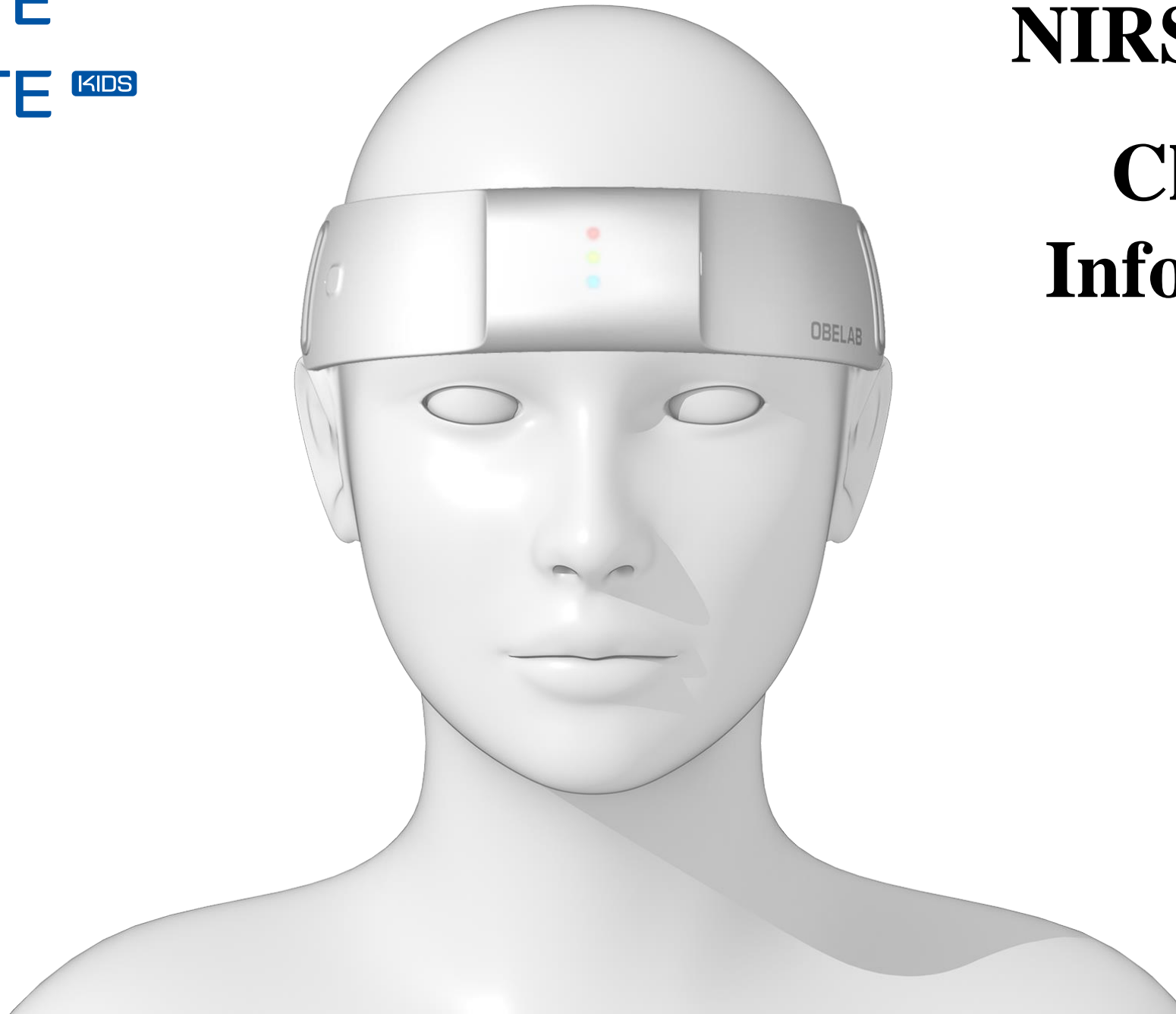


NIRSIT LITE  
NIRSIT LITE **KIDS**



**NIRSIT LITE**

# **Channel Information**

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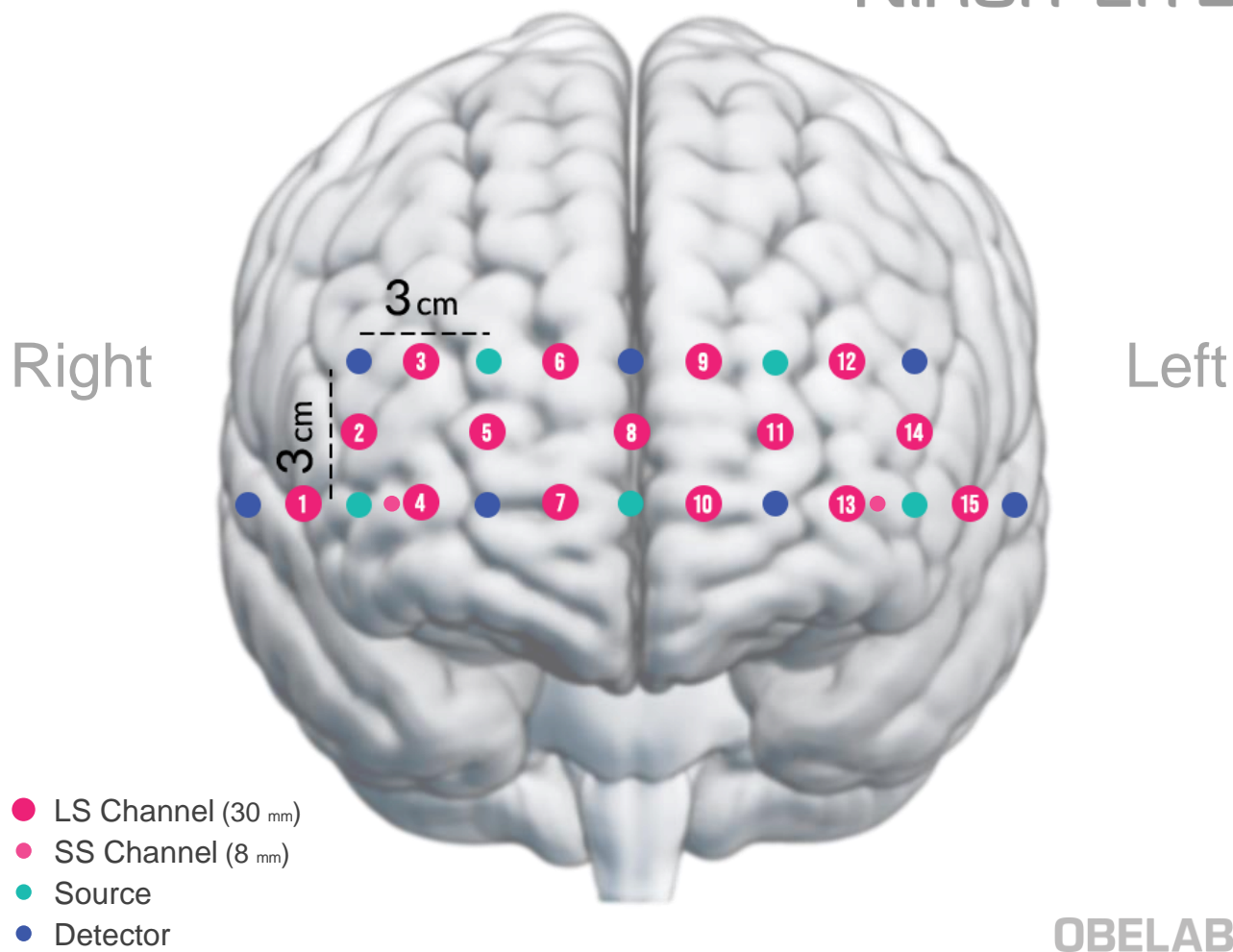
Contents of this brochure are subject to change without notice, regarding the updates on channel topology estimation or specifications of the device.

For information on the device, please contact the OBELAB Customer Support Center.

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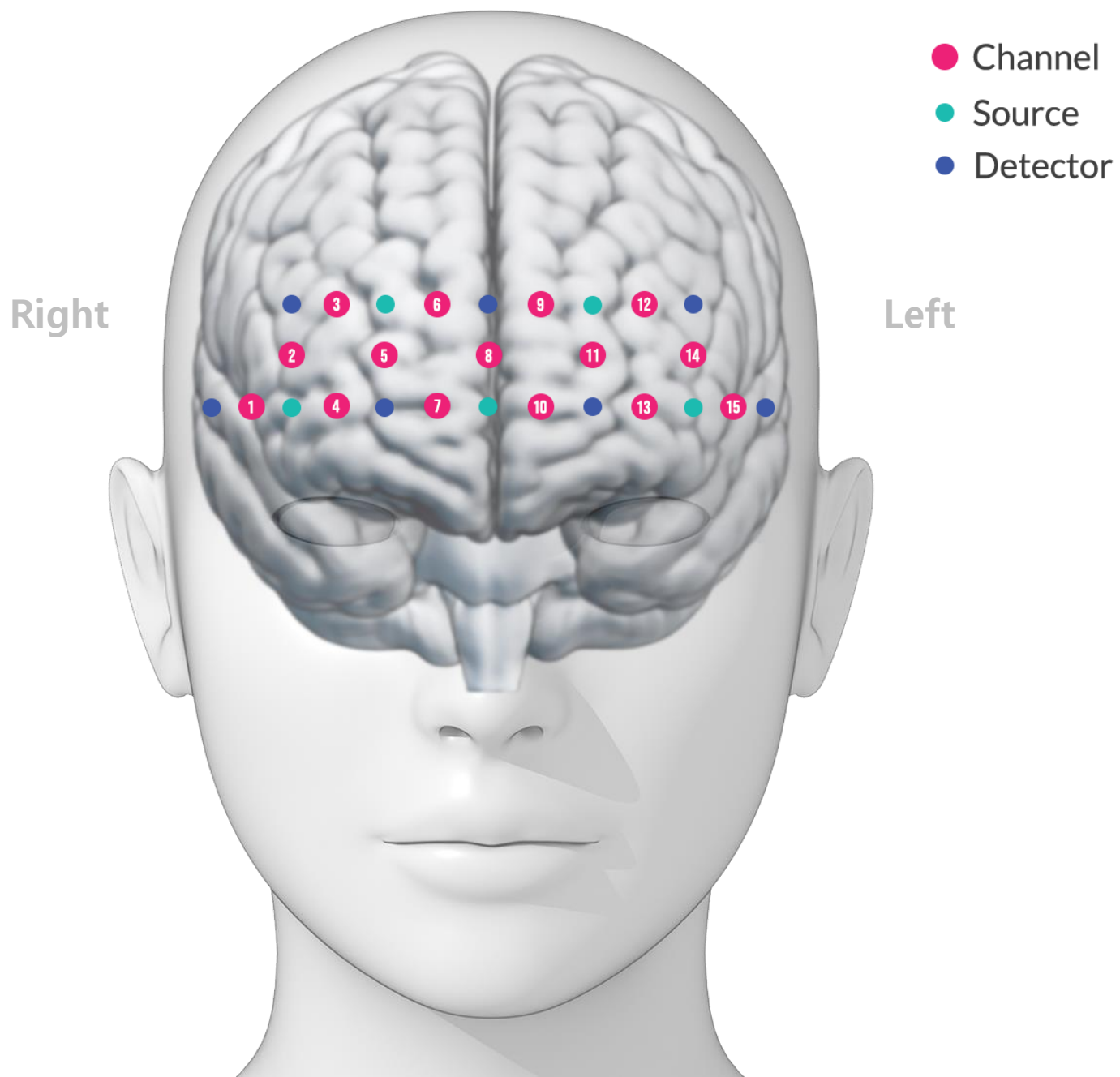
# Source-Detector & Channel Information

