

















Auditory development (2)	
Here the second se	from Pujol et al.2009
Developmental event	Timing (weeks)
IHC et OHC histologically visible	10 à 12
Ciliogenesis of IHC and OHC	12 +
IHC Maturation - synapses with the auditory nerve	15
OHC Maturation - synapses with the auditory nerve	22
Maturation of the stereocilia	22
	From Hall 2000





		Sensory sy	stems development (2	1)
Sensory	Perij	oheral	First observations of	First cortical responses
Systems	anatomica	1 structures	physiological and/or behavioural responses	
	elements	form	benaviourui responses	
Touch	9-17 wks	20 wks	14 wks (whole body)	24 wks (Somes. EP)
Nociception	7 wks	20 wks	16-20 wks	25 wks (NIRS)
Vestibular	5 wks	14 wks	24 wks (Moro réflex)	-
Gustatory	10 wks	18-20 wks	26-30 wks	-
Olfactory	4-7 wks	11-14 wks	28 wks (earlier ?)	30 wks (not explored before) (NIRS orbito-frontal cortex)
Auditory	10 wks	22 wks	23-25 wks	24-27 wks (AERP)
Visual	10 wks	24-26 wks	25 wks	29-31 wks (VERP cortical)
				Kuhn et al Arch Ped 2011













































Ayelet Schlez MD ¹ , I	ta Litmanovi	itz MD ^{1,2} , So	fia Bauer MD ¹	, Tzipora D	olfin MD ^{1,2} , Rivka Regev MD ^{1,2} and Shmuel Amon MD ^{1,2}
Table 2. The impact of	of therapy m	odes on mot	ther-inflant dya	ds (N = 52)	
		KC alone	KC with live harp music therapy	Pusie	
Heart rate (bpm)	Infants	155 (0)	154 (9)	0.13	52 mothor infant dyads
	Mothers	77 (11)	78.010	0.21	
Or saturation (%)	infants	96 (2)	98 (2)	0.37	- 32 to 37 wks GA
	Mothers	97 (2)	96 (2)	0.18	 Live harp music during SSO
Respiratory rate	infants	45 (11)	43 (10)	0.48	has a significant effect on
(mar)	Mothers	21 (9)	23 (7)	0.26	maternal anxiety
Behavioral score**	Indants	1	1	0.7	maternal anxiety
Child accelutes	Mothers	45.8.000	10.2 (2.6)	10.00	





· Analysis in binomial regression







Architecture -Acoustic environment and exposure to language stimuli
Single room :
- « too quiet » ?
- Closed incubators limiting ambiant noise
- Social isolation, deprivation in language stimuli
- Deprived environment if parental absence



Architecture – Acoustic environment and exposure to langage stimuli



	Mean (SD)									
		Open-bay NICU				SFR-NICU				
ayley-III composite cores*	Low MI (n = 58)	High MI (n = 35)	Effect size	P value	Low MI (n = 50)	High MI (n = 73)	Effect size	P value	NICU P value	Value
ognitive composite anguage composite leceptive communication xpressive communication fotor composite ine motor iross motor	88.2 (12.0) 81.5 (13.2) 6.5 (2.4) 7.2 (2.6) 90.9 (12.0) 9.1 (2.4) 7.7 (2.2)	92.1 (12.8) 90.0 (18.4) 7.9 (3.5) 8.5 (3.1) 93.0 (10.1) 9.7 (2.0) 8.0 (1.9)	0.26 0.57 0.47 0.43 0.14 0.20 0.10	.14 .01 .03 .03 .39 .22 .59	87.8 (11.8) 82.9 (14.0) 6.9 (2.6) 7.2 (2.6) 89.2 (14.0) 9.1 (2.5) 7.3 (2.6)	93.8 (13.2) 93.7 (16.5) 8.6 (2.9) 9.4 (2.8) 94.3 (11.1) 10.0 (1.8) 8.4 (2.1)	0.40 0.72 0.57 0.73 0.34 0.30 0.37	.01 <.001 <.001 <.001 .03 .02 .01	.44 .15 .10 .14 .54 .29 .57	.0 <.0 <.0 <.0 .1 .0











Gaps in knowledge

- Opportunities for future research are the evaluation of:
- The hedonic responses of preterm infants to specific auditory stimuli.
- The long term effect of the early auditory environment on early communication abilities, language development and the bonding process.
- The benefit (?) of additional auditory stimuli (music > recorded maternal sounds)
- T- Which babies would benefit at best ?

Conclusion

- Possible to adapt the HOSPITAL environment to the infants needs
- Multidisciplinary Team work
- Protect VPT from the hospital auditory stressors
- Supporting access to direct biological meaningful signals coming from the mother (father) during multimodal conruent experience of SSC
- Individualization of the auditory environment in the NIDCAP $\bigotimes_{\rm nidea}^{}$
- Early maternal vocal contact appears essential for providing more nurturing environment
- Future areas of research !
- More humane neonatal care





Ultra - intervention meeting
 B. Westrup and the KI NIDCAP Team
 Stockholm 2017 March 23rd



