SUPERNOVA POLYMER DYES

A STELLAR NEW WAY TO SEE DIM POPULATIONS

VISUALIZE
the possibilities.

BECKMAN COULTER
Life Sciences

INTRODUCING THE NEXT GENERATION OF POLYMER DYES WITH IMPROVED STAINING INDEX

Beckman Coulter Life Sciences introduces the next generation of polymer dyes to bring cutting edge science to clinical research.

SuperNova conjugated antibodies not only deliver unique brightness for flow cytometry staining, but also generate limited nonspecific staining thanks to a proprietary formulation.

SuperNova v428

SuperNova v428 (SNv428), the first dye of the series, is optimally excited by the violet laser (405 nm) with an excitation maximum of 414 nm. It has an emission peak of 428 nm and can be detected using a 450/50 bandpass filter or equivalent. It is among the brightest dyes excitable by the violet laser, and is therefore particularly suited for the assessment of dimly expressed markers.

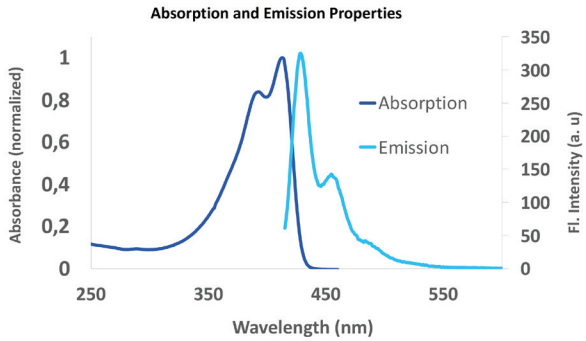


Figure 1: Absorption and emission spectra λ_{exc} = 405 nm of SuperNova v428 in PBS.

SuperNova v605

SuperNova v605 (SNv605) is a tandem polymer dye, derived from the core SN v428. Therefore both share the same absorbance characteristics, with a maximum excitation at 414 nm. With emission peaks at 605 nm, it is optimally detected using the 610/20 nm bandpass filters of the flow cytometer.

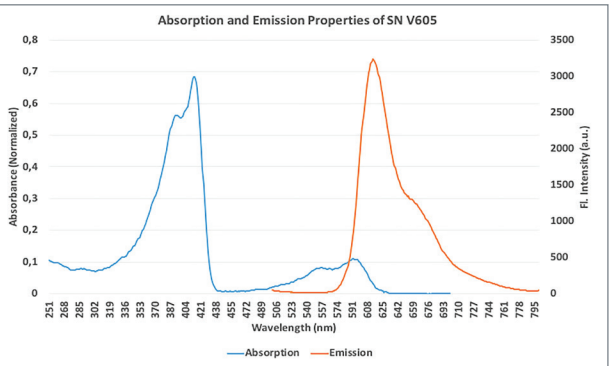


Figure 2: Absorption and emission spectra λ_{exc} = 405 nm of SuperNova v605 in PBS.

SuperNova v786

SuperNova v786 (SNv786) is a tandem polymer dye, derived from the core SN v428. Therefore both share the same absorbance characteristics, with a maximum excitation at 414 nm. With emission peaks at 786 nm, it is optimally detected using the 780/60 nm bandpass filters of the flow cytometer.