NIRSIT LITE

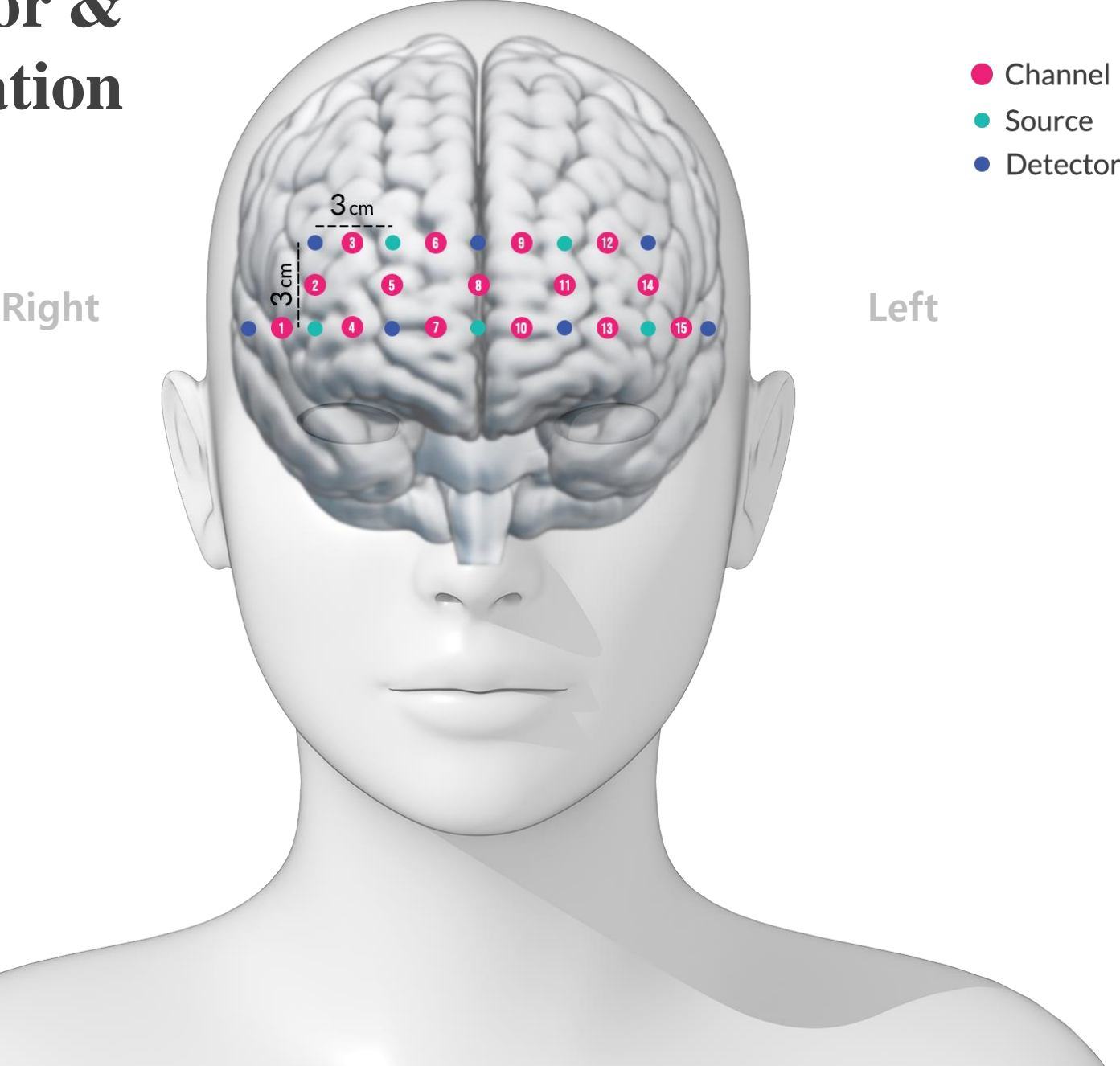


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# Source-Detector & Channel Information



