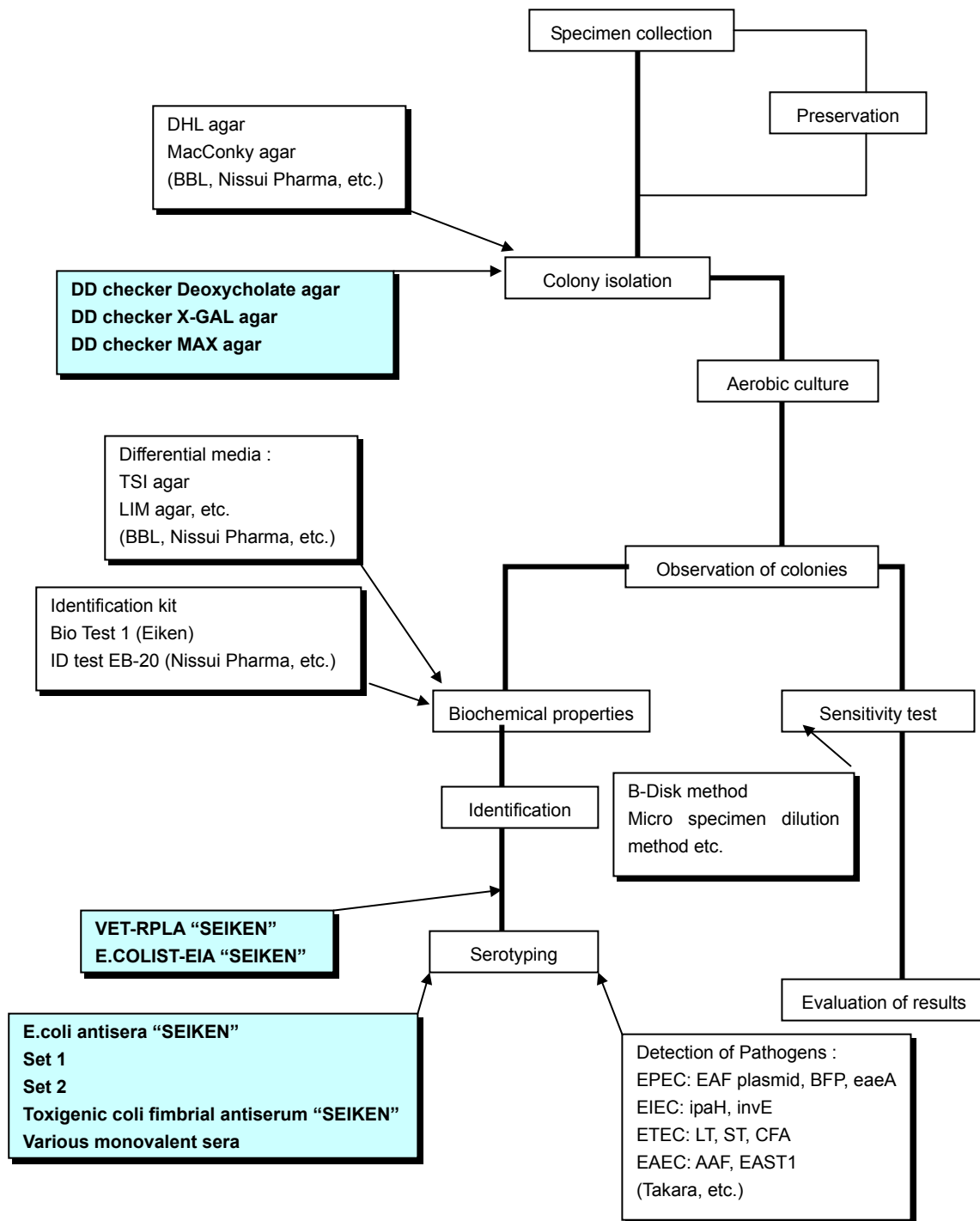
Contents of kits:

Set 1: Contains all Denka Seiken *Shigella* sera. (49 vials)

Set 2: Contains polyvalent and monovalent sera for *Shigella flexneri* and *Shigella sonnei*, and polyvalent serum for *Shigella dysenteriae* and *Shigella boydii*. (19 vials)

Set 3: Contains polyvalent sera for *Shigella dysenteriae*, *Shigella flexneri*, *Shigella boydii*, and *Shigella sonnei*. (8 vials)

(II)-1 *Escherichia coli*



CE marked

Escherichia coli Antisera			
Set 1 (2mL x 8 polyvalent, 43 monovalent)		295347	
Polyvalent 1		296016	
O1	295583	O8	295996
O26	295903	O15	295750
O86a	296009	O115	295620
O111	295590	O169	295866
O119	295637	Polyvalent 7	
O127a	295675	O28ac	295927
O128	295682	O112ac	295606
Polyvalent 2		O124	295644
O44	295941	O136	295699
O55	295958	O144	295729
O125	295651	Polyvalent 8	
O126	295668	O29	295934
O146	295736	O143	295712
O166	295835	O152	295774
Polyvalent 3		O164	295828
O18	295873	Set 2(5mL x 22 H-antisera)	
O114	295613	H-2	295422
O142	295705	H-4	295484
O151	296767	H-5	295538
O157	295798	H-6	295552
O158	295804	H-7	295569
Polyvalent 4		H-9	295576
O6	295965	H-10	295361
O27	295910	H-11	295378
O78	295989	H-12	295385
O148	295743	H-16	295392
O159	295811	H-18	295408
O168	295859	H-19	295415
Polyvalent 5		H-20	295439
O20	295880	H-21	295446
O25	295897	H-27	295453
O63	295972	H-28	295460
O153	295781	H-40	295477
O167	295842	H-41	295507
		H-42	295514
		H-45	295521
		H-51	295545

CE marked

Supplementary E.coli Antisera			
Polyvalent II	292490	Polyvalent III	292506
O26, O55, O111		O86, O114, O125	
O119, O126		O127, O128	
Polyvalent IV	292513		
		O44, O112	
		O124, O142	

not CE marked

Toxigenic E.coli	
Pili Set	200457
K88	213877
K99	213884
987P	213891

Purpose: Serotyping of *Escherichia coli*

Features: Antisera for the typing of *E.coli* Group O and H antigens. These are available in two separate sets to accommodate the requirements of users. All items are also available in single polyvalent or monovalent vial form. (Refer to our complete product list on the previous page.)

Note: Perform Group O antigen serotyping by using the slide agglutination method. For H antigen-typing, first perform several cultures using a semi-fluid culture medium, then identify by using the test tube agglutination method. Antiserum names consist of the letter O or H followed by a number(s). Use only non-selective culture medium.

Contents of kits:

Set 1: For *E.coli* Group O antigen serotyping. (51 vials)

Set 2: For *E.coli* H antigen serotyping. (22 vials)

VET-RPLA

***Limited Supply**

Product Code 230010	Contents
V. cholerae Enterotoxin/E. coli heat-labile Enterotoxin Detection Kit	20 tests
Kit contents:	
Sensitized latex anti-enterotoxin	5 mL 1 vial
Control latex	5 mL 1 vial
Control enterotoxin (Lyophilized)	0.5 mL eq x 1 vial
Diluent	50 mL x 1 vial

*** Please inquire if you would like to know further information about this product.**

Purpose: Semi-quantitatively detects *E.coli* heat-labile enterotoxins(LT) by RPLA method using microplates (96 well, V-type).

Features: Heat-labile enterotoxins of enterotoxigenic *E.coli* are detected using animal or tissue culture cells. However, this LT test reagent does not require these cultures.

Note: As *E.coli* heat-labile enterotoxins and *Vibrio cholerae* enterotoxins share the same antigen factor, both can be detected using VET-RPLA. It should be noted; however, that the enrichment culture differs for each, and therefore prepared in the laboratory accordingly.