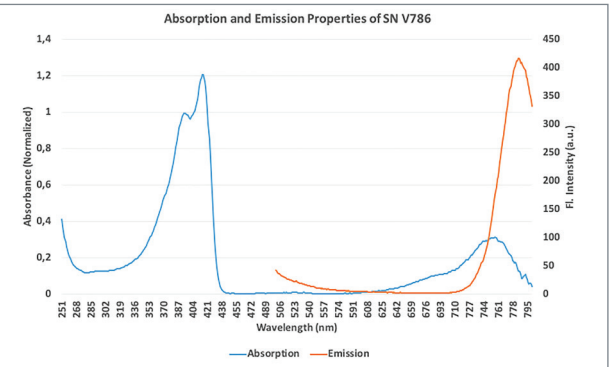


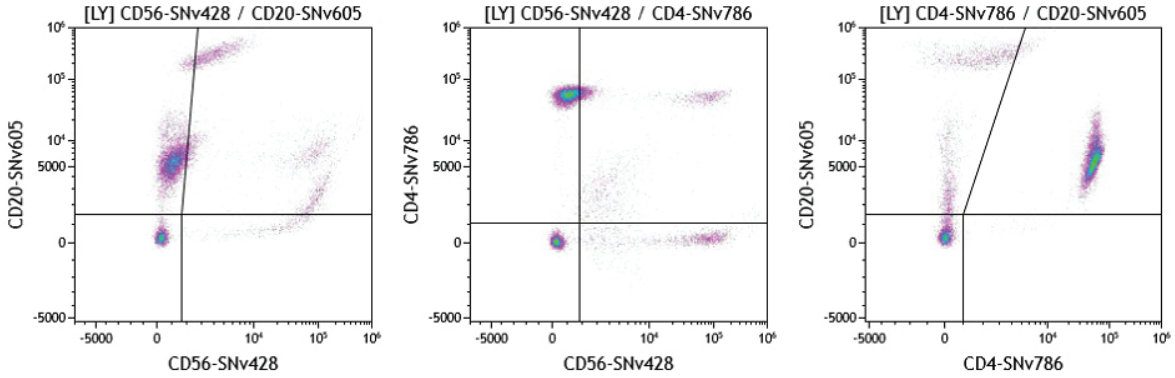
Figure 3: Absorption and emission spectra λ_{exc} = 405 nm of SuperNova v786 in PBS.

STAINING BUFFER

The SuperNova Staining Buffer has been designed to avoid non-specific interactions between SuperNova antibody conjugates when they are mixed in a cocktail for a flow cytometry experiment. The SuperNova Staining Buffer is only necessary when there is more than one SuperNova antibody conjugate in the cocktail.

Abnormal stainings can occur in case of absence or misuse of the SuperNova Staining Buffer (data can appear under-compensated). The SuperNova Staining Buffer is compatible with the use of other fluorochrome antibody conjugates, with a surface or intracellular procedure.

Staining without the use of SuperNova Staining Buffer



Staining with the use of SuperNova Staining Buffer

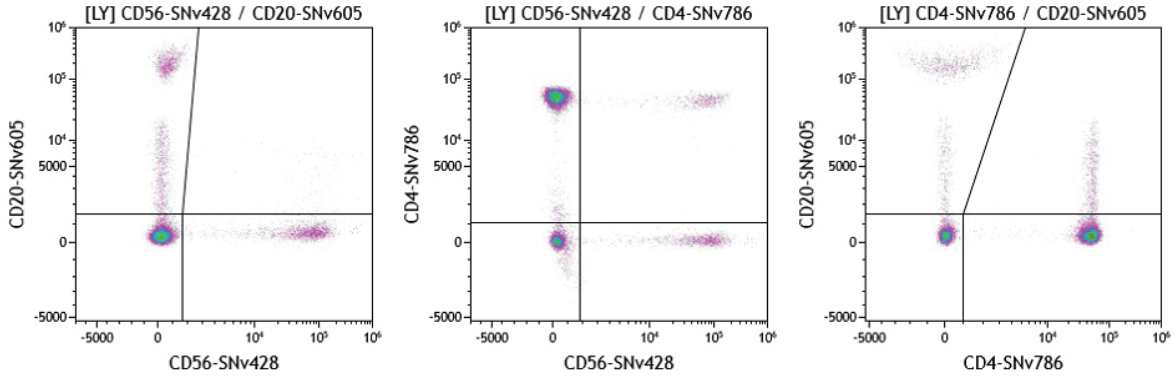
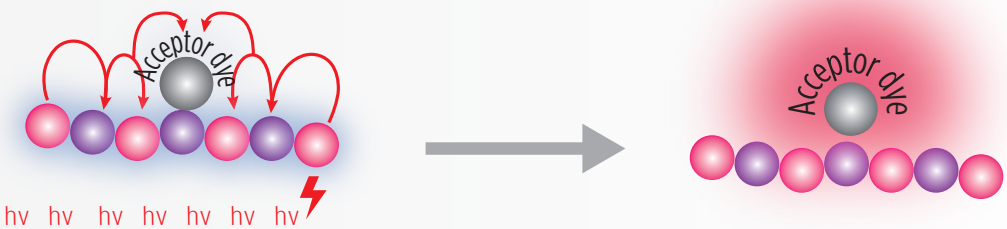


Figure 4: Normal whole blood staining with CD56-SNv428, CD20-SNv605 and CD4-SNv786 with and without SuperNova staining buffer

