SMC® Human IL-22BP High Sensitivity Immunoassay Kit

Microparticle Assay

Human IL-22BP Immunoassay Kit for the Quantitative Determination of IL-22BP in Human Serum and Plasma

03-0219-00

For research use only. Not for use in diagnostic procedures.

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Introduction

Interluekin-22 Binding Protein (IL-22BP), also known as IL-22 Receptor Subunit Alpha-2 (IL-22RA2) is a protein secreted by a variety of tissues to modulate IL-22 activity. As an antagonist, IL-22BP modulates the activity of IL-22 by binding the site used to interact with IL-22 receptors. In doing so, IL-22BP can downregulate the immune-related functions of IL-22. This interaction has been indicated as playing a role in inflammatory bowel disease (IBD), autoimmune diseases, cancer, and other disease states. High levels of IL-22BP are associated with increased susceptibility to infection and impaired tissue repair. Low levels of IL-22BP are associated with inflammatory responses and autoimmune conditions.

The SMC® Human IL-22BP High Sensitivity Immunoassay uses a quantitative fluorescent sandwich immunoassay technique to measure IL-22BP in human serum and plasma samples. A capture antibody specific for human IL-22BP has been pre-coated onto paramagnetic microparticles (beads). The user pipettes beads, standards, and samples into uncoated microplate wells. During incubation, the IL-22BP present in the sample binds to the capture antibody on the coated beads. Unbound molecules are washed away during the subsequent wash steps. Fluor-labeled detection antibody is added to each well and incubated. This detection antibody recognizes and binds to IL-22BP that has been captured onto the beads, thus completing the sandwich. Elution buffer is added to dissociate the protein sandwich, releasing the fluor-labeled antibodies. The eluted antibodies are transferred to a SMCxPRO® 384-well plate. The plate is loaded into the SMCxPRO® System where the labeled molecules are detected and counted. The number of fluor-labeled detection antibodies counted is directly proportional to the amount of IL-22BP present in the sample. The amount of IL-22BP in unknown samples is interpolated from a standard curve.

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Supplies

Included with the Kit

The SMC® Human IL-22BP Immunoassay Kit includes all reagents listed below; these components are lot matched and not intended to be used separately. Additional reagents and supplies are required to run this immunoassay, as listed in the next section; Additional Supplies Required (not provided). This kit and all reagents supplied are for research use only.

All items are shipped with a cold pack unless otherwise stated.

Description	Storage Conditions	Packaging Details	Component Number
Assay Buffer	2-8 °C	2 x 20 mL	02-9944-00
IL-22BP Coated Beads	2-8 °C	1 x 550 µL	02-2219-00
Standard Diluent	2-8 °C	2 x 20 mL	02-0225-02
IL-22BP Detection Antibody	2-8 °C	1 x 270 µL	02-1219-00
IL-22BP Standard	2-8 °C	1 lyophilized vial	02-8219-00
IL-22BP Quality Control	2-8 °C	1 lyophilized vial	02-6219-00
10X Wash Buffer	2-8 °C	2 x 50 mL	02-0001-03
Buffer D	2-8 °C	1 x 6 mL	02-0446-00
Elution Buffer B	2-8 °C	1 x 5 mL	02-0211-02
SMC® 1 Plex Commercial Plate	RT	1 Plate	02-1PCP-00

Kit Storage

The SMC® Human IL-22BP High Sensitivity Immunoassay Kit should be stored at 2-8 °C. Discard standards after one use.

Supplied 10X Wash Buffer does not contain preservative. After dilution, the 1X Wash Buffer may be filter sterilized with Stericup® Filter, for storage of up to 1 month at 2-8 °C. If not filter sterilized, all remaining 1X Wash Buffer should be discarded upon experiment completion.

Proper kit performance can only be guaranteed if the materials are stored properly.

Additional Supplies Required (Not provided)

Catalogue numbers are provided to purchase products at SigmaAldrich.com unless otherwise noted.