E. COLIST-EIA “SEIKEN”

Product Code 230133	Contents
E. coli Heat-stable Enterotoxin Detection Kit (ELISA)	96 tests
Kit contents:	
Antigen-coated plate	16 wells x 6 strips
Positive control	1 mL x 1 vial
Negative control	1 mL x 1 vial
Enzyme-labeled antibody	0.1 mL x 1 vial
Diluent for conjugate	1.5 mL x 1 vial
Substrate A	4 mL eq x 4 vials
Substrate B	30 mL x 1 vial
Stock wash solution (x 10 conc.)	60 mL x 1
Stopping reagent	12 mL x 1 vial
Plate holder	1 pc.

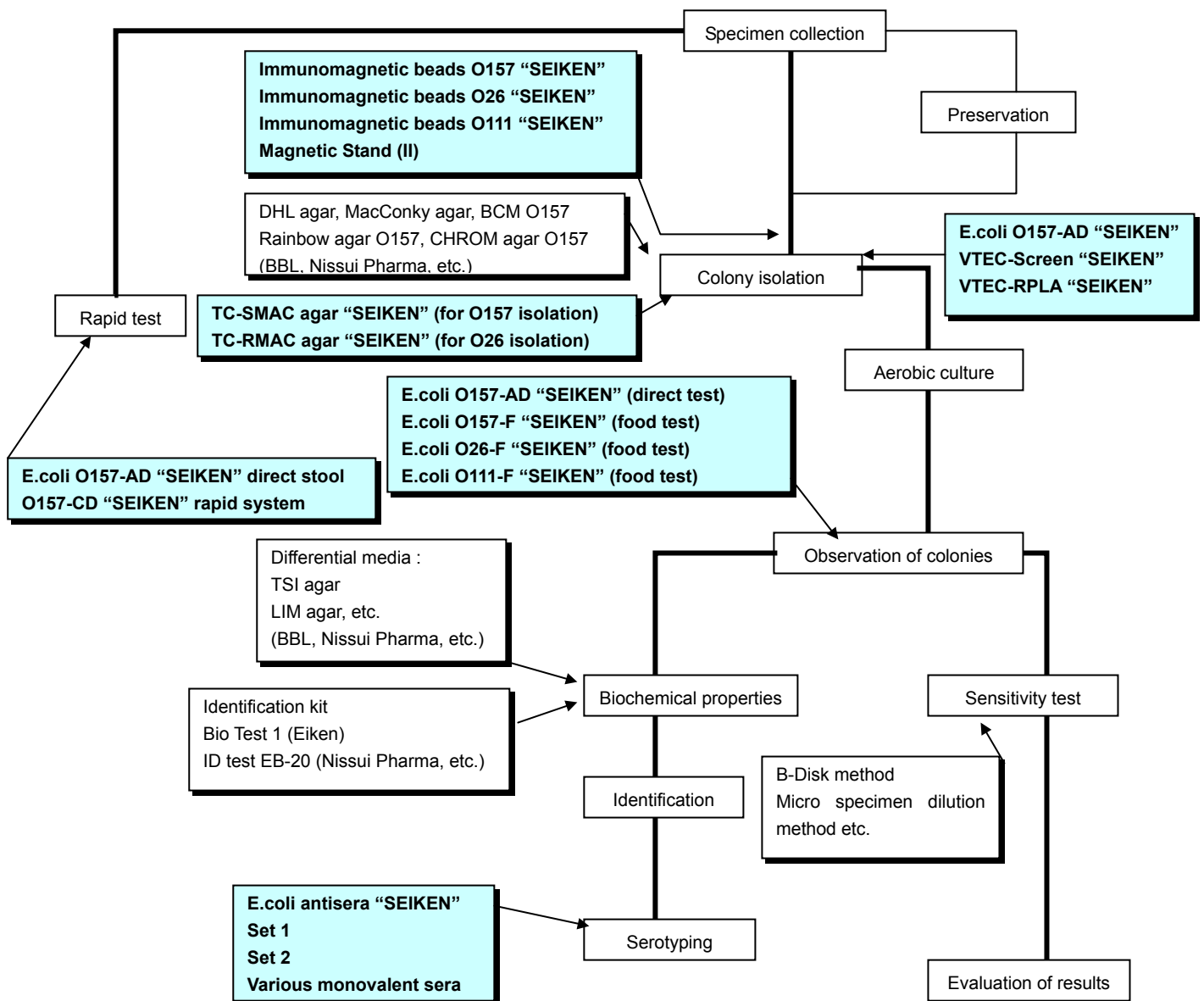
Purpose: Qualitatively detects *E. coli* heat-stable enterotoxins (ST) by EIA using microplates.

Features: Allows tests otherwise requiring the use of lactating mice to be performed qualitatively by the

microplate EIA method. Free of factors causing external differences such as size differences of animals, etc. Applies competitive reaction using the EIA method. Allows visual detection; however, negative-positive boundaries require the use of spectrophotometers for microplates. Use of break-apart plates reduces unnecessary use of the reagent.

Note: Prepare the enrichment culture in the laboratory.

(II)-2 Enterohemorrhagic *Escherichia coli* (EHEC)



E. coli O157-AD “SEIKEN”

Product Code 230552	Contents
<i>E. coli</i> O157 antigen detection by slide latex method	50 tests
<u>Kit contents:</u>	
Sensitized latex	2 mL x 1 vial
Control latex	2 mL x 1 vial
Positive control	1 mL x 1 vial
Extraction reagent 1	5 mL x 1 vial
Extraction reagent 2	5 mL x 1 vial
Extraction reagent 3	5 mL x 1 vial
Sterile swab	60 pcs.
Microcentrifuge tube	55 pcs.
Test card	30 pcs.

Purpose: For the specific detection of the *E. coli* O157 antigen by slide latex agglutination method.

Features: Reagent using sensitized anti-*E. coli* O157 monoclonal antibodies to latex particles. *E. coli* O157 can be detected both from single colonies and colony-concentrated areas on a culture medium.

E. coli O157 can also be directly identified from the stool of patients suspected of acute enterohemorrhagic *E. coli* infection. Results are obtained in as little as 10 minutes.

Note: The nitrous acid extraction procedure is required for a short period of time. Enterohemorrhagic *E. coli* infection is caused by the shigatoxins produced by O157, O26, and O111. Other serotype *E. coli* producing shigatoxins have been reported. Furthermore, even if the Group O and H antigen serum types belong to the enterohemorrhagic *E. coli* category, strains that do not produce shigatoxins are not enterohemorrhagic *E. coli*.

VTEC-RPLA***Limited Supply**

Product Code 230553	Contents
Shigatoxin Detection Kit	20 tests
<u>Kit contents:</u>	
Sensitized latex (VT1)	5 mL x 1 vial
Sensitized latex (VT2)	5 mL x 1 vial
Control latex	5 mL x 1 vial
Control VT1 (Lyophilized)	5.0 mL eq x 1 vial
Control VT2 (Lyophilized)	5.0 mL eq x 1 vial
Diluent	50 mL x 1 vial