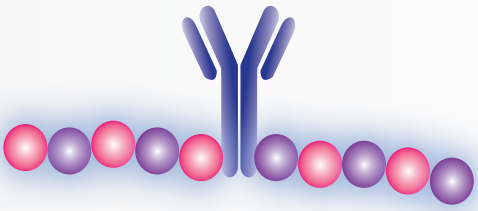
SUPERNOVA POLYMER DYES TECHNOLOGY

1. Polymers are made from different monomers

2. Each monomer can absorb light and reemit at longer wavelength



3. Tandems can be derived from core polymers



4. Both core and tandem polymers can be conjugated to antibodies

SNv428 COMPARISON TO BV*421 & SUPERBRIGHT* 436

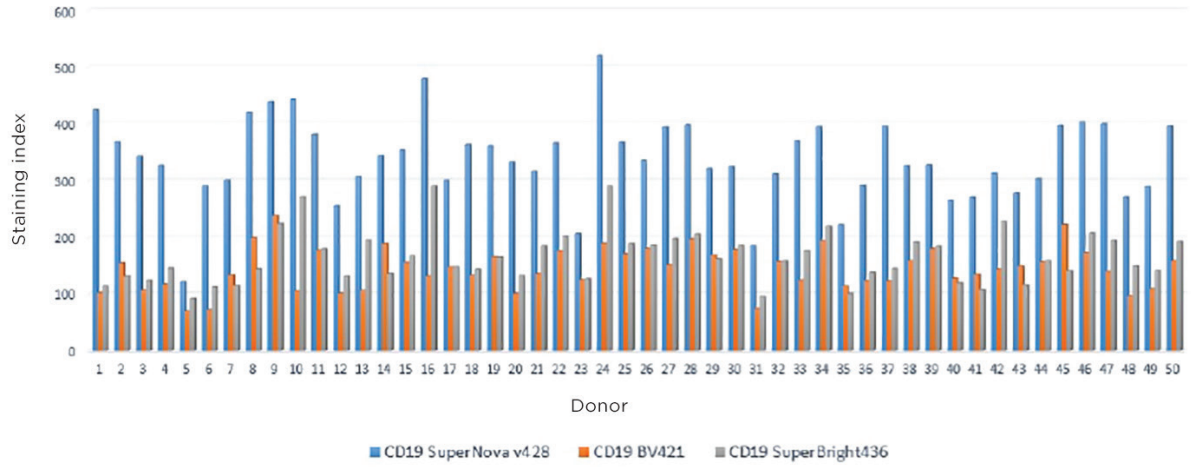


Figure 5: Staining index comparison CD19-SNv428 vs CD19-BV*421 vs CD19-SB*436 on 50 whole blood samples. Study conducted by BioCytex (Biotech company specialized in standardization of flow assays)

SNv428 FLOW CYTOMETRY RESULTS

As shown in Table 1 and Figure 6, SuperNova v428 conjugated antibodies deliver brighter signal compared to their BV*421 equivalent, and consequently greater discrimination between negative and positive populations, making them well-suited to stain dim populations. SNv428 conjugates also generate significantly less non-specific staining to help ensure more confidence in the results. SNv428 conjugates are a brighter alternative to Pacific Blue*, being on average more than 10 times brighter, and the only fluorochrome excitable by the violet laser delivering a brightness even superior to PE conjugates.

		Lymphocytes Stain Index	Monocytes MFI (background)
CD19	SNv428	281	0,688
	BV*421	191	1,533
	PE	246	0,805
	Pacific Blue*	48	0,600
CD22	SNv428	172	1,033
	BV*421	123	1,476
	PE	136	0,716
	Pacific Blue*	28	0,958
CD25	SNv428	36	0,731
	BV*421	14	2,021
	PE	24	1,052
	Pacific Blue*	6	0,522

Table 1: Lymphocytes staining index and monocytes MFI (background) obtained staining normal whole blood with lymphocytes markers conjugated to SNv428, BV*421, PE and Pacific Blue*.