Equipment

- SMCxPRO® Ultrasensitive Immunoassay System for sample acquisition (95-0100-00)
- Orbital microplate shaker for assay plate incubation (e.g., Boekel Scientific® Jitterbug™)
- Bio-Tek® 405 TSUVS Microplate Washer for assay plate washing (95-0004-05)
- Sphere Mag Plate for performing microparticle capture (90-0003-02)
- Rotisserie tube rotator for microparticle suspension
- Benchtop centrifuge with bucket rotors capable of reaching 1,100 *x g* for sample/plate centrifugation
- Microcentrifuge capable of reaching 13,000 *x g* for reagent/sample centrifugation
- Single channel manual pipettes to accurately dispense 10-20 µL and 20-250 µL
- 12-channel manual pipettes to accurately dispense 10-20 µL and 20-250 µL
- Plate Roller for complete plate sealing (Fisher Scientific, NC9185793)

Supplies

- Micro-centrifuge tubes for sample preparation and storage
- 1 L Container with cap for wash buffer dilution
- Stericup® Filter, 0.22 µm, 1 L; for filter sterilizing 1X Wash Buffer (S2GPU11RE)
- MultiScreen®$_{HTS}$ BV 96-Well Filter Plate for sample filtration (MSBVN1210)
- 15 mL conical tube with cap for capture bead and Detection Antibody dilution
- 96-well V-bottom plate for assay setup (Fisher Scientific, 14-222-241)
- Axygen™ Microplate Sealing Film and Tapes (Fisher Scientific, 14-222-344)
- Universal plate cover to minimize plate well contamination (Fisher Scientific, 253623)
- 12-Channel Reagent Reservoir (sterile) for standard serial dilution (Argos/Cole Parmer 04395-33)
- VistaLab® 25 mL Reservoirs for addition of reagents (Fisher Scientific, 21-381-27C)
- Millex® Syringe Filter, 0.2 µm for Detection Antibody filtration (SLGPR33RS)
- Luer-Lok® Syringe, 5 mL; for Detection Antibody filtration (Fisher Scientific, 14-829-45)
- SMCxPRO® 384-Well Plate with adhesive seal (02-1008-00)
- SMCxPRO® 384-Well Plate, bulk case of 32 (ABB2-00160A)
- Nunc™ Aluminum Adhesive Plate Seals (Fisher Scientific, 276014)

Reagents

- 10X Wash Buffer for automated assay plate washing, 1 L (02-0111-00)
- De-ionized or distilled water for dilution of 10X Wash Buffer

Assay Best Practices

To obtain reliable and reproducible results, the operator should carefully read this entire manual and fully understand all aspects of each assay step before running the assay. The following notes should be reviewed and understood before the assay is set up.

- Wipe down bench and pipettes with 70% isopropanol before use.
- It is important to allow all reagents to warm to room temperature (20-25 °C).
- Use sterile filter pipette tips and reagent trays to avoid contamination.
- Pre-wet tips (aspirate and dispense within well) twice before each transfer.
- The standards prepared by serial dilution must be used within 10 minutes of preparation.

  Note: It is recommended that the standards are prepared as the last step prior to plate setup.
- All washing must be performed with the wash buffer provided.
- Boekel Scientific® Jitterbug™ Shaker settings #3-5 provide maximal orbital mixing without splashing liquid or causing cross-contamination.

  Note: If using different orbital shaker, refer to recommended rpm ranges provided for each incubation step, and adjust speeds as necessary to ensure maximal orbital mixing without splashing liquid or causing cross-contamination.
- Plate must also be protected from light after adding detection.
- After the assay is complete, the plate should be read immediately.
- The plates may be stored at 2-8 °C for up to 48 hours away from light if same day reading is not possible.
- After the assay is complete, seal the plate before storing at 2-8 °C.

  Note: For SMCxPRO® Immunoassay System, use aluminum adhesive plate seal.
- Bring to RT then centrifuge the plate at 1,100 *x g* for 1 minute prior to reading.

  For optimal SMCxPRO® performance, perform ASSIST testing daily (ideally at beginning of the day before assay is prepared).