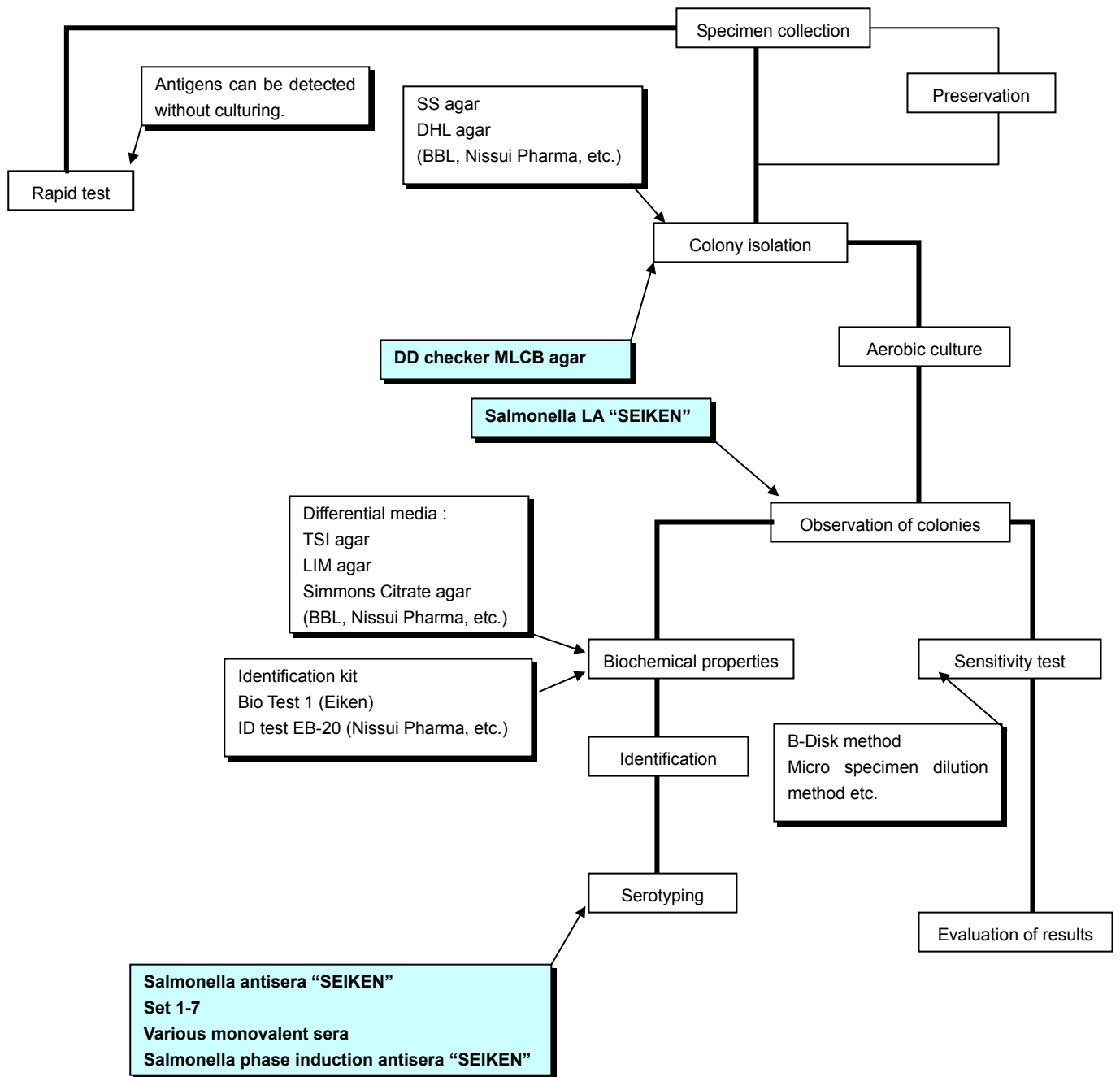
*** Please inquire if you would like to know further information about this product.**

Purpose: Semi-quantitatively detects *E. coli* shigatoxins by reversed passive latex agglutination(RPLA) method using microplates(96 well, V-type).

Features: Shigatoxin detection is basically carried out by cytotoxicity tests using Vero cells. However, this reagent does not require complicated procedures using cell culture, and is able to detect and differentiate both Shigatoxin type I(ST1) and type II(ST2) with sensitivity of 1ng/mL. It is 100% sensitive and specific when compared to the verocell assay for *E. coli* culture isolates.

Note: Use of enrichment medium is designated in the protocol. For shaking culture, CAYE culture is used. The centrifugal supernatant is used as the specimen. In the case of static culture, perform the polymyxin B procedure on the bacteria cultured on BHI agar culture, and use the centrifugal supernatant as the specimen. Culture media and polymyxin B are available separately.

(III) *Salmonella*



Salmonella Antisera									
		Set 1 293855		H-sera			Set 5 293893		
Former Alphabetical O Groups	Current WHO O Groups	2mL x 2 polyvalent, 15 O-grouping and Vi		Typing		Phase Ind.	5mL x 7 H-G mono		
				Set 2	293862	Set 200181			
		Polyvalent O	294463	H-a	293923	211798	H-f	294180	
A	2	O2	294364	H-b	293930	211804	H-m	294197	
B	4	O4	294401	H-c	293947	211811	H-p	294203	
C1-C2	6,7	O7	294425	H-d	293954	211828	H-q	294210	
C2-C3	8	O8	294432	H-e,h	293961	211835	H-s	294227	
D1	9	O9	294449	H-G	293978	211842	H-t	294234	
D2	9,46	O9,46	294456	H-i	293985	211859	H-u	294241	
D3	9,46,27	O3,10	294388	H-k	293992	211866	Set 6 293909		
E1-E2-E3	3,10	O1,3,19	294302	H-L	294005	211873	3 H-z4 and 2 H-e,n		
E	1,3,19	Polyvalent O1	294357	H-r	294012	211880	H-z23	294258	
F	11	O11	294319	H-y	294029	211897	H-z24	294265	
G1-G2	13	O 13	294326	H-e,n	294036	211903	H-z32	294272	
H	6,14	O6,14	294418	H-1	294043	211910	H-x	294289	
I	16	O16	294333	H-z	294050	211927	H-z15	294296	
J	17	O18	294340	H-z4	294067	211934	Set 7 293916		
K	18	O21	294371	H-z10	294074	211941	O2	294364	
L	21	O35	294395	H-z29	294081	211958	O9	294449	
M	28	Vi	294470				H-a	293923	
N	30			Set 3 293879			H-d	293954	
O	35	Not CE Marked Also available		5mL x 4 H-L mono			Vi	294470	
P	38			H-v		294098			
Q	39	O17	292575	H-w		294104	Also available		
R	40	O28	292582	H-z13		294111	Poly A-G	292483	
S	41	O39	292599	H-z28		294128	Poly A-S	292476	
T	42	O6	291875	Set 4 293886			Omnivalent	292537	
U	43	H-g,p	291882	5mL x 5 H-1 mono			H-Rapid-1	292445	
V	44			H-2		294135	H-Rapid-2	292452	
W	45			H-5		294142	H-Rapid-3	292469	
X	47			H-6		294159	H-E Complex	292520	
Y	48			H-7		294166			
Z	50			H-z6		294173			

Purpose: Serotyping of *Salmonella*

Features: Antisera for the typing of Salmonella Group O and H antigens. These are available in two separate sets to accommodate the requirements of users. All items are also available separately in single polyvalent or monovalent vial form. (Refer to our complete product list on the previous page.)

Contents of kits:

Set 1: For Salmonella Group O antigen serotyping. (18 vials including Vi serum)

Set 2: For Salmonella H antigen serotyping (17 vials)

Set 3: H-L antigen group factor serum set. (4 vials)

Set 4: H-1 antigen group factor serum set. (5 vials)

Set 5: H-G antigen group factor serum set. (7 vials)

Set 6: H-Z4 antigen group factor serum and H-e, n antigen group factor serum set. (5 vials)

Set 7: for serotyping of typhoid bacillus and paratyphoid A bacillus.
(5 vials: 2 O sera, 2 H sera, and 1 Vi serum)

Note: The antisera contain preservatives and therefore cannot be used for phase induction. Set 7 is not necessary if using Sets 1 and 2. Antisera nomenclature consist of alphabetical letters (upper and lower case) and numerals, which should be noted when placing an order. Use only non-selective culture medium.

- Important note regarding O grouping -

Bacterial serotyping methods are standardized worldwide. The WHO has a reference center based in France (Pasteur Institute) for Salmonella, as does the bacteriology department in Japan's National Institute of Infectious Diseases (NIID). Due to the fact that each country should have a similar reference center, manufacturers of typing antisera obtain bacterial strains via the Pasteur Institute. Therefore, Denka Seiken also uses strains obtained from the Pasteur Institute through the NIID.

A committee comprised of experts from various countries was organized to determine the serotyping of Salmonella. This task was originally based on research done by Kaufman-White. At first, O serotypes were assigned letters from the Roman alphabet: A, B, etc. Later as new serotypes were discovered, they were included in these groups. However, since there are only 26 letters in the alphabet, after "Z" all O-antigen factor strains were assigned a number. Eventually, Salmonella serotyping charts listed a mixture of Roman letters and numerals; therefore, about 10 years ago all O-antigen factor strains were ultimately assigned a uniform number to simplify the typing system, which is currently in use.