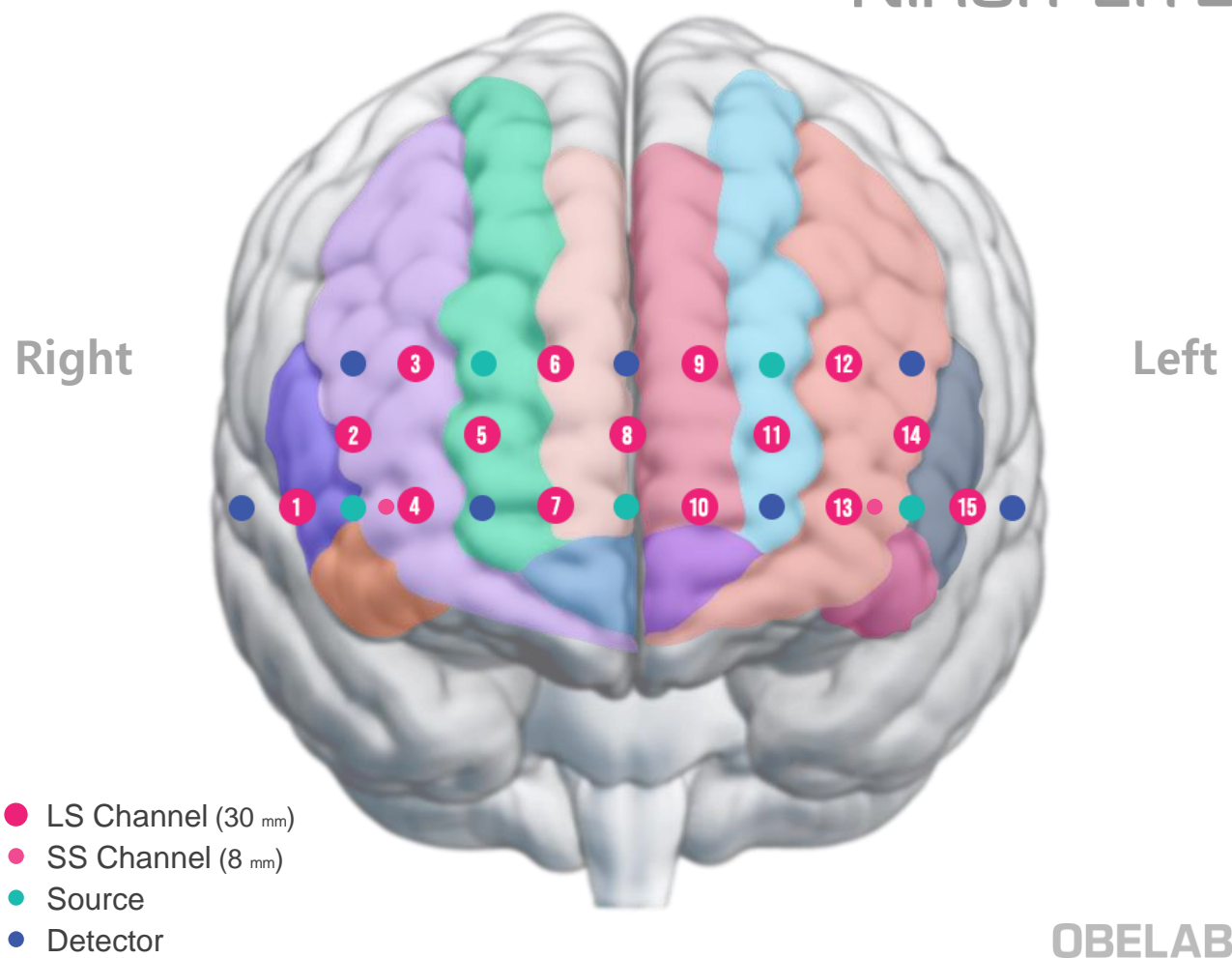
# Source-Detector & Channel Information



# AAL Label

on 3D Brian Templates

NIRSIT LITE



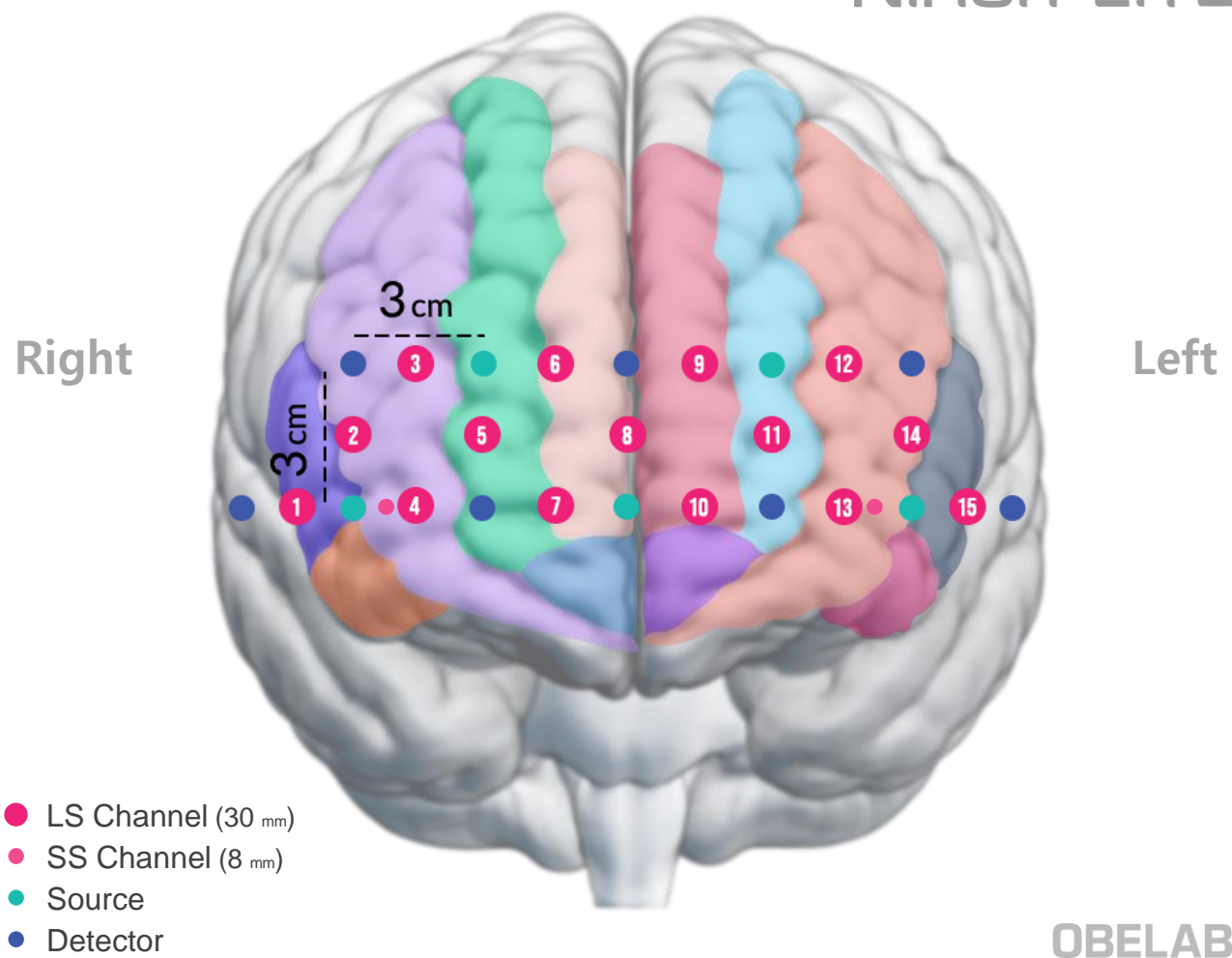
OBELAB

AAL index	Label	Location
3	Superior Frontal Gyrus, Dorsolateral	Left
4	Superior Frontal Gyrus, Dorsolateral	Right
5	Middle Frontal Gyrus	Left
6	Middle Frontal Gyrus	Right
9	Inferior Frontal Gyrus, Triangular Part	Left
10	Inferior Frontal Gyrus, Triangular Part	Right
11	Inferior Frontal Gyrus, Pars Orbitalis	Left
12	Inferior Frontal Gyrus, Pars Orbitalis	Right
19	Superior Frontal Gyrus, Medial	Left
20	Superior Frontal Gyrus, Medial	Right
21	Superior Frontal Gyrus, Medial Orbital	Left
22	Superior Frontal Gyrus, Medial Orbital	Right

# AAL Label

on 3D Brian Templates

NIRSIT LITE



OBELAB

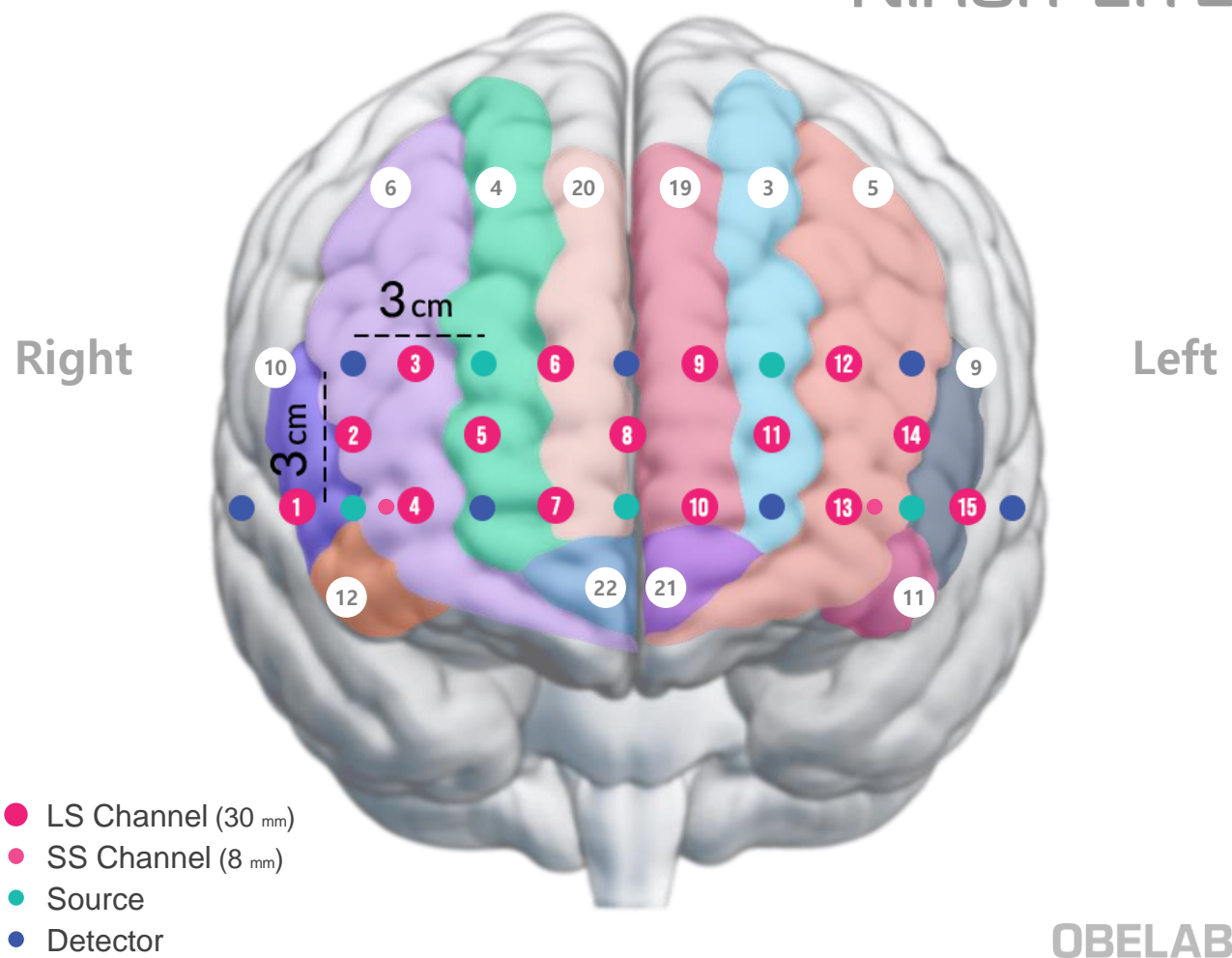
AAL index	Label	Location
3	Superior Frontal Gyrus, Dorsolateral	Left
4	Superior Frontal Gyrus, Dorsolateral	Right
5	Middle Frontal Gyrus	Left
6	Middle Frontal Gyrus	Right
9	Inferior Frontal Gyrus, Triangular Part	Left
10	Inferior Frontal Gyrus, Triangular Part	Right
11	Inferior Frontal Gyrus, Pars Orbitalis	Left
12	Inferior Frontal Gyrus, Pars Orbitalis	Right
19	Superior Frontal Gyrus, Medial	Left
20	Superior Frontal Gyrus, Medial	Right
21	Superior Frontal Gyrus, Medial Orbital	Left
22	Superior Frontal Gyrus, Medial Orbital	Right



# AAL Label

on 3D Brian Templates

NIRSIT LITE



AAL index	Label	Location
3	Superior Frontal Gyrus, Dorsolateral	Left
4	Superior Frontal Gyrus, Dorsolateral	Right
5	Middle Frontal Gyrus	Left
6	Middle Frontal Gyrus	Right
9	Inferior Frontal Gyrus, Triangular Part	Left
10	Inferior Frontal Gyrus, Triangular Part	Right
11	Inferior Frontal Gyrus, Pars Orbitalis	Left
12	Inferior Frontal Gyrus, Pars Orbitalis	Right
19	Superior Frontal Gyrus, Medial	Left
20	Superior Frontal Gyrus, Medial	Right
21	Superior Frontal Gyrus, Medial Orbital	Left
22	Superior Frontal Gyrus, Medial Orbital	Right