SMC® Assay Overview

1. Prepare all reagents, standard curve, and samples as instructed.
2. Add 100 µL of Standard/Quality Control/1:2 diluted Samples and 100 µL of Coated Beads to assay plate.
3. Seal and incubate for 2 hours at 25 °C on appropriate microplate incubator/shaker.

2 hours 25 °C

4. After capture incubation, centrifuge assay plate at 1,100 *x g* for 1 minute.
5. Perform Post-Capture Wash.
6. Remove from washer magnet and add 20 µL of Detection Antibody per well.
7. Seal assay plate and incubate for 1 hour at 25 °C on microplate incubator/shaker.

1 hour at 25 °C

8. Perform Post-Detection Wash.
9. Seal the assay plate and perform the post-detection shake for 2 minutes on microplate incubator/shaker.
10. Perform the Final Aspiration.
11. Remove from washer magnet and add 10 µL of Elution Buffer B to each well.
12. Seal assay plate and incubate for 10 minutes at 25 °C on microplate incubator/shaker.

10 minutes at 25 °C

13. Add 10 µL of Buffer D to neutralize the eluted antibody.
14. Transfer 18 µL of neutralized eluate to the SMC® Read Plate.
15. Seal SMC® Read Plate with aluminum adhesive plate seal for SMCxPRO® System.
16. Load on SMCxPRO® System.

Assay Preparation

Sample Preparation

Prepare Serum or Plasma samples by one of the following methods:

- **Preferred Method:** If using a filter plate with prefilter: Stack the filter plate on top of a 96-well receptacle plate. Place 250 µL of sample into a filter plate well and spin for ≥ 10 minutes at 1,100 x *g*.
- **If using a microcentrifuge:** Centrifuge samples at > 13,000 x *g* for 10 minutes immediately prior to use. Carefully pipette the supernatant into a clean microcentrifuge tube, avoiding particulates and slowly aspirating below the lipid layer.

Sample Dilution

1. Dilute the clarified samples 1:2 using the Standard Diluent (e.g., for triplicates, transfer 200 µL of clarified sample to the sample preparation plate and add 200 µL Standard Diluent).
2. Add 100 µL per well of 1:2 diluted Serum and Plasma.
3. If further sample dilution is required, samples can be diluted with the provided Standard Diluent.

Reagent Preparation

1. Warm all reagents to room temperature (RT) prior to use.
2. Store the Detection Antibody away from light until ready to use.
3. Prepare 1X Wash Buffer (from 10X Wash Buffer) as follows:
   - Pour both bottles of 10X Wash Buffer (containing 50 mL each for 100 mL total) into a container capable of holding at least 1 L. Add 900 mL of deionized water.
   - Mix thoroughly by gentle inversion or with a clean, sterile stir bar.

   Note: 1X Wash Buffer may be filter sterilized (refer to Storage Instructions).
4. Mix IL-22BP Antibody Coated Beads on a rotisserie spin rotator, or manually by repeat inversion, for ≥ 20 minutes until all beads are resuspended.

QC Preparation

1. Reconstitute lyophilized QC in 250 µL of deionized water. Invert the vial several times to mix. Gently pulse vortex the vial for 10 seconds. Allow the vial to sit for 5-10 minutes.
2. Refer to the Certificate of Analysis for the Final QC expected concentration.
3. To prepare the High QC, dilute 14.3 µL of the IL-22BP QC in 985.7 µL of Standard Diluent.
4. To prepare the Low QC, dilute 20 µL of the High QC with 480 µL of Standard Diluent.

   Note: If a Mid QC is desired, dilute 100 µL of the High QC with 400 µL of Standard Diluent.