The antisera product list on the previous page conforms to that of the WHO, by including a column in the left-hand side of the chart to depict the difference between the former and current classification systems. Although internationally MUREX and DIFCO still employ the alphabet classification system, the reason is unclear. The aforementioned comparison chart has been included in our product list for the convenience of users familiar with either system.

Antisera for Salmonella Phase Induction "Seiken"

Purpose: The flagella of Salmonella exist in phases 1 and 2. This product is used for phase induction of the H antigen by its addition to a semi-fluid culture medium.

Features: Available for individual purchase or as a set.

Note: The antisera do not contain preservatives. This serum cannot be used for agglutination tests. Antiserum nomenclature consists of alphabetical letters (upper and lower case) and numerals, which should be noted when placing an order. (Please refer to the list on the previous page.)

Salmonella LA

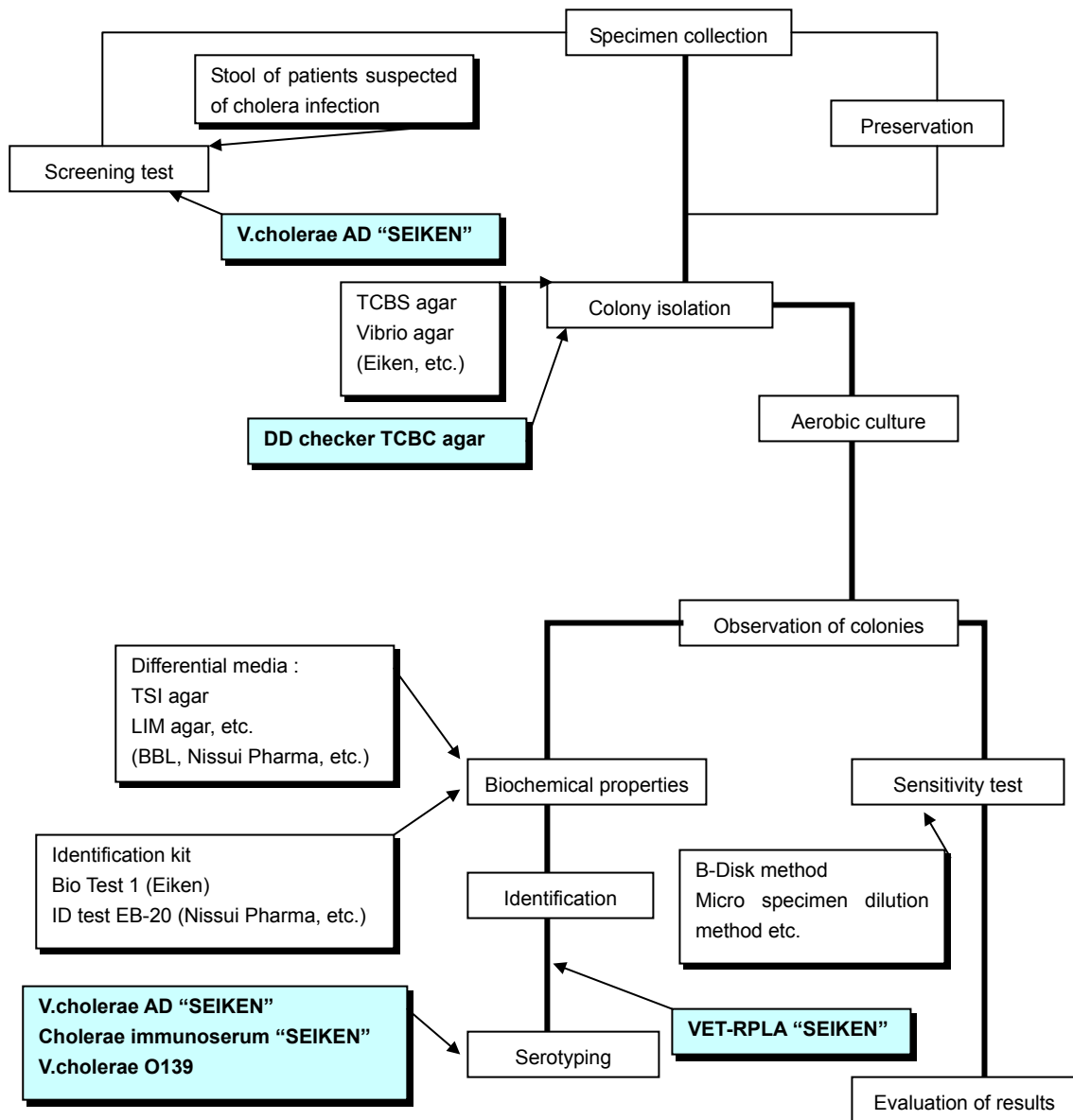
Product Code 230279	Contents
Salmonella screening by Slide Latex Agglutination	30 tests
<u>Kit contents:</u>	
Sensitized latex	1 mL x 1 vial
Control latex	1 mL x 1 vial
Positive control	0.5 mL x 1 vial
Test card	18 pcs.
Mixing stick	80 pcs.

Purpose: Identification of *Salmonella*.

Features: Identifying *Salmonella* from unknown bacteria by slide latex agglutination method. Having outstanding specificity, it does not react with other bacteria on separated culture medium. Effective for differentiation from *Citrobacter*, which resembles *Salmonella*. Rapid reaction and easy to perform.

Note: Cannot be used for serotyping of *Salmonella*.

(IV) *Vibrio cholerae*



CE Marked

<i>Vibrio cholerae</i> Antisera	
Set (2 ml x 3)	293817
Polyvalent (serovar Inaba and Ogawa)	293831
Serovar Inaba	293824
Serovar Ogawa	293848
O139 "Bengal"	294487

Purpose: Serotyping of *Vibrio cholerae* O1

Note: The O139 "Bengal" serovar is not included in the set.

Vibrio cholerae-AD

Product Code 230157	Contents
Vibrio cholerae Antigen O1 Serotyping and Detection Kit by Slide Latex Agglutination	50 tests
<u>Kit contents:</u>	
Sensitized latex a	2 mL x 1 vial
Sensitized latex b	2 mL x 1 vial
Sensitized latex c	2 mL x 1 vial
Control latex	2 mL x 1 vial
Test card	55 pcs.