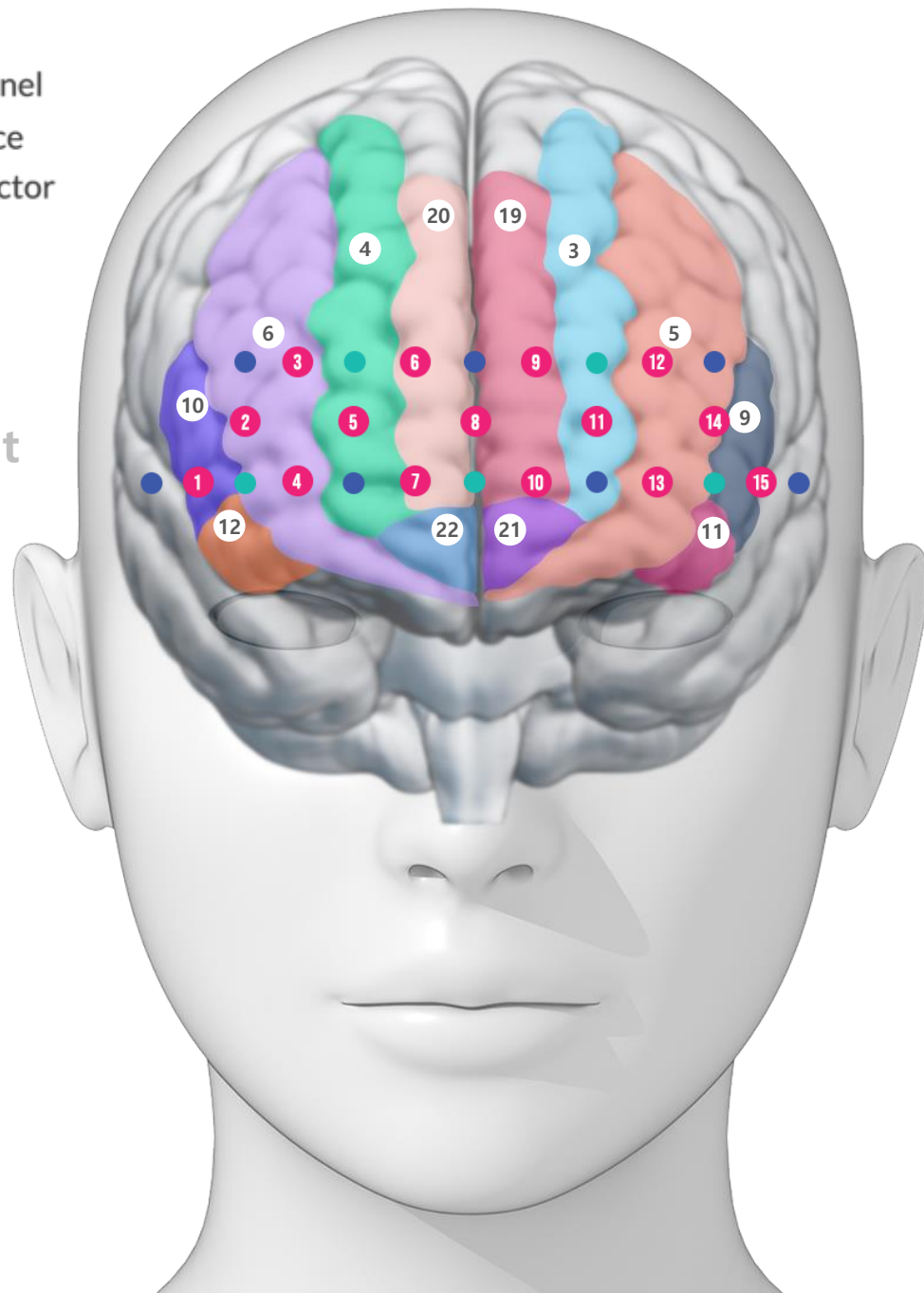
# AAL Label

## on 3D Brian Templates

- Channel
- Source
- Detector

Right

Left

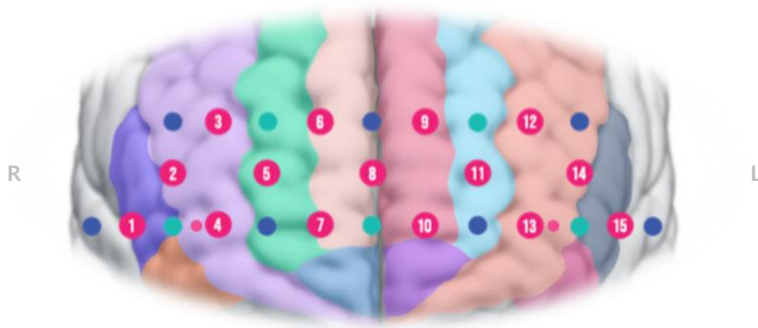


AAL index	Label	Location
3	Superior Frontal Gyrus, Dorsolateral	Left
4	Superior Frontal Gyrus, Dorsolateral	Right
5	Middle Frontal Gyrus	Left
6	Middle Frontal Gyrus	Right
9	Inferior Frontal Gyrus, Triangular Part	Left
10	Inferior Frontal Gyrus, Triangular Part	Right
11	Inferior Frontal Gyrus, Pars Orbitalis	Left
12	Inferior Frontal Gyrus, Pars Orbitalis	Right
19	Superior Frontal Gyrus, Medial	Left
20	Superior Frontal Gyrus, Medial	Right
21	Superior Frontal Gyrus, Medial Orbital	Left
22	Superior Frontal Gyrus, Medial Orbital	Right

# AAL Label

## on 3D Brian Templates

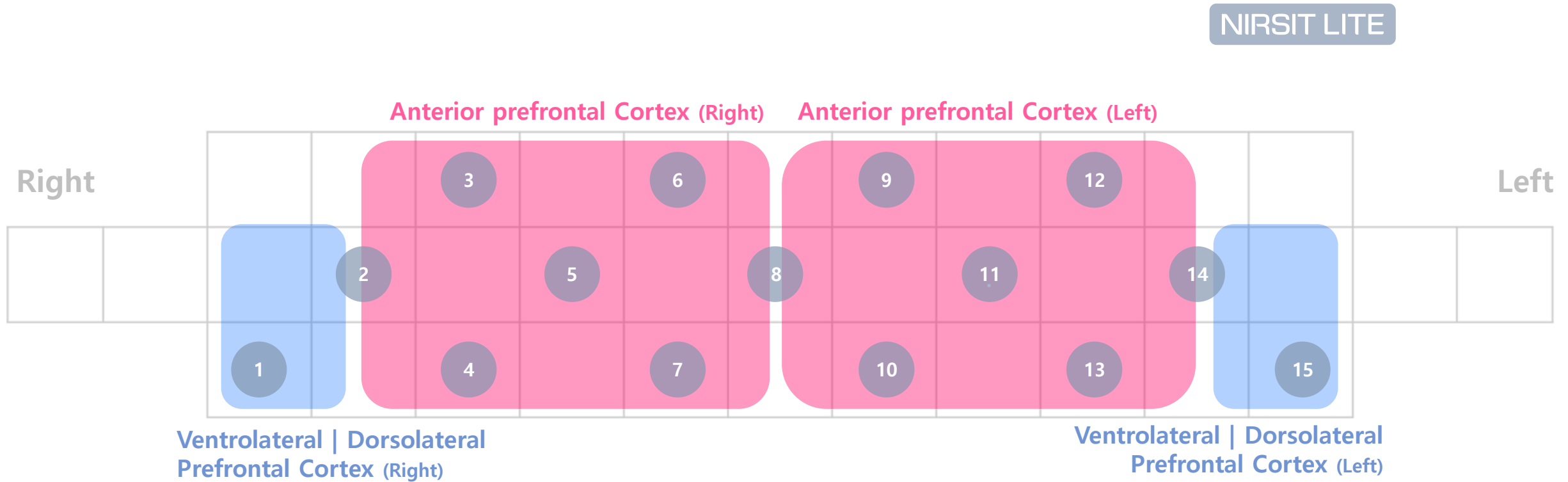
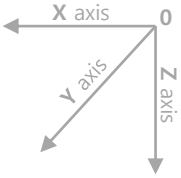
AAL index	Label	Location	AAL index	Label	Location
3	Superior Frontal Gyrus, Dorsolateral	Left	11	Inferior Frontal Gyrus, Pars Orbitalis	Left
4	Superior Frontal Gyrus, Dorsolateral	Right	12	Inferior Frontal Gyrus, Pars Orbitalis	Right
5	Middle Frontal Gyrus	Left	19	Superior Frontal Gyrus, Medial	Left
6	Middle Frontal Gyrus	Right	20	Superior Frontal Gyrus, Medial	Right
9	Inferior Frontal Gyrus, Triangular Part	Left	21	Superior Frontal Gyrus, Medial Orbital	Left
10	Inferior Frontal Gyrus, Triangular Part	Right	22	Superior Frontal Gyrus, Medial Orbital	Right

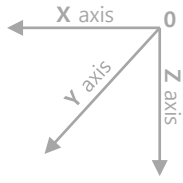


# Estimated MNI Coordinates & AAL Label

Channel	X	Y	Z	Location	AAL_index (AAL3v1)	Label 1	Label 2	Label 3
CH 1	54.67	44.00	0.00	Right	10   12	Inferior Frontal Gyrus, Triangular Part	Inferior Frontal Gyrus, pars orbitalis	
CH 2	48.00	52.67	12.67	Right	6   10	Middle Frontal Gyrus	Inferior Frontal Gyrus, Triangular Part	
CH 3	36.33	58.33	24.67	Right	6	Middle Frontal Gyrus		
CH 4	39.00	64.67	0.00	Right	6	Middle Frontal Gyrus		
CH 5	26.33	69.67	12.67	Right	4	Superior Frontal Gyrus, Dorsolateral		
CH 6	13.67	69.00	24.67	Right	20   4	Superior Frontal Gyrus, Medial	Superior Frontal Gyrus, Dorsolateral	
CH 7	14.33	73.00	0.33	Right	20   4   22	Superior Frontal Gyrus, Medial	Superior Frontal Gyrus, Dorsolateral	Superior Frontal Gyrus, Medial Orbital
CH 8	0.33	68.00	11.33	Center	20   19	Superior Frontal Gyrus, Medial	Superior Frontal Gyrus, Medial	
CH 9	-13.00	68.00	24.00	Left	19   3	Superior Frontal Gyrus, Medial	Superior Frontal Gyrus, Dorsolateral	
CH 10	-14.33	73.00	0.00	Left	19   3   21	Superior Frontal Gyrus, Medial	Superior Frontal Gyrus, Dorsolateral	Superior Frontal Gyrus, Medial Orbital
CH 11	-26.00	68.00	12.00	Left	3	Superior Frontal Gyrus, Dorsolateral		
CH 12	-35.67	57.67	23.67	Left	5	Middle Frontal Gyrus		
CH 13	-38.00	63.00	0.00	Left	5	Middle Frontal Gyrus		
CH 14	-45.67	51.67	12.33	Left	5   9	Middle Frontal Gyrus	Inferior Frontal Gyrus, Triangular Part	
CH 15	-52.33	43.67	-0.33	Left	9   11	Inferior Frontal Gyrus, Triangular Part	Inferior Frontal Gyrus, Pars Orbitalis	