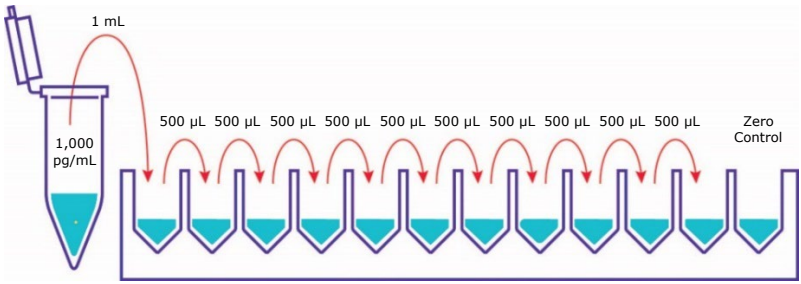
Initial Standard Stock Preparation

1. Reconstitute lyophilized standard in 250 µL of deionized water. Invert the vial several times to mix. Gently pulse vortex the vial for 10 seconds. Allow the vial to sit for 5-10 minutes.
2. Refer to the standard value assignment on the Certificate of Analysis for the starting concentration of the IL-22BP Standard in the vial.
3. Perform the necessary dilutions in Standard Diluent to achieve the final working concentration of 1,000 pg/mL in a 1.0 mL final volume.

Standard Curve

Prepare the standard curve in a 12-channel reagent reservoir. Perform 1:2 serial dilutions of the 1,000 pg/mL Standard 1 for Standards 2 through 11 to achieve a curve from 1,000 pg/mL to 0.98 pg/mL. Standard 12 is the Blank (Standard Diluent only).

Run the standards in triplicate.



1	2	3	4	5	6	7	8	9	10	11	12
1,000	500	250	125	62.5	31.3	15.6	7.81	3.91	1.95	0.98	0

Note: Pipette gently into reservoir wells to avoid creating bubbles.

1. Add 500 µL Standard Diluent to wells 2 through 12 of a 12-channel reservoir dilution plate.
2. Transfer 1,000 µL of 1,000 pg/mL working stock (Standard 1) into well 1.
3. Transfer 500 µL from well 1 into well 2, mixing thoroughly. Continue serial dilutions from well 2 stopping at well 11, mixing thoroughly each time. Use a fresh tip with each transfer.

Assay Procedure

Target Capture

1. Pipette 100 µL per well of Standards, Quality Controls, or 1:2 diluted Samples to assay plate.
2. Retrieve the IL-22BP Coated Bead vial from the rotator and transfer its full contents to 11.0 mL of supplied Assay Buffer. Rinse the bead vial with 0.55 mL of fresh Assay Buffer and ensure that all beads have been transferred from the original vial. Mix by gentle inversion. There should be a total volume of 12.1 mL of diluted IL-22BP Coated Beads.
3. Using a multichannel pipette, add 100 µL per well of diluted IL-22BP Coated Beads into the assay plate.
4. Seal the assay plate with clear adhesive plate seal, applying pressure to the seal to prevent leaking and cross-contamination.
5. Incubate for 2 hours at 25 °C on microplate incubator/shaker set at approximately 650-750 rpm or Jitterbug™ setting #3.
6. A minimum of 10 minutes prior to the end of target capture incubation, prepare the IL-22BP Detection Antibody working stock:

   Prepare 1X Detection Antibody by adding 250 µL of 20X Detection Antibody into 4,750 µL of Assay Buffer and filter the diluted Detection Antibody using the syringe with a 0.2 µm filter into a clean tube.
7. When incubation is complete, centrifuge the assay plate at 1,100 x *g* for 1 minute, place the plate on the washer magnet, and carefully remove clear adhesive plate seal to avoid splashing.

Post-Capture Wash

Wash plate once with a plate washer using the Post Capture Wash (POSTCAP) program on the Bio-Tek® 405 TSUVS washer.

If using automation, please contact your technical service representative for the appropriate automation procedure.