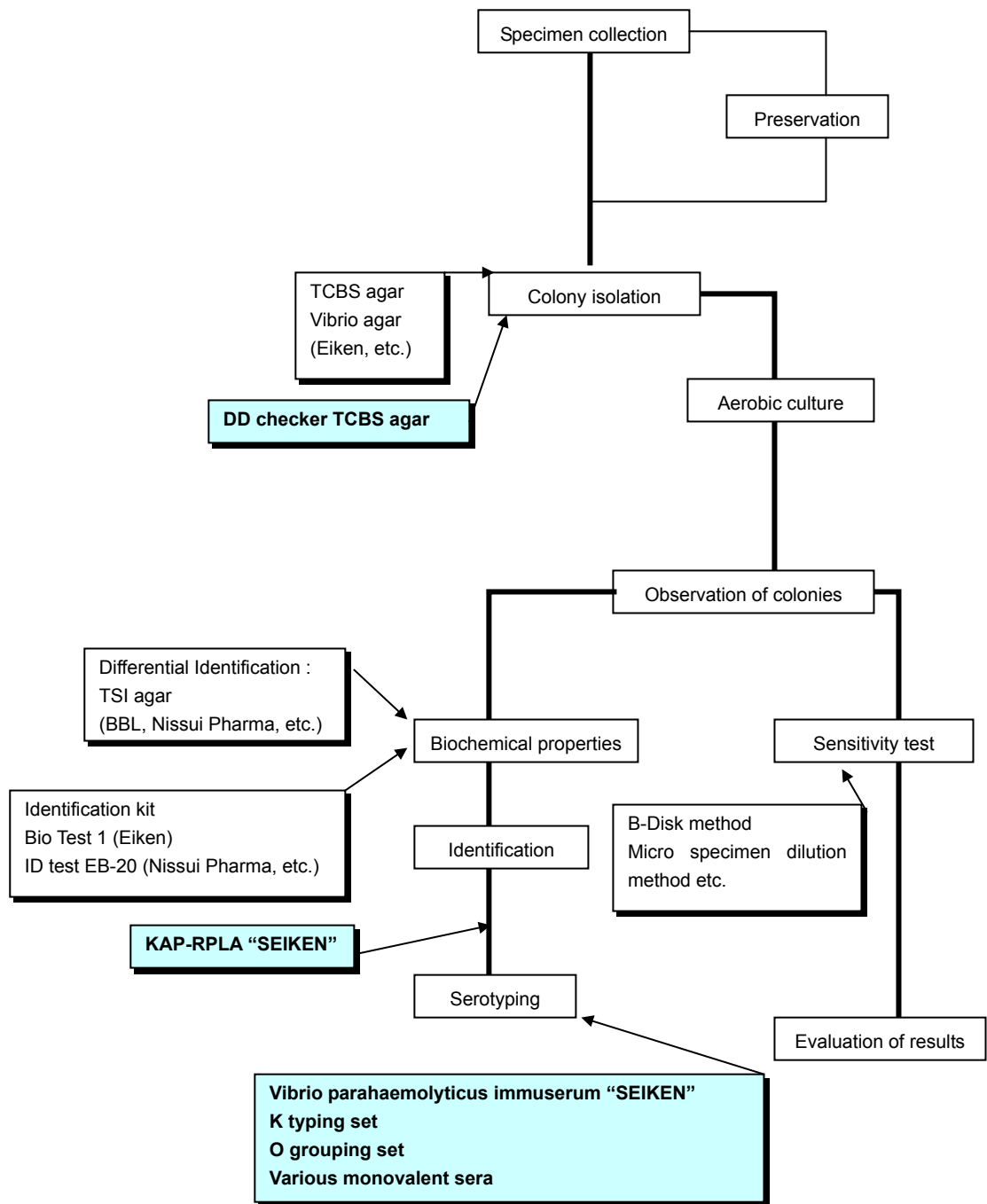
VET-RPLA

***Limited Supply**

Product Code 230010	Contents
V. cholerae Enterotoxin/E. coli heat-labile Enterotoxin Detection Kit	20 tests
<u>Kit contents:</u>	
Sensitized latex	5 mL 1 vial
Control latex	5 mL 1 vial
Control enterotoxin (Lyophilized)	0.5 mL eq x 1 vial
Diluent	50 mL x 1 vial

*** Please inquire if you would like to know further information about this product.**

(V) *Vibrio parahaemolyticus*



<i>Vibrio parahaemolyticus</i> Antisera							
Set (2 mL x 9 polyvalent, 65 monovalents)						200280	
Polyvalent K I	212344	Polyvalent K II	212351	Polyvalent K III	212368	Polyvalent K IV	212375
K 1	212436	K 9	212504	K 18	212573	K 25	212641
K 3	212443	K 10	212511	K 19	212580	K 26	212658
K 4	212450	K 11	212528	K 20	212597	K 28	212665
K 5	212467	K 12	212535	K 21	212603	K 29	212672
K 6	212474	K 13	212542	K 22	212610	K 30	212689
K 7	212481	K 15	212559	K 23	212627	K 31	212696
K 8	212498	K 17	212566	K 24	212634	K 32	212702
Polyvalent K V	212382	Polyvalent K VI	212399	Polyvalent K VII	212405	Polyvalent K VIII	212412
K 33	212719	K 41	212788	K 48	212856	K 55	212924
K 34	212726	K 42	212795	K 49	212863	K 56	212931
K 36	212733	K 43	212801	K 50	212870	K 57	212948
K 37	212740	K 44	212818	K 51	212887	K 58	212955
K 38	212757	K 45	212825	K 52	212894	K 59	212962
K 39	212764	K 46	212832	K 53	212900	K 60	212979
K 40	212771	K 47	212849	K 54	212917	K 61	212986
Polyvalent K IX	212429	Also available		O-grouping Set (2 ml x 11)		200273	
K 63	212993			O 1	213082	O 7	213143
K 64	213006			O 2	213099	O 8	213150
K 65	213013			O 3	213105	O 9	213167
K 66	213020			O 4	213112	O 10	213174
K 67	213037			O 5	213129	O 11	213181
K 68	213044			O 6	213136		
K 69	213051						

Purpose: Serotyping of *Vibrio parahaemolyticus*.

Features: Immunosera for the typing of *Vibrio parahaemolyticus* Group O and K antigens. These are available as K serum and Group O serum sets, and are also available separately in single polyvalent of monovalent vial form.

Contents of kits:

K Serum Set: Contains a total of 9 polyvalent and 65 monovalent sera. (74 vials)

Group O Serum Set: Contains 11 Group O sera.