# Brodmann Mapping of NIRSIT LITE Channels



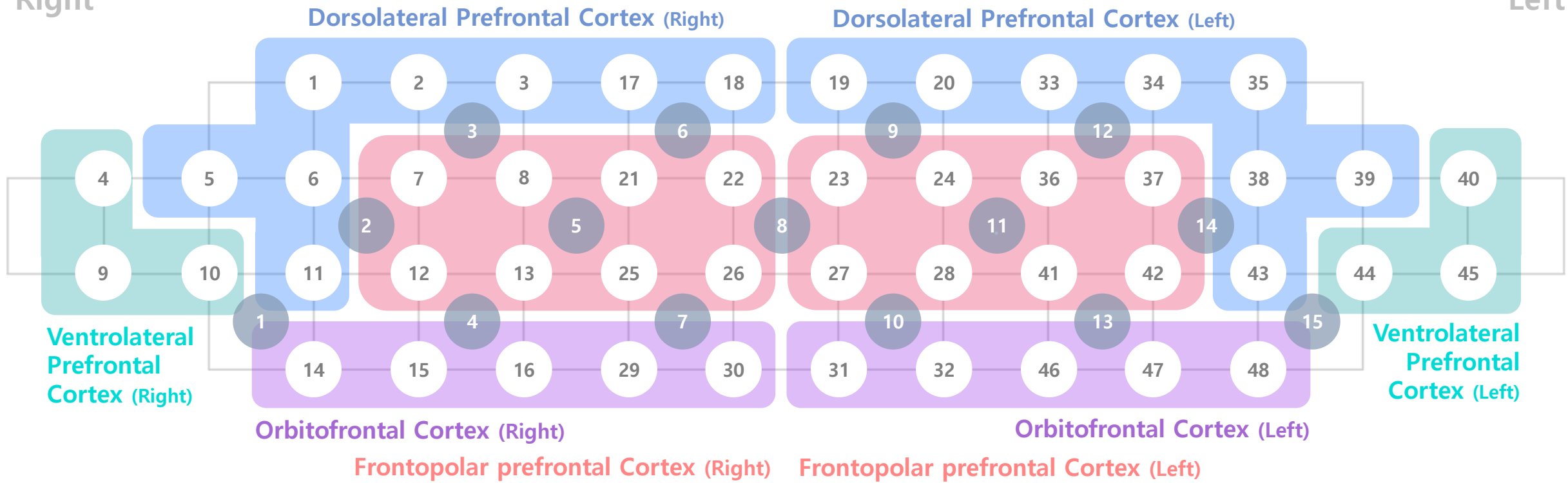


# Brodmann Mapping of NIRSIT & NIRSIT LITE Adult Channels

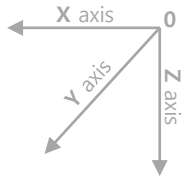
NIRSIT    NIRSIT LITE Adult

Right

Left

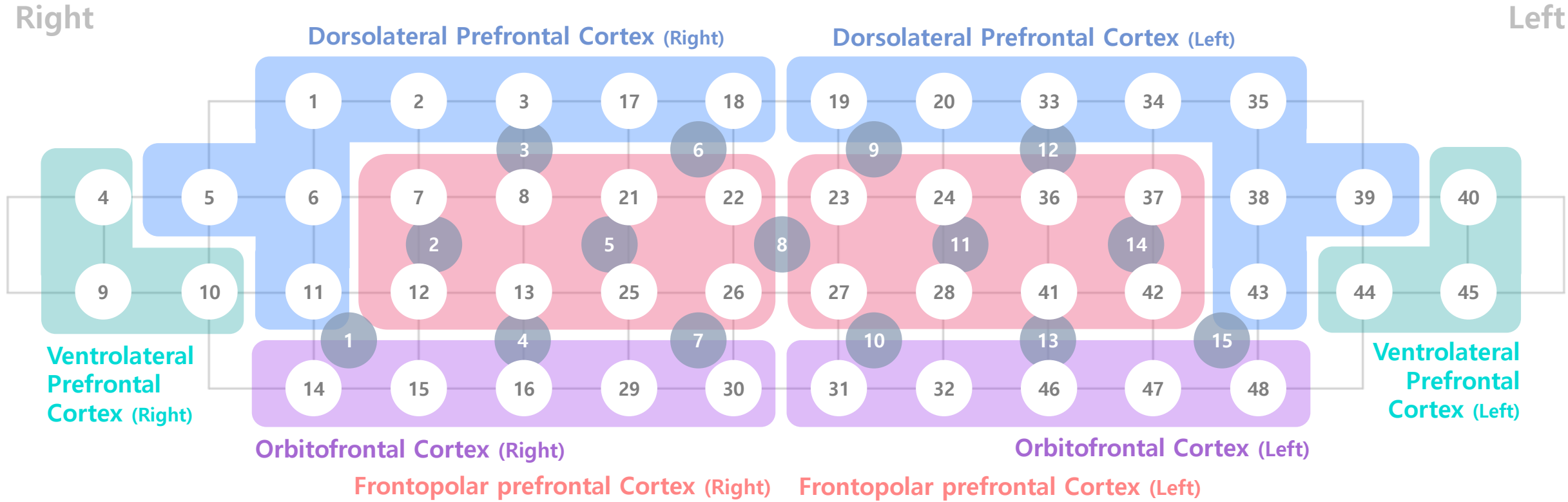


\* NIRSIT LITE (Adult) channels are superimposed on NIRSIT channel configuration for comparison. Direct mapping of LITE channels to Brodmann regions is yet to be made.



# Brodmann Mapping of NIRSIT & NIRSIT LITE Kids Channels

NIRSIT NIRSIT LITE Kids

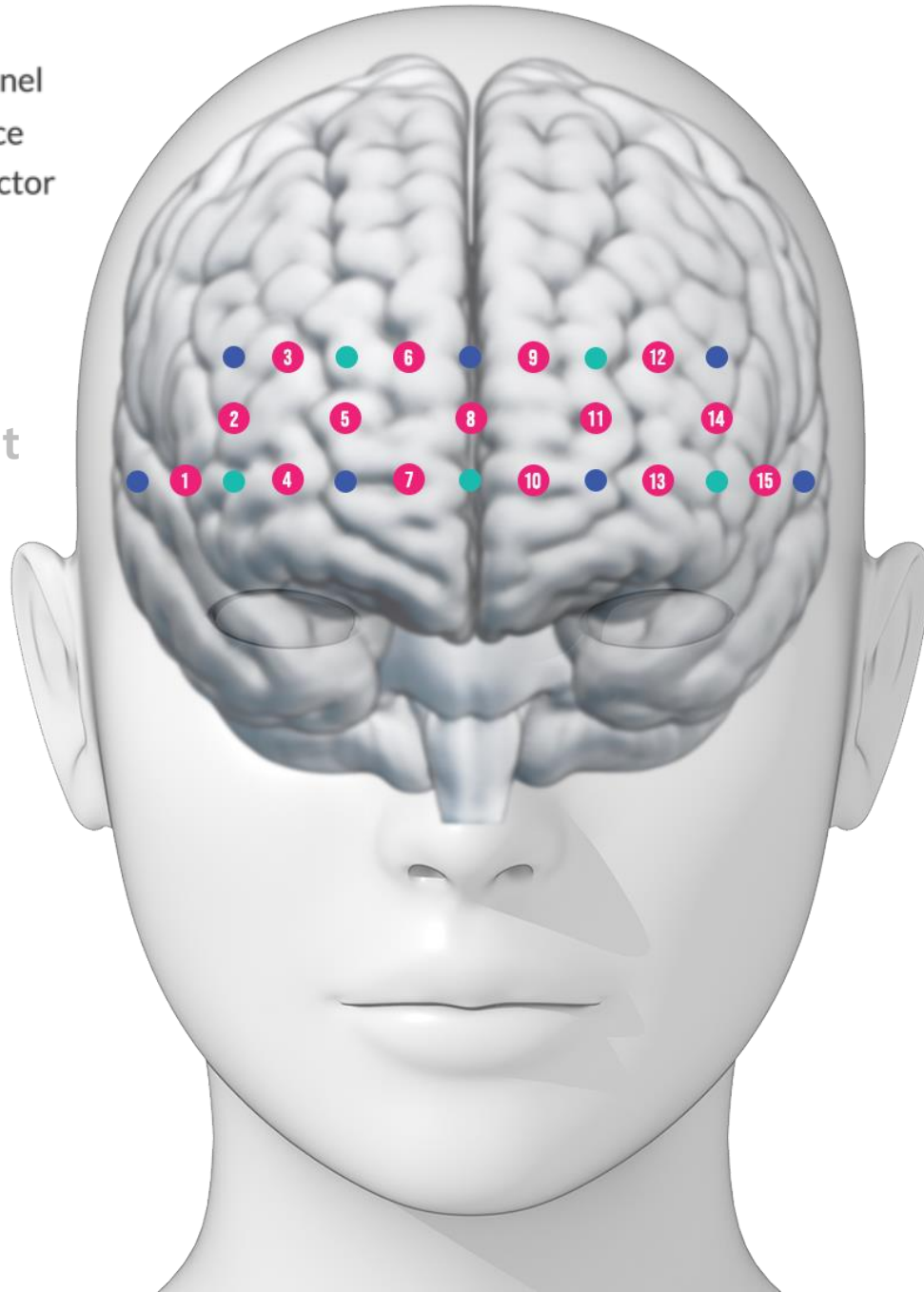


\* NIRSIT LITE (Kids) channels are superimposed on NIRSIT channel configuration for comparison. Direct mapping of LITE channels to Brodmann regions is yet to be made.