Detection Antibody Incubation

1. After removal from the plate washer, place the assay plate onto the sphere mag plate and allow beads to form a tight pellet at the well corners for 2 minutes.
2. Using a multichannel pipette, dispense 20 µL per well of IL-22BP Detection Antibody using reverse pipetting without disturbing the bead pellets.
3. Seal the assay plate with a new clear adhesive plate seal. Apply pressure to the seal to prevent leaking and cross-contamination.
4. Incubate for 1 hour at 25 °C on microplate incubator/shaker set at approximately 1000 rpm or Jitterbug™ setting #5. Ensure plate is protected from light during this incubation.
5. When incubation is complete, centrifuge at 1,100 x *g* for 1 minute then carefully remove the clear adhesive plate seal to avoid splashing.

Post-Detection Wash

Wash the assay plate with wash buffer using the 4 cycle Pre-Transfer (4CYCPRE) program on the Bio-Tek® 405 TSUVS washer.

If using automation, please contact your technical service representative for the appropriate automation procedure.

Post-Detection Shake

1. After 4 cycle Pre-Transfer wash, visually verify that each well contains ~200 µL of wash buffer.
2. Seal the assay plate with a new clear adhesive plate seal. Apply pressure to the seal to prevent leaking and cross-contamination.
3. Place the plate on the microplate/incubator shaker set at approximately 500-750 rpm or Jitterbug™ setting #3 for 2 minutes. **Ensure plate is protected from light during this incubation.**
4. Remove the plate from the shaker, and centrifuge at 1,100 x *g* for 1 minute. Carefully remove clear adhesive plate seal to avoid splashing and place it on the plate washer to perform Final Aspiration.

Final Aspiration

Perform the Final Aspirate program (FINASP) on the Bio-Tek® 405 TSUVS washer.

If using automation, please contact your technical service representative for the appropriate automation procedure.

Elution

1. After removal from the plate washer, place the assay plate onto the sphere mag plate and allow beads to form a tight pellet at the well corners for 2 minutes.
2. Dispense 10 µL Elution Buffer B per well using reverse pipetting without disturbing the bead pellet.
3. Seal assay plate with a new clear adhesive plate seal. Apply pressure to the seal to prevent leaking and cross-contamination.
4. Incubate the plate for 10 minutes at 25 °C on microplate incubator/shaker set at 1000-1500 rpm or Jitterbug™ setting #5. Ensure plate is protected from light during this incubation.
5. When incubation is complete, centrifuge at 1,100 *x g* for 1 minute.

Assay Reading on the SMCxPRO® Immunoassay System

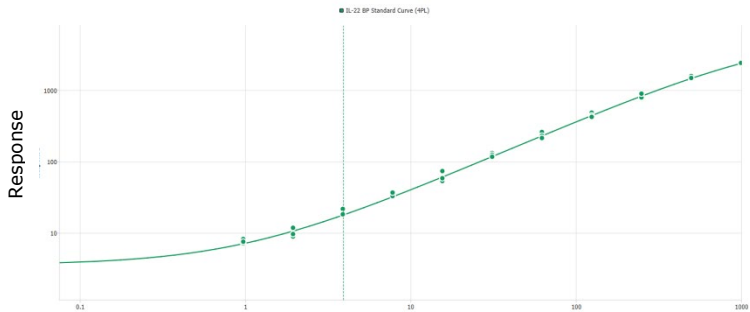
1. Place the assay plate with Elution Buffer B onto the sphere mag plate and allow beads to form a tight pellet for 2 minutes.
2. Keeping the assay plate on the magnet, carefully remove the adhesive plate seal. Using a multichannel pipette, add 10 µL of Buffer D to center of wells containing Elution Buffer B. Use a fresh tip with each dispense.
3. Set a manual 12-channel pipette to 18 µL and put 12 tips onto the pipettor. Transfer 18 µL of neutralized eluate solution per well to corresponding wells of the SMCxPRO® Read Plate, placed over the included plate holder by aspirating directly from the v-bottom of the plate, avoiding the pelleted beads, and changing tips with each dispensed row.
4. Seal the 384-well Read Plate with a new clear adhesive plate seal. Centrifuge plate for 1 minute at RT, approximately 1,100 x *g*. Remove the seal, inspect reading plate wells and remove bubbles if they are present.
5. Firmly seal the reading plate with aluminum plate seal using the recommend plate roller.
6. Remove the plate holder from the sealed reading plate and load it onto the SMCxPRO® Immunoassay System. Start read.