FLOW CYTOMETRY RESULTS

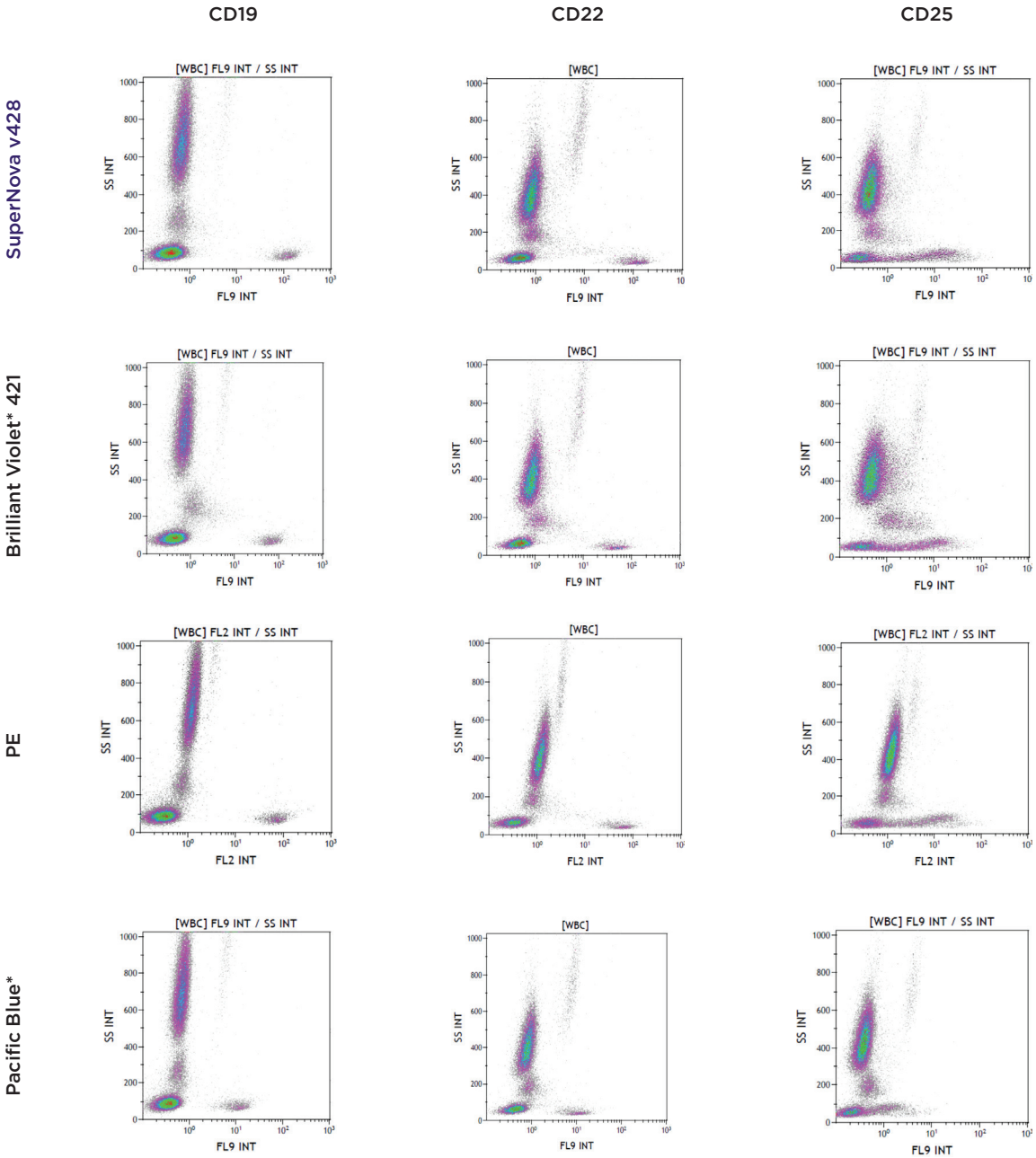


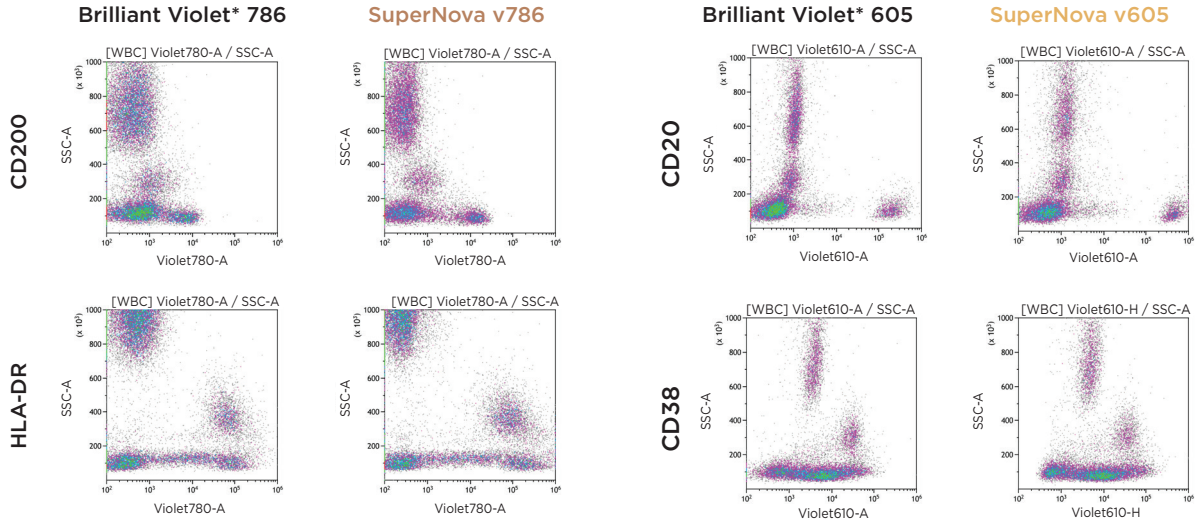
Figure 6: Staining pattern comparison of SNv428, BV*421, PE and Pacific Blue* conjugated to CD19, CD22, and CD25.
SNv428 systematically provided highest brightness. Non-specific staining is systematically reduced compared to BV*421 conjugates.