# Estimated MNI Coordinates & BA Label

- Channel
- Source
- Detector

Right



Left

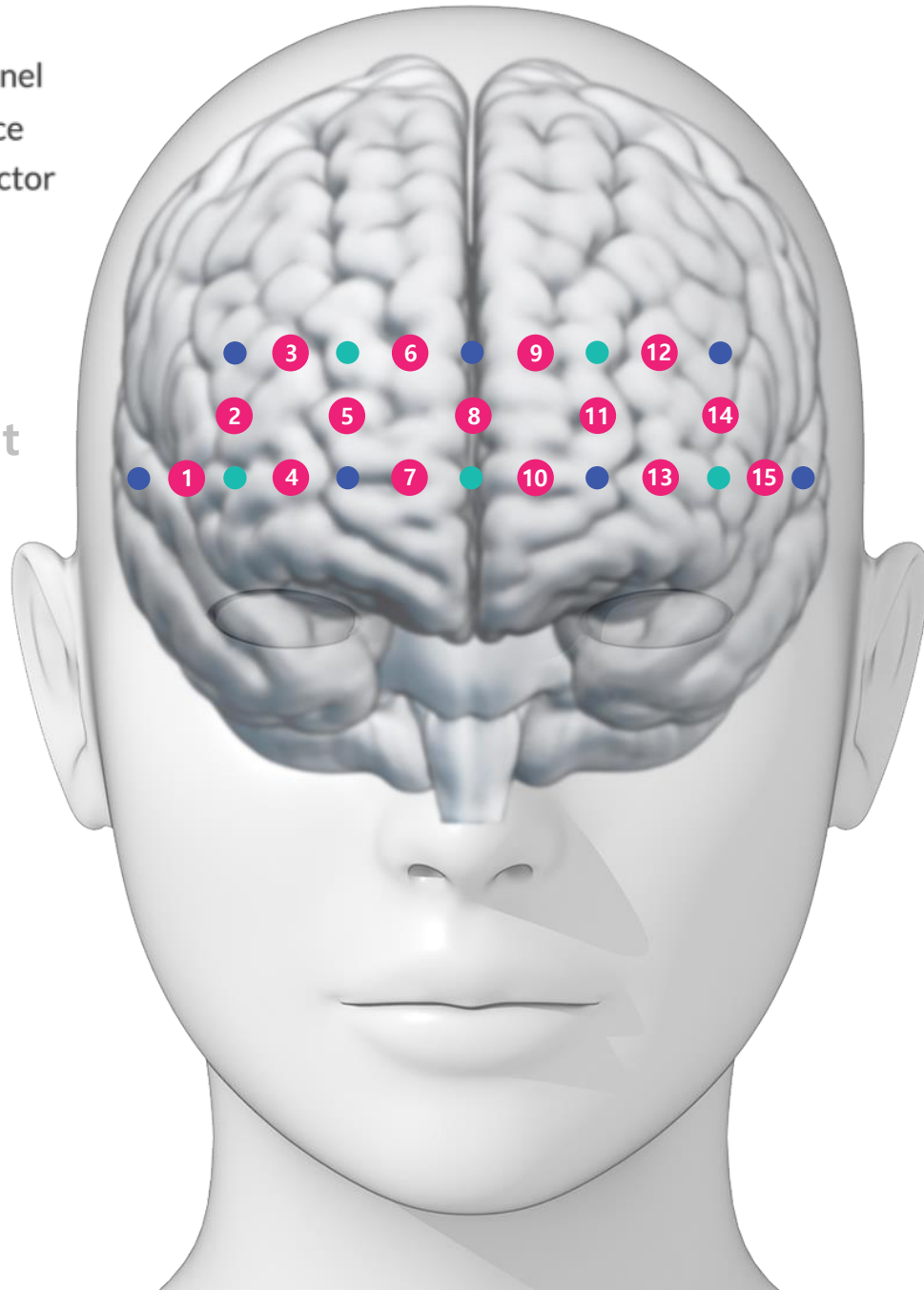
Channel	X	Y	Z	Location	BA	BA Label
CH 1	54.67	44.00	0.00	Right	46	Dorsolateral Prefrontal
CH 2	48.00	52.67	12.67	Right	10	Anterior Prefrontal
CH 3	36.33	58.33	24.67	Right	10	Anterior Prefrontal
CH 4	39.00	64.67	0.00	Right	10	Anterior Prefrontal
CH 5	26.33	69.67	12.67	Right	10	Anterior Prefrontal
CH 6	13.67	69.00	24.67	Right	10	Anterior Prefrontal
CH 7	14.33	73.00	0.33	Right	10	Anterior Prefrontal
CH 8	0.33	68.00	11.33	Center	10	Anterior Prefrontal
CH 9	-13.00	68.00	24.00	Left	10	Anterior Prefrontal
CH 10	-14.33	73.00	0.00	Left	10	Anterior Prefrontal
CH 11	-26.00	68.00	12.00	Left	10	Anterior Prefrontal
CH 12	-35.67	57.67	23.67	Left	10	Anterior Prefrontal
CH 13	-38.00	63.00	0.00	Left	10	Anterior Prefrontal
CH 14	-45.67	51.67	12.33	Left	10	Anterior Prefrontal
CH 15	-52.33	43.67	-0.33	Left	47	Orbital Part of IFG



# Estimated MNI Coordinates & BA Label

- Channel
- Source
- Detector

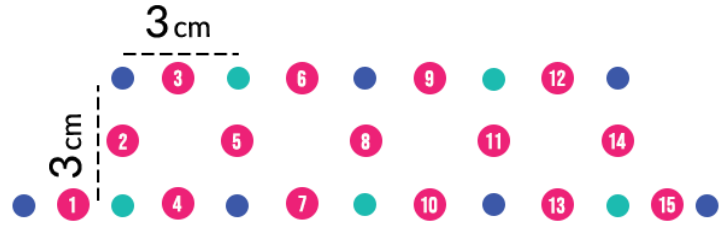
Right



Left

Channel	X	Y	Z	Location	BA	BA Label
CH 1	54.67	44.00	0.00	Right	46	Dorsolateral Prefrontal
CH 2	48.00	52.67	12.67	Right	10	Anterior Prefrontal
CH 3	36.33	58.33	24.67	Right	10	Anterior Prefrontal
CH 4	39.00	64.67	0.00	Right	10	Anterior Prefrontal
CH 5	26.33	69.67	12.67	Right	10	Anterior Prefrontal
CH 6	13.67	69.00	24.67	Right	10	Anterior Prefrontal
CH 7	14.33	73.00	0.33	Right	10	Anterior Prefrontal
CH 8	0.33	68.00	11.33	Center	10	Anterior Prefrontal
CH 9	-13.00	68.00	24.00	Left	10	Anterior Prefrontal
CH 10	-14.33	73.00	0.00	Left	10	Anterior Prefrontal
CH 11	-26.00	68.00	12.00	Left	10	Anterior Prefrontal
CH 12	-35.67	57.67	23.67	Left	10	Anterior Prefrontal
CH 13	-38.00	63.00	0.00	Left	10	Anterior Prefrontal
CH 14	-45.67	51.67	12.33	Left	10	Anterior Prefrontal
CH 15	-52.33	43.67	-0.33	Left	47	Orbital Part of IFG

- Channel
- Source
- Detector



- Channel
- Source
- Detector

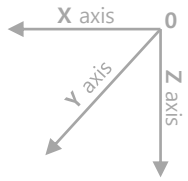


- LS Channel (30 mm)
- SS Channel (8 mm)
- Source
- Detector



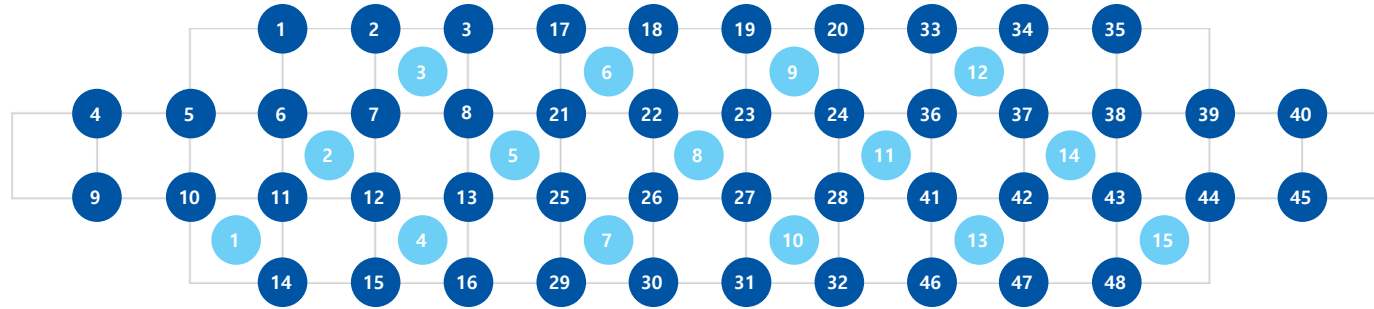
- LS Channel (30 mm)
- SS Channel (8 mm)
- Source
- Detector