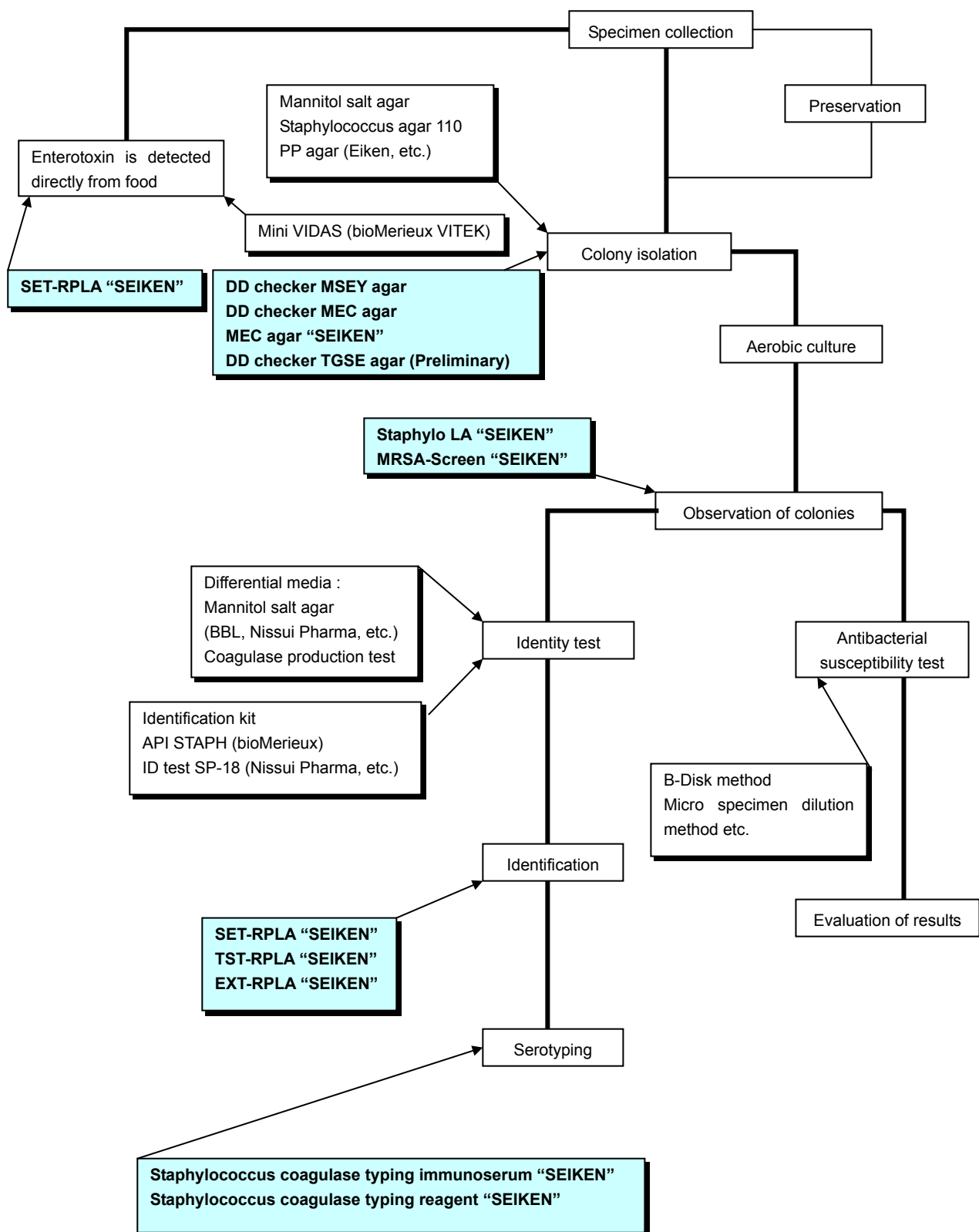
KAP-RPLA

Product Code: 230027	Contents
<i>V. parahaemolyticus</i> Heat-stable Hemolytic Toxin Detection (RPLA)	20 tests
<u>Kit contents:</u>	
Sensitized latex	5 mL 1 vial
Control latex	5 mL 1 vial
Control heat-stable hemolytic toxin (Lyophilized)	0.5 mL eq x 1 vial
Diluent	50 mL x 1 vial

Purpose: Semi-quantitatively detects heat resistant hemolytic toxins produced by *Vibrio parahaemolyticus* by RPLA method using microplates.

Features: Able to detect heat resistant hemolytic toxins without the use of animal or tissue cultured cells. Detection sensitivity is higher than the “Kanagawa Phenomenon” on Wagatsuma agar.

(VI) *Staphylococcus aureus*



CE Marked

Staphylococcal Coagulase Antisera	
Set (5 ml x 8)	270016
Type I	270061
Type II	270078
Type III	270085
Type IV	270092
Type V	270108
Type VI	270115
Type VII	270122
Type VIII	270139
Auxillary reagents	
Diluent	271020
Normal rabbit serum	271037
Normal rabbit plasma lyophilized	271044

Purpose: For the serotyping of *Staphylococcus aureus* coagulase.

Features: Antisera for the serotyping of the coagulase characteristically produced by *Staphylococcus aureus*. Available as a set for individual purchases, according to user requirements. Auxiliary reagents including normal rabbit serum, lyophilized normal rabbit plasma, and diluent are sold separately.

Note: The auxiliary reagents mentioned above are required to perform the test. When placing orders for purchases, note that normal rabbit serum and lyophilized normal rabbit plasma are easily mistaken.

Reference terminology

***Coagulase:** Externally produced protein by the *Staphylococcus*. Coagulates plasma by acting on the prothorombin in the plasma.

***Clamping factor:** Protein produced by *Staphylococcus* on the surface of the bacteria. Produces clots when bacteria and plasma mix by acting on the fibrinogen on the plasma.

***Protein A:** Internally and externally produced protein by *Staphylococcus*. Specifically binds to the Fc site of immunoglobulin G (IgG).

Staphylo-LA**CE Marked**

Product Code 296146	Contents
S. aureus screening by Slide Latex Agglutination	100 tests
<u>Kit contents:</u>	
Sensitized latex	6 mL x 1 vial
Test card	30 pcs.
Mixing stick	120 pcs.

Purpose: Identification of *Staphylococcus aureus* and other staphylococci by slide latex agglutination.

Features: Results correlate well with conventional methods such as coagulase production tests, etc. Allows direct testing of colonies on separated culture media. Easy to use and reaction time is about 20 seconds.

Note: Ensure that the bacteria and sensitizing latex are evenly mixed.

MRSA-Screen**CE Marked**

Product Code 230782	Contents
Rapid PBP2' Detection by Slide Latex Agglutination	50 tests
<u>Kit contents:</u>	
Sensitized latex	1.3 mL x 1 vial
Control latex	1.3 mL x 1 vial
Extraction reagent 1	10 mL x 1 vial
Extraction reagent 2	2.5 mL x 1 vial
Test card	30 pcs.
Mixing stick	110 pcs.

Purpose: Reagent for the detection of penicillin-binding protein 2' (PBP2').

Features: Correlates well with the results of the mecA gene tests. Allows extraction and detection of PBP2' directly from bacteria cultivated on agar culture medium. Test time is about 15 minutes. Due to the use of monoclonal antibodies, sensitivity and specificity are high. Identification is easy with the use of the slide latex agglutination method.

Note: PBP2' has also been found to exist in MRCNS (Methicillin-resistant coagulase-negative *Staphylococcus aureus*). When identifying MRSA, use together with Staphylo-LA "SEIKEN.

DD Checker MEC(selective agar culture medium)

Product Code 410382	Contents
MEC (Mannit Egg Yolk Ceftizoxime) agar plates for MRSA	20 pcs

Purpose: For the screening of MRSA and other antibiotic-resistant *Staphylococcus*.

Features: For the selective cultivation of MRSA and other antibiotic-resistant *Staphylococcus* with ceftizoxime, polymyxin B, carumonam, and amphotericin B. In particular, ceftizoxime has a strong PBP2' induction action compared to oxacillin, making the selective characteristic of the agar more reliable. PBP2' can be detected more precisely by testing bacteria cultivated on MEC agar culture medium by using MRSA-Screen "SEIKEN". *Staphylococcus aureus* can also be identified by observing mannitol solution and egg-yolk reaction.

Note: Culture temperature should not exceed 35°C.

SET-RPLA**Research Use Only *Limited Supply**

Product Code 230829	Contents
Staphylococcal Enterotoxin A-D Detection (RPLA)	20 tests
<u>Kit contents:</u>	
Sensitized latex anti-enterotoxin A	5 mL x 1 vial
Sensitized latex anti-enterotoxin B	5 mL x 1 vial
Sensitized latex anti-enterotoxin C	5 mL x 1 vial
Sensitized latex anti-enterotoxin D	5 mL x 1 vial
Control latex	5 mL x 1 vial
Contol enterotoxin A (Lyophilized)	0.5 mL eq x 1 vial
Contol enterotoxin B (Lyophilized)	0.5 mL eq x 1 vial
Contol enterotoxin C (Lyophilized)	0.5 mL eq x 1 vial
Contol enterotoxin D (Lyophilized)	0.5 mL eq x 1 vial
Diluent	50 mL x 2 vials

*** Please inquire if you would like to know further information about this product.**

Purpose: For the detection of *staphylococcus* enterotoxins.

Features: *Staphylococcus* enterotoxins A to D can be detected by the reversed passive latex agglutination reaction method without the need for animal and tissue culture cells. The test has outstanding sensitivity and specificity. Easy to use with microplates.

TST-RPLA***Limited Supply**

Product Code 230041	Contents
Staphylococcal Toxic Shock Syndrome Toxin-1 (TSST-1) Detection (RPLA)	20 tests
<u>Kit contents</u>	
Sensitized latex	5 mL 1 vial
Control latex	5 mL 1 vial
Control TST (Lyophilized)	0.5 mL eq x 1 vial
Diluent	50 mL x 1 vial

*** Please inquire if you would like to know further information about this product.**

Purpose: For detection of TSST-1

Features: TSST-1 can be detected by the RPLA method without the need for animal or tissue cultured cells. Has outstanding sensitivity and specificity.