FLOW CYTOMETRY RESULTS

SuperNova v605 conjugated to CD20 and CD38, and SuperNova v786 conjugated to CD200 and HLA-DR antibodies were compared to their BV*610 and BV*786 equivalent on normal whole blood samples. As shown in Table 2 and Figure 7, the SuperNova conjugated antibodies deliver brighter signal compared to their BV* dyes counterpart, and consequently greater discrimination between negative and positive populations. SNv605 and SNv786 conjugates also generate significantly less non-specific staining.

		Lymphocytes Stain Index	Monocytes MFI (background)
CD20	SNv605	660.61	1101.65
	BV*605	522.62	1108.40
CD38	SNv605	11.51	N/A[§]
	BV*605	7.12	
CD200	SNv786	16.16	2821.94
	BV*786	7.17	4609.08
HLA-DR	SNv786	46.01	N/A[§]
	BV*786	26.37	

Table 2: Lymphocytes staining index and monocytes MFI (background) obtained staining normal whole blood with lymphocytes markers conjugated to SN v605, SN v786, BV605 and BV786.



[§] CD38 and HLA-DR staining on monocytes is not background, both being naturally expressed on monocytes

Figure 7: Staining pattern comparison of SNv786 and BV*786 conjugated to CD200 and HLA-DR, and comparison of SNv605 and BV*605 conjugated to CD20 and CD38 on normal whole blood samples.

REFERENCES

- Webpage SuperNova: https://www.beckman.com/reagents/coulter-flow-cytometry/supernova-fluorescent-polymer-dyes
- Protocols for use of SuperNova v428 conjugated antibodies in a variety of flow cytometry applications, Application note
- SuperNova v428: New Bright Polymer Dye for Flow Cytometry Applications, whitepaper
- Flow cytometry: New tools to enhance accuracy and limit non-specific staining.
- Expanding the flow cytometry toolkit with next-generation polymer dyes.
- Flow Cytometric Analysis of SuperNova V428 Polymer Dye Conjugates, whitepaper
- SuperNova v605 and v786: Next generation polymer dyes - A Stellar new way to see dim populations, whitepaper
- Comparison of anti CD19 conjugates and performances of the newly developed SuperNova polymer dyes, whitepaper

ORDERING INFORMATION

Part Number	Description		
C76795	CD3-SNv428	50 tests	RUO
C76798	CD5-SNv428	50 tests	RUO
C69244	CD19-SNv428	0.5 mL	ASR
C78079	CD20-SNv605	0.5 mL	ASR
C69246	CD22-SNv428	50 tests	RUO
C69245	CD25-SNv428	0.5 mL	ASR
C78081 **	CD25-SNv605	0.5 mL	ASR
C76819 **	CD33-SNv428	50 tests	RUO
C69243	CD38-SNv428	0.5 mL	ASR
C78077	CD38-SNv605	50 tests	RUO

Part Number	Description		
C76801 **	CD56-SNv428	50 tests	RUO
C78085	CD103-SNv786	0.5 mL	ASR
C76813 **	CD117-SNv428	50 tests	RUO
C76816 **	CD200-SNv428	50 tests	RUO
C78083	CD200-SNv786	0.5 mL	ASR
C74033 **	CD366 (Tim3)-SNv428	50 tests	RUO
C78087	HLA-DR-SNv786	50 tests	RUO
C76556 **	SuperNova Staining buffer	100 tests	RUO

** available from January/February 2022

ASR: Analyte Specific Reagents. Analytical and performance characteristics are not established
RUO: For research use only. Not for use in diagnostic procedures

* Pacific Blue is a registered trademark of Molecular Probes Inc.; Brilliant Violet ("BV") is a trademark of Becton, Dickinson and Company.; Super Bright ("SB") is a trademark of Thermo Fisher Scientific.

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