# NIRSIT / NIRSIT LITE

NIRSIT NIRSIT LITE

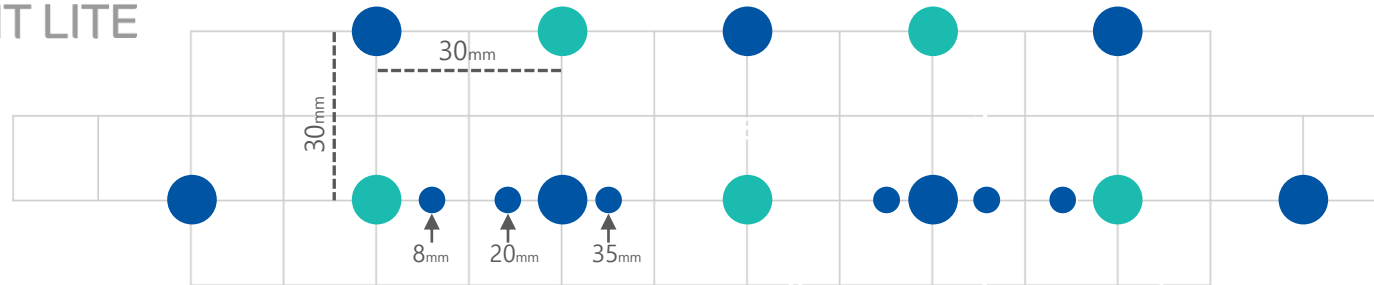


Right

Left

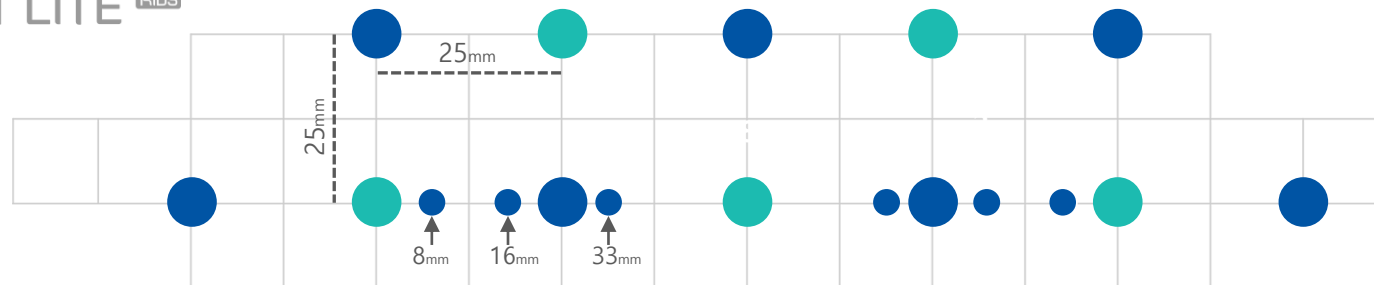
NIRSIT LITE

- TX
- RX



NIRSIT LITE KIDS

- TX
- RX



# NIRSIT LITE Channels & Sensors

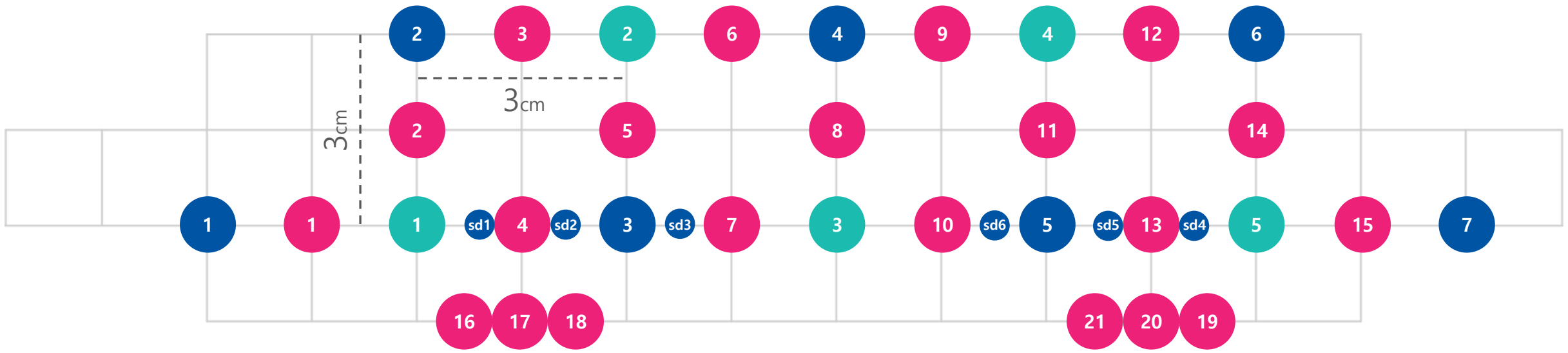
- Channel
- Source
- Detector

Source ~ Detector : 3cm

NIRSIT LITE

Right

Left

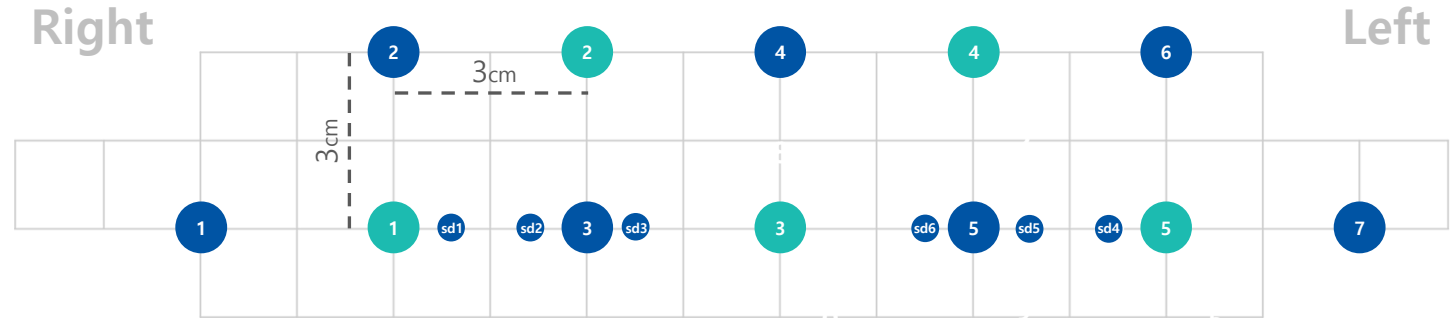


# NIRSIT LITE Channel & Source-Detector Information

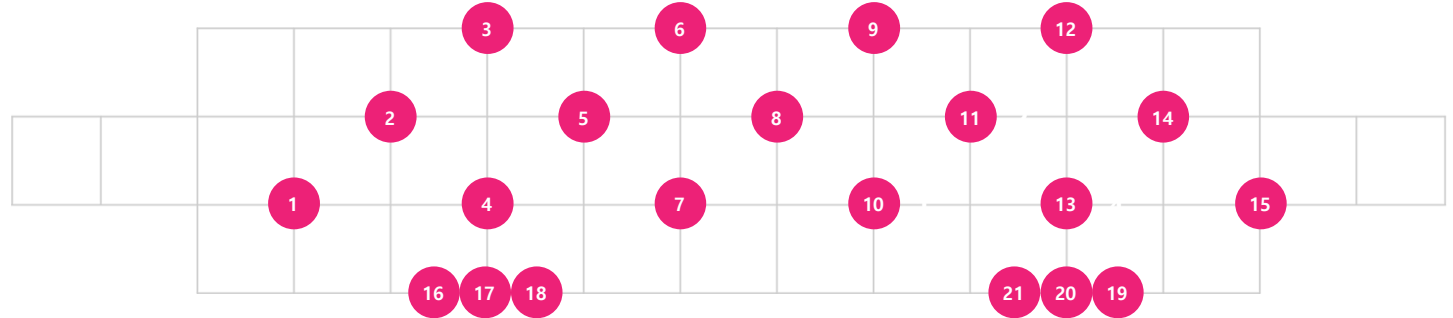
Channel	Source	Detector	Distance (cm)	
			Adult	Kids
CH 1	1	1	3	2.5
CH 2	1	2	3	2.5
CH 3	2	2	3	2.5
CH 4	1	3	3	2.5
CH 5	2	3	3	2.5
CH 6	2	4	3	2.5
CH 7	3	3	3	2.5
CH 8	3	4	3	2.5
CH 9	4	4	3	2.5
CH 10	3	5	3	2.5
CH 11	4	5	3	2.5
CH 12	4	6	3	2.5
CH 13	5	5	3	2.5
CH 14	5	6	3	2.5
CH 15	5	7	3	2.5
CH 16	1	sd1	0.8	
CH 17	1	sd2	2	
CH 18	1	sd3	3.5 (Not yet supported)	
CH 19	5	sd4	0.8	
CH 20	5	sd5	2	
CH 21	5	sd6	3.5 (Not yet supported)	