EXT-RPLA***Limited Supply**

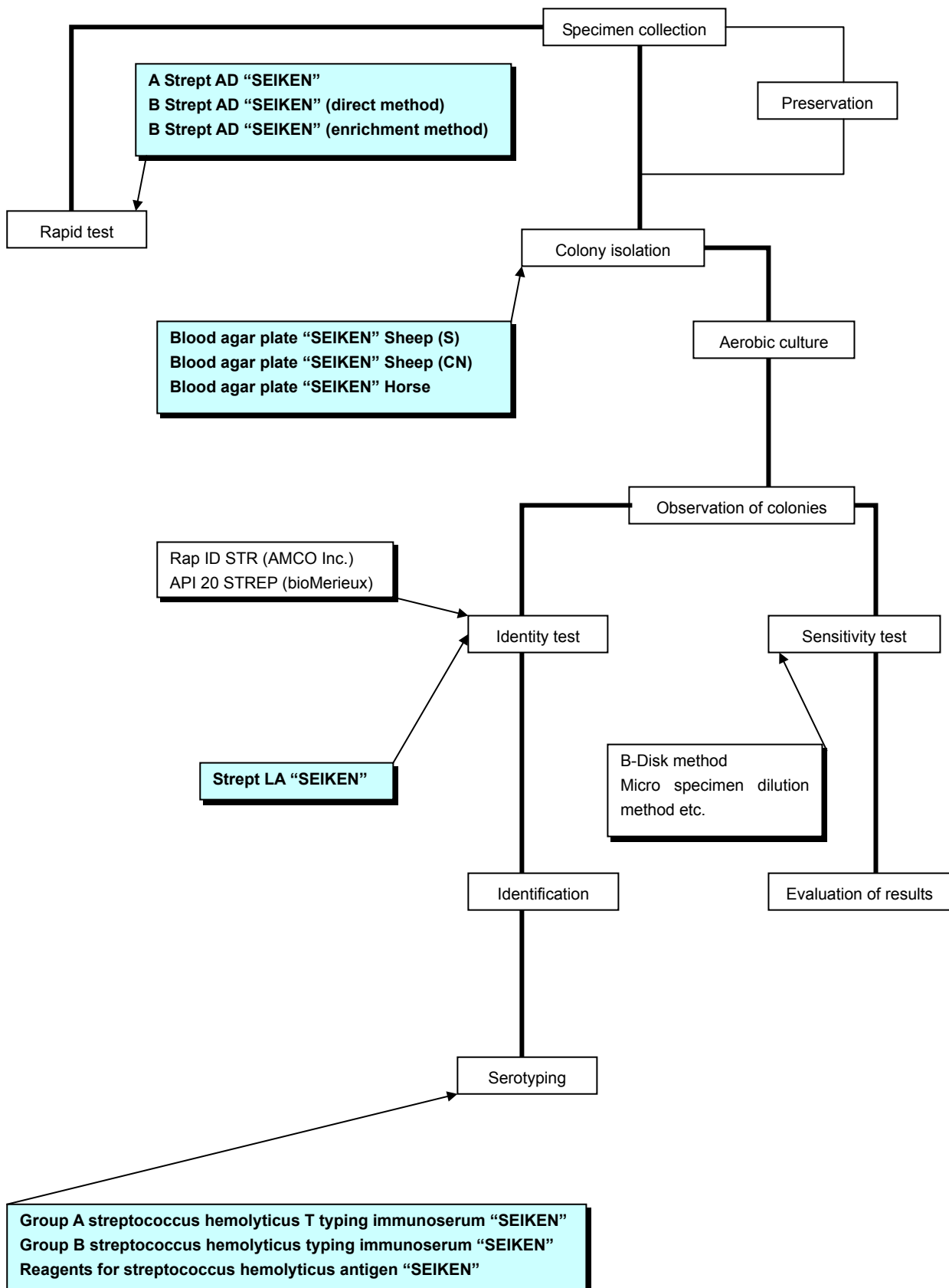
Product Code 230492	Contents
Staphylococcal Exfoliative Toxin A & B Detection (RPLA)	20 tests
<u>Kit contents</u>	
Sensitized latex anti-exfoliative toxin A (EXT-A)	5 mL 1 vial
Sensitized latex anti-exfoliative toxin B (EXT-B)	5 mL 1 vial
Control latex	5 mL 1 vial
Control EXT-A (Lyophilized)	0.5 mL eq x 1 vial
Control EXT-B (Lyophilized)	0.5 mL eq x 1 vial
Diluent	50 mL x 1 vial

*** Please inquire if you would like to know further information about this product.**

Purpose: For detection of exfoliative toxins in culture supernates of *Staphylococcus aureus*.

Features: *Staphylococcus* exfoliative toxins can be detected by the RPLA method without the need for animal or tissue cultured cells. Has outstanding sensitivity and specificity.

(VII) *Streptococcus*



Group B is CE Marked

Streptococci Antisea					
Group-A T-Typing Set (2 mL x 24)			200327	Group-B Typing	
Polyvalent T	213235	Polyvalent X	213266	Set (2 ml x 6)	270023
T-1	213280	T-8	213341	Ia	270146
T-3	213303	T-14 / 49	213396	Ib	270153
T-13	213389	T-25	213433	II	270160
T-B3264	213457	T-Imp. 19	213464	III	270177
Polyvalent U	213242	Polyvalent Y	213273	IV	270184
T-2	213297	T-9	213358	V	270191
T-4	213310	T-18	213402	Also available	
T-6	213334	T-22	213419	VI (NT6)	270207
T-28	213440	T-23	213426	VII (7271)	270221
Polyvalent W	213259			VIII (JM9)	270214
T-5 / 27 / 44	213327	Auxiliary reagents			271013
T-11	213365	Pancreatic extract			
T-12	213372	pH adjustment			
		Phenol red			

Auxiliary Reagents for Typing of *Hemolytic Streptococcus*

Product Code 271013	Contents
<u>Kit contents</u>	
Swine pancreas extract	5 mL x 4 vials
pH correction solution	5 mL x 2 vials
Phenol red solution	5 mL x 1 vial

Strept-LA

Product Code 230201	Contents
<i>Hemolytic Streptococci</i> Grouping Kit by Slide Latex Agglutination <u>Kit contents:</u> Sensitized latex A Sensitized latex B Sensitized latex C Sensitized latex G Positive control Extraction reagent 1 Extraction reagent 2 Extraction reagent 3 Test card Sampling cup Pipette Mixing stick	50 tests 2 mL x 1 vial 2 mL x 1 vial 2 mL x 1 vial 2 mL x 1 vial 1 mL x 1 vial 5 mL x 1 vial 5 mL x 1 vial 5 mL x 1 vial 55 sheets 55 pcs. 55 pcs. 220 pcs.

A Strept-AD “SEIKEN”

Product Code 230140	Contents
Group-A Streptococcal Antigen Detection Kit by Slide Latex Agglutination <u>Kit contents:</u> Sensitized latex Control latex Positive control Extraction reagent 1 Extraction reagent 2 Extraction reagent 3 Sampling cup Pipette Sterile swab Test card	50 tests 2 mL x 1 vial 2 mL x 1 vial 1 mL x 1 vial 5 mL x 1 vial 5 mL x 1 vial 5 mL x 1 vial 55 pcs. 55 pcs. 55 pcs. 30 pcs.

B Strept-AD (Enrichment Detection Method)

Product Code 230522	Contents
Group-B Streptococcal Antigen Detection Kit by Slide Latex Agglutination	50 tests
<u>Kit contents:</u>	
Sensitized latex	2 mL x 1 vial
Control latex	2 mL x 1 vial
Positive control	1 mL x 1 vial
Extraction reagent 1	5 mL x 1 vial
Extraction reagent 2	5 mL x 1 vial
Extraction reagent 3	5 mL x 1 vial
Enrichment broth	3 mL x 1 vial
Sterile swab	50 pcs.
Test card	30 pcs.
Mixing stick	120 pcs.

B Strept-AD (Direct Detection Method)

Product Code 230515	Contents
Group-B Streptococcal Antigen Detection Kit by Slide Latex Agglutination	50 tests
<u>Kit contents:</u>	
Sensitized latex	2 mL x 1 vial
Control latex	2 mL x 1 vial
Positive control	1 mL x 1 vial
Extraction reagent 1	5 mL x 1 vial
Extraction reagent 2	5 mL x 1 vial
Extraction reagent 3	5 mL x 1 vial
Sampling cup	55 pcs.
Dropper	55 pcs.
Sterile swab	50 pcs.
Test card	30 pcs.
Mixing stick	120 pcs.