   Note: There is a smart warm up period of up to 30 minutes to equilibrate plate temperature to internal instrument temperature. Once achieved the read will start automatically.

Assay Characteristics

Typical Reference Curve

Typical SMCxPRO® Immunoassay System Standard Curve is shown below (not to be used to calculate data).



Sensitivity

Assay sensitivity measures the true limit of quantitation of an analyte and is often defined by the Lower Limit of Quantification (LLOQ). LLOQ is calculated as the lowest concentration that can achieve CVs of < 20% and the percent recovery of the standard point is still between 80-120%. The LLOQ of IL-22BP is 3.91 pg/mL. Please note that the published LLOQ is data generated during kit verification and can have minor variation between kit lots. For lot specific LLOQ, please see the certificate of analysis.

Precision

The assay variations of SMC® Human IL-22BP Immunoassay kits were studied using five normal plasma samples run in triplicate by 3 different operators on 3 different days.

- Mean intra-assay variation was < 10%.
- Mean inter-assay variation was < 20%.

Cross-Reactivity

Cross-reactivity to the following analytes were tested with the following results:

- Human IL-10: < 1%
- Human IL-22: < 1%

Specificity to the following species samples were tested with the follow results:

- Rat: 4 out of 4 individuals were quantifiable.
- Mouse: 1 out of 4 individuals were quantifiable.
- Cynomolgus Monkey: 1 out of 2 individuals were quantifiable.
- Rhesus Monkey: 2 out of 2 individuals were quantifiable.
- Canine: 4 out of 4 individuals were quantifiable.
- Feline: 4 out of 4 individuals were quantifiable.

Spike Recovery

The data represent mean percent recovery of three different concentrations of standard spiked into samples (n = 5 serum samples, 5 plasma samples).

If you have both, separate them out. Data should match with verification report.

Sample ID	Serum Recovery	Plasma Recovery
Sample 1	144%	91%
Sample 2	107%	93%
Sample 3	88%	85%
Sample 4	116%	98%
Sample 5	125%	62%
Average	116%	86%

Troubleshooting

Problem	Probable Cause	Solution
Background is too high	Background wells were contaminated	Avoid cross-well contamination by using seal appropriately. Pipette with multichannel pipets without touching reagent in plate. Change tips when adding reagents if cross contamination is expected.
		Ensure reagents (including wash buffer) are not contaminated.
		Insufficient washes—washer may need to be cleaned or reprogrammed.
	Plate was over-incubated	Confirm plate incubation times are as recommended, particularly for the Detection incubation.
Sample variability is high	Multichannel pipet may not be calibrated	Calibrate pipets.
	Plate washing was not uniform	Confirm that there is no residual left in the wells following post-capture wash step and Final Aspirate. Ensure that you have < 2 µL or residual remaining in the well.
	Samples may have high particulate matter or other interfering substances	Samples should be filtered according to the Assay Preparation section. Unprocessed samples could lead to higher imprecision.
	Plate agitation was insufficient	Plate should be agitated during all incubation steps using an orbital plate shaker at a speed where beads are in constant motion without causing splashing (~650-1500 rpm).
	Cross-well contamination	Ensure that the plate is sealed well at each incubation step. If splashing occurs on plate seal, centrifuge plate at 1,100 *x g* for 1 minute to remove material prior to removing the seal. A new plate seal should be used every time the plate is sealed.
		Care should be taken when using same pipet tips that are used for reagent additions and that pipet tip does not touch reagent in plate.