- Channel
- Source
- Detector

NIRSIT LITE



Source ~ Detector : 3cm

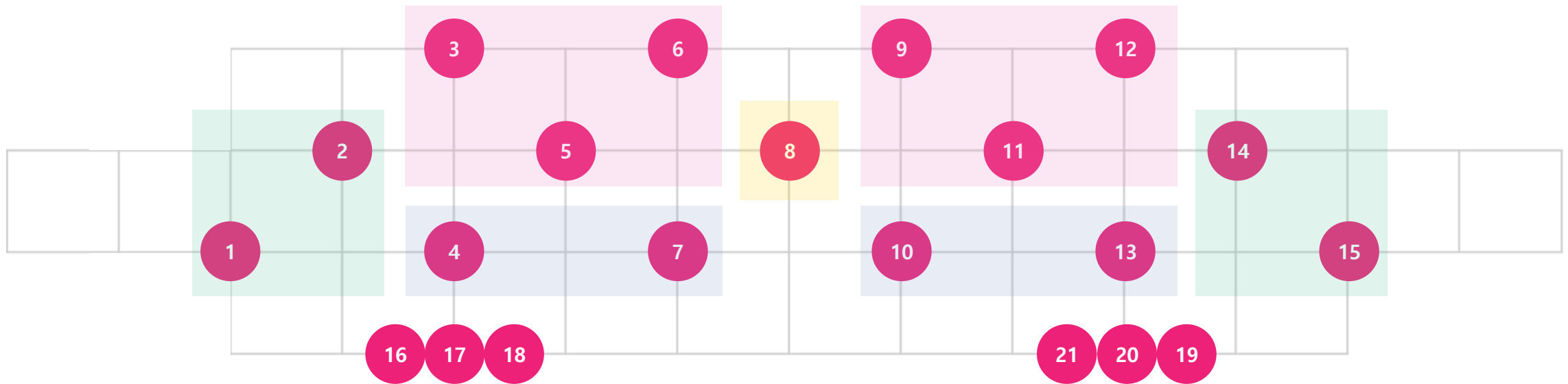


# Connectivity-based Channel Clustering: Grouping 1

NIRSIT LITE

Right

Left

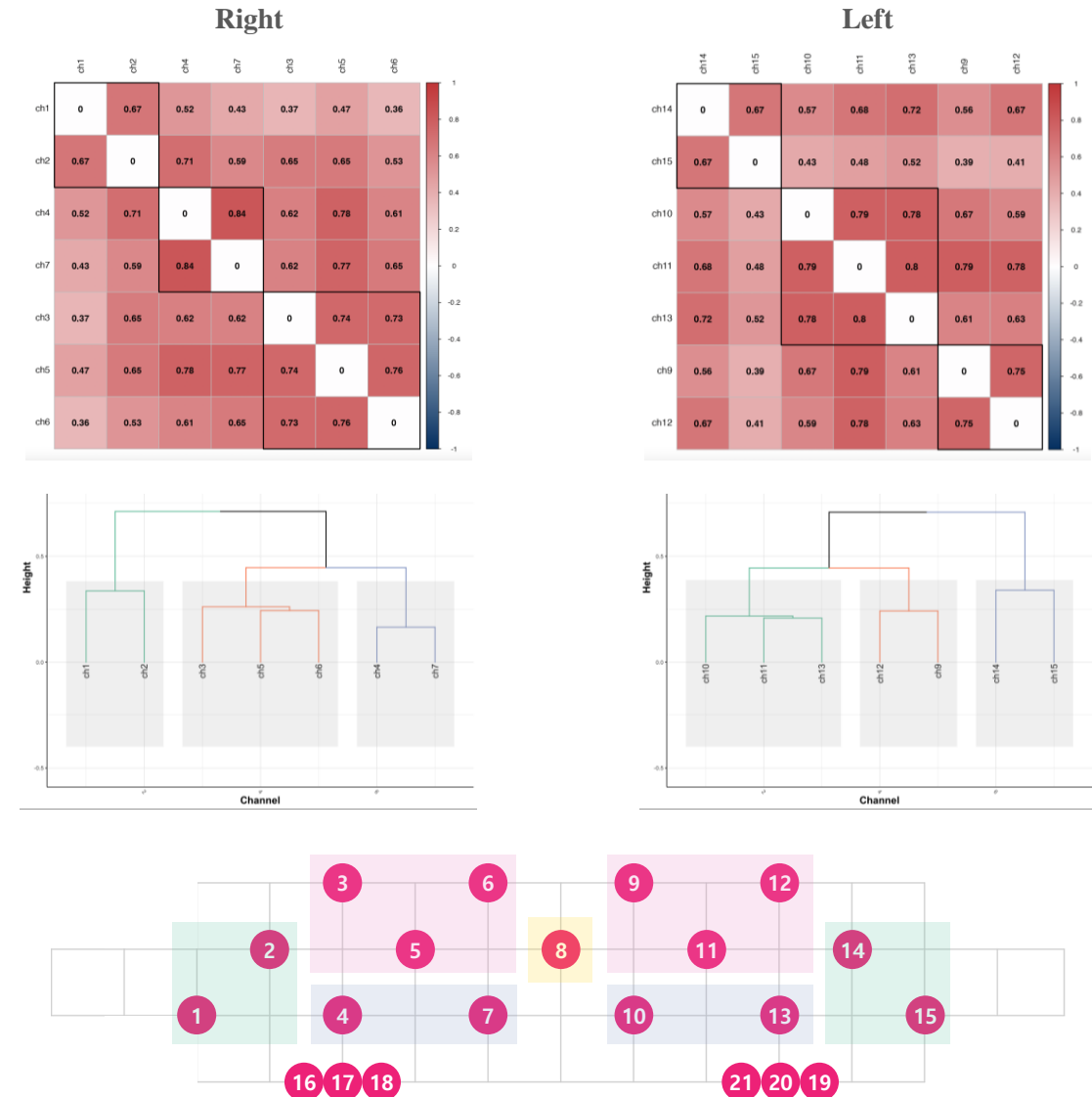


- Channel grouping estimated by hierarchical clustering analysis of functional connectivity across channels
- Hierarchical Clustering Analysis using agglomerative WARD method,  $n = 885$  (Resting-state,  $n = 325$ ; Task,  $n = 400$ ; Movie-viewing,  $n = 160$ )
- See next page for further details.

# Grouping 1 - method

## Method

- Samples (n = 825)
  - Resting-State Dataset (n = 325)
  - Task Dataset (n = 400)
  - Movie-viewing Dataset (n = 160)
- Signal Processing
  - Channel pruning based on SNR
  - Light intensity to dOD conversion
  - dOD to HB concentration conversion using Modified Beer-Lambert Law
  - Band-pass filtered with cutoff frequency (.008-.09Hz)
  - Extraction of HbO2 time-series for all channels
  - Calculation of functional connectivity between the time-series of all channels using the pairwise Pearson correlation coefficient
  - Dividing connectivity matrix into left & right hemisphere to account for hemispheric specialization
- Hierarchical Clustering Analysis
  - Agglomerative Hierarchical Clustering in each hemisphere
  - Distance Metric : 1- correlation coefficient
  - WARD linkage method, # of Cluster = 7



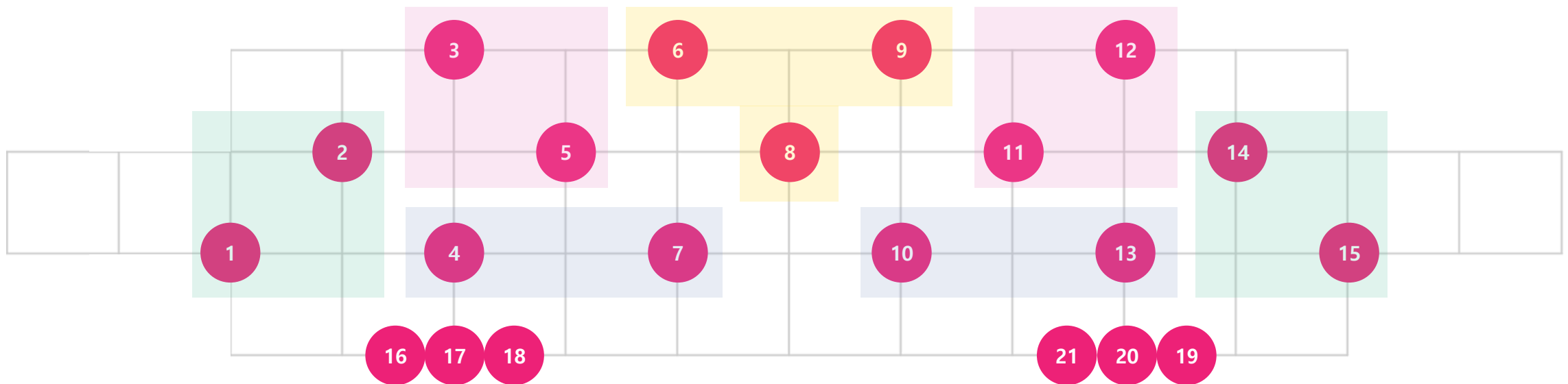


# Connectivity-based Channel Clustering: Grouping 2

NIRSIT LITE

Right

Left

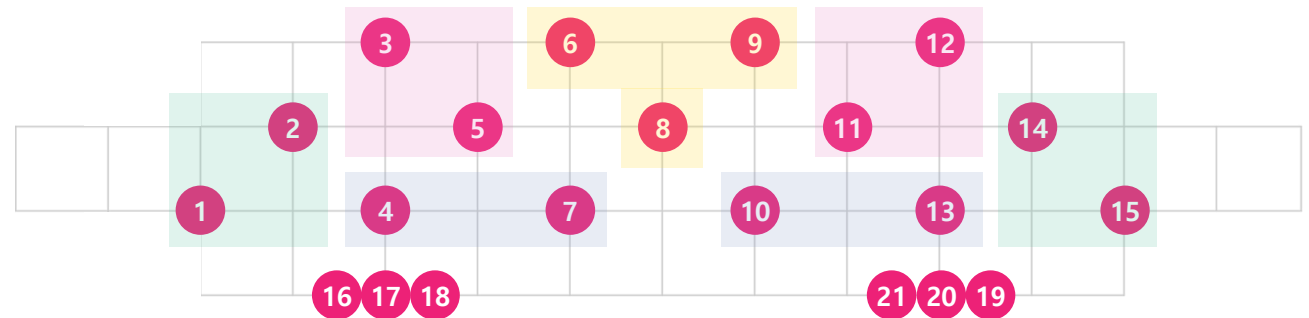
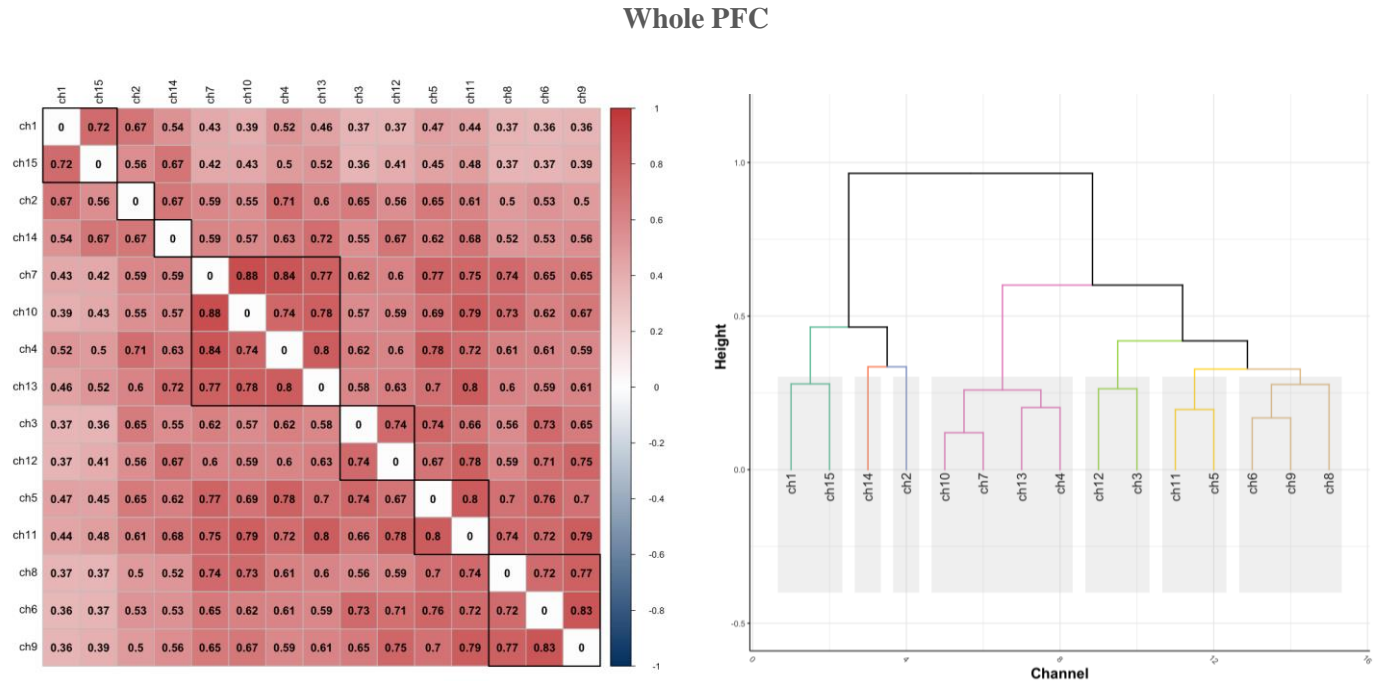


- Channel grouping estimated by hierarchical clustering analysis of functional connectivity across channels
- Hierarchical Clustering Analysis using agglomerative WARD method,  $n = 885$  (Resting-state,  $n = 325$ ; Task,  $n = 400$ ; Movie-viewing,  $n = 160$ )
- See next page for further details.

# Grouping 2 - method

## Method

- Samples (n = 825)
  - Resting-State Dataset (n = 325)
  - Task Dataset (n = 400)
  - Movie-viewing Dataset (n = 160)
- Signal Processing
  - Channel pruning based on SNR
  - Light intensity to dOD conversion
  - dOD to HB concentration conversion using Modified Beer-Lambert Law
  - Band-pass filtered with cutoff frequency (.008-.09Hz)
  - Extraction of HbO2 time-series for all channels
  - Calculation of functional connectivity between the time-series of all channels using the pairwise Pearson correlation coefficient
- Hierarchical Clustering Analysis
  - Agglomerative Hierarchical Clustering within the whole PFC
  - Distance Metric : 1- correlation coefficient
  - WARD linkage method, # of Cluster = 7



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