<i>Streptococcus pneumoniae</i> Antisera					
Set (2mL x 8 polyvalent, 39 monovalent)					270054
Polyvalent 1	270542	Polyvalent 4	270573	Polyvalent 7	270603
1	270627	17	270771	27	270863
2	270634	18	270788	32	270900
3	270641	21	270818	36	270948
4	270658	22	270825	38	270955
5	270665	Polyvalent 5	270580	39	270962
Polyvalent 2	270559	20	270801	Polyvalent 8	270610
6	270672	29	270887	7	270689
8	270696	31	270894	19	270795
9	270702	33	270917	24	270849
10	270719	34	270924	40	270979
Polyvalent 3	270566	35	270931		
11	270726	47	271006		
12	270733	Polyvalent 6	270597		
14	270740	23	270832		
15	270757	25	270856		
16	270764	28	270870		
		41	270986		
		46	270993		

All serotyping results by this kit were completely identical to those obtained by the conventional method.

(VIII) Other Items

Alkalescens-Dispar

CE Marked

<i>Alkalescens-Dispar</i> Antisera	
Set (2 ml x 5)	270047
Polyvalent OK	270498
O1:K1	270504
O2:K1	270511
O3:K2	270528
O4:K3	270535

Bacillus cereus

CRET-RPLA

Product Code 230102	Contents
Bacillus cereus Enterotoxin Detection (RPLA)	20 tests
<u>Kit contents</u>	
Sensitized latex anti-enterotoxin	5 mL 1 vial
Control latex	5 mL 1 vial
Control enterotoxin (Lyophilized)	0.5 mL eq x 1 vial
Diluent	50 mL x 1 vial

Bordetella pertussis

<i>Bordetella pertussis</i> Antigen	
10 mL	
Phase I (Tohama strain) antigen	220134
Phase I (Yamaguchi strain) antigen	220141
Diluent	221445

Campylobacter jejuni**CE Marked**

Campylobacter jejuni Antisera			
Set (2 mL x 25, and reference antisera)		270030	
Group A	270238	Group R	270375
Group B	270245	Group S	270382
Group C	270252	Group U	270399
Group D	270269	Group V	270405
Group E	270276	Group Y	270412
Group F	270283	Group Z	270429
Group G	270290	Group Z2	270436
Group I	270306	Group Z4	270443
Group J	270313	Group Z5	270450
Group K	270320	Group Z6	270467
Group L	270337	Group Z7	270474
Group N	270344	Reference Antiserum	270481
Group O	270351		
Group P	270368		

Reagents for Sensitized Blood Cells	CE Marked	271051
Fixed Chick RBCs		25 mL x 1 vial
Extraction Reagent-1		13 mL x 1 vial
Extraction Reagent-2		13 mL x 1 vial
Extraction Reagent-3		13 mL x 1 vial
Buffer solution		50 mL x 2 vials

Based on the Penner Typing System. Serotypes for each group are as follows:

A: 1, 44	F: 6, 7	L: 15	S: 27	Z2: 41
B: 2	G: 8	N: 18	U: 31	Z4: 45
C: 3	I: 10	O: 19	V: 32	Z5: 52
D: 4, 13, 16, 43, 50	J: 11	P: 21	Y: 37	Z6: 55
E: 5	K: 12	R: 23, 36, 53	Z: 38	Z7: 57

Campylobacter LA

Product Code 230393	Contents
Screening of Campylobacter by Slide Latex Agglutination*	50 tests
<u>Kit contents:</u>	
Sensitized latex	2.5 mL x 1 vial
Control latex	2.5 mL x 1 vial
Positive control	1 mL x 1 vial
Diluent for specimens	50 mL x 1 vial
Test card	30 pcs.
Mixing stick	60 pcs.

*This product is not available for sale in all countries. Please enquire for further details

Clostridium perfringens Type A

<i>Clostridium perfringens</i> Type A Antisera			
Set (4 poly and 17 monovalents, 2 mL each)		200501	
Polyvalent I	214515	Polyvalent III	214539
Type 1	214553	Type 10	214645
Type 2	214560	Type 11	214652
Type 3	214577	Type 12	214669
Type 4	214584	Type 13	214676
Type 5	214591		
Polyvalent II	214522	Polyvalent IV	214546
Type 6	214607	Type 14	214683
Type 7	214614	Type 15	214690
Type 8	214621	Type 16	214706
Type 9	214638	Type 17	214713

PET-RPLA

Research Use Only *Limited Supply

Product Code 230836	Contents
<i>Clostridium perfringens</i> Enterotoxin Detection (RPLA)	20 tests
<u>Kit contents:</u>	
Sensitized latex	5 mL 1 vial
Control latex	5 mL 1 vial
Control enterotoxin (Lyophilized)	0.5 mL eq x 1 vial
Diluent	50 mL x 1 vial

*Please inquire if you would like to know further information about this product.

Haemophilus influenzae***CE Marked***

<i>Haemophilus influenzae</i> Antisera	
Set (2 mL x 6)	293688
Type a	293695
Type b	293701
Type c	293718
Type d	293725
Type e	293732
Type f	293749

Legionella pneumophila

<i>Legionella pneumophila</i> Antisera			
CE Marked		Research Use Only	
Set (2 mL x 10)	294623	Group 7 – Group 15	
Group 1	294746	Group 7	215727
Group 2	294753	Group 8	215734
Group 3	294760	Group 9	293572
Group 4	294777	Group 10	293589
Group 5	294784	Group 11	293626
Group 6	294791	Group 12	293633
<i>L. bozemanii</i>	294807	Group 13	293640
<i>L. dumoffii</i>	294685	Group 14	293657
<i>L. gormanii</i>	294678	Group 15	293664
<i>L. micdadei</i>	294814		

Listeria monocytogenes

<i>Listeria monocytogenes</i> Antisera				
Set (2 mL x 8, 5 mL x 4)	294616	<i>Listeria monocytogenes</i> Serotyping Guide		
		Serotype	O-antigen	H-antigen
Listeria O I/II	294548	1/2a	I, II	AB
Listeria O I	294531	1/2b	I, II	ABC
Listeria O IV	294555	1/2c	I, II	BD
Listeria O V/VI	294562	3a	I, II	BD
Listeria O VI	294579	3b	II, IV	AB
Listeria O VII	294586	3c	II, IV	BD
Listeria O VIII	294593	4a	VII, IX	ABC
Listeria O IX	294609	4ab	V, VI, VII, IX	ABC
Listeria H-A	294494	4b	V, VI	ABC
Listeria H-AB	294500	4c	V, VII	ABC
Listeria H-C	294517	4d	VI, VIII	ABC
Listeria H-D	294524	4e	V, VI	ABC
		7*	XII, XIII	ABC

Pseudomonas aeruginosa

<i>Pseudomonas aeruginosa</i> Antisera				
Set (2 mL x 3 polyvalent, 14 monovalent) 294616		Comparison of <i>P. aeruginosa</i> serotyping schemes		
		DENKA	Homma	Liu
Polyvalent I 213556		A	1	3
Group A	213587	B	2	2
Group C	213600		7	5
Group H	213655		13	16 H
Group I	213662		16	16 L
Group L	213693	C	3	7
Polyvalent II 213563				8
Group B	213594	D	4	9
Group J	213679	E	5	11
Group K	213686	F	6	4
Group M	213709	G	8	6
Polyvalent III 213570		H	9	10
Group D	213617	I	10	1
Group E	213624	J	11	15
Group F	213631	K	12	13
Group G	213648			14
Group N	213716	L	14	12
		M	15	
			17	
		N*		

*: Group N is corresponding to Meitert serotype 10.

Yersinia enterocolitica**CE Marked**

<i>Yersinia enterocolitica</i> Antisera	
Set (2 ml x 5)	293756
Poly: Group O1 and O2	293763
Group O3	293770
Group O5	293787
Group O8	293794
Group O9	293800

Yersinia pseudotuberculosis

<i>Yersinia pseudotuberculosis</i> Antisera	
Set (2 ml x 6)	200556
Group 1	215093
Group 2	215109
Group 3	215116
Group 4	215123
Group 5	215130
Group 6	215147