Problem	Probable Cause	Solution
Beads are lost during the wash	Plate washer needs optimization/cleaning	Contact Tech Support or local Specialist to schedule washer programming. Refer to user guide for cleaning procedure.
	Insufficiently primed washer	Washer should be primed with wash buffer prior to running the post capture wash protocol.
	Beads came in contact with water	Washer should be primed with wash buffer sufficiently prior to plate wash. Viscosity of water changes the performance of the magnetic particles.
	Proper magnet was not used	Ensure that the mag plate Catalogue No. 90-0003-02 was present on plate wash stage prior to running wash protocol.
Published LLoQ was not achieved	Improper dilution/reconstitution of the standard reference material	Confirm appropriate kit protocol was followed when preparing standard curve.
		Check plate washer to confirm no beads were lost during washes and that plate contains < 2 µL following the post-capture and final aspiration protocols.
		Ensure standards are prepared before starting capture incubation.
Microparticles do not resuspend into homogenous solution	Beads were not properly stored and may have been frozen	Labelled microparticles should be stored at 4 °C. If microparticles are frozen, they will not resuspend properly.
	Samples may be causing interference due to excess particulate matter	Samples should be properly processed prior to testing to remove particulate matter or lipids.

Precautions

Use caution when handling biological samples. Wear protective clothing and gloves.

Components of this reagent kit contain sodium azide as a preservative. Sodium azide is a toxic and dangerous compound when combined with acids or metals. Solutions containing sodium azide should be disposed of properly.

Hazard Labels

Ingredient	Catalogue No.	Label	
IL-22BP Standard IL-22BP Quality Control	02-8219-00 02-6219-00		**Warning.** Harmful if swallowed, in contact with skin or if inhaled. May cause damage to organs Brain through prolonged or repeated exposure if swallowed. May cause damage to organs Respiratory Tract through prolonged or repeated exposure if inhaled. Harmful to aquatic life with long lasting effects. Do not breathe dust. Wash skin thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing. IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth. IF ON SKIN: Wash with plenty of water. Call a POISON CENTER/doctor if you feel unwell. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell. Get medical advice/ attention if you feel unwell. Take off contaminated clothing and wash it before reuse. Dispose of contents/container to an approved waste disposal plant.
IL-22BP Coated Beads	02-2219-00	No Label Required	Harmful to aquatic life. Avoid release to the environment. Dispose of contents/container to an approved waste disposal plant.

Ingredient	Catalogue No.	Label	
Assay Buffer	02-9944-00	No Label Required	Harmful to aquatic life with long lasting effects. Avoid release to the environment. Dispose of contents/container to an approved waste disposal plant.
Standard Diluent	02-0225-02		**Warning.** May cause damage to organs Respiratory Tract through prolonged or repeated exposure if inhaled. Do not breathe dust/fume/gas/mist/vapours/ spray. Get medical advice/ attention if you feel unwell. Dispose of contents/ container to an approved waste disposal plant.
10X Wash Buffer	02-0001-03		**Warning.** Causes serious eye irritation. Harmful to aquatic life with long lasting effects. Avoid release to the environment. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Elution Buffer B	02-0211-02	No Label Required	Harmful to aquatic life. Avoid release to the environment. Dispose of contents/ container to an approved waste disposal plant.

	1	2	3	4	5	6	7	8	9	10	11	12
A	Standard 1	Standard 2	Standard 3	Standard 4	Standard 5	Standard 6	Standard 7	Standard 8	Standard 9	Standard 10	Standard 11	Standard 12
B	Standard 1	Standard 2	Standard 3	Standard 4	Standard 5	Standard 6	Standard 7	Standard 8	Standard 9	Standard 10	Standard 11	Standard 12
C	Standard 1	Standard 2	Standard 3	Standard 4	Standard 5	Standard 6	Standard 7	Standard 8	Standard 9	Standard 10	Standard 11	Standard 12
D	QC1	QC1	QC1	QC2	QC2	QC2	QC3	QC3	QC3	Sample 1	Sample 1	Sample 1
E	Sample 2	Sample 2	Sample 2	Sample 3	Sample 3	Sample 3	Etc.	Etc.	Etc.			
F												
G												
H												

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Safety Data Sheets (SDS)

Safety Data Sheets are available on the product page at SigmaAldrich.com.

Contact Information

For the location of the office nearest you, go to SigmaAldrich.com/offices.

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