The warm sensitive neurons in the preoptic area of the anterior hypothalamus play a key role in the control of core body temperature. The molecular mechanism of the warm sensitivity of these central neurons in the temperature range 35-41°C are not known. Efforts were made subsequent to the identification by Julius and colleagues of the peripheral heat and cold sensitive TRP channels to identify these channels in the CNS and some PCR evidence has been presented for the low level expression of transcripts encoding several TRP channels.

We have started with an unbiased approach not assuming that one or another TRP channel or ion pump will be present in warm sensitive neurons; individual warm-sensitive neurons from POA slices were electrophysiologically characterized, cDNA was prepared from each cell, linearly amplified and subjected to Illumina chip hybridization. Over 7000 transcripts encoding ion channels, receptors, biosynthetic enzymes for neurotransmitters, cyclic nucleotides etc were identified and functional expression of the proteins encoded by many of these transcripts was proven. While our data confirms many of the receptors known to be expressed in warm-sensitive neurons, we found no evidence of expression of thermoTRP channel mRNA. The receptor and ion channel repertoire of these neurons will be presented. The molecular mechanism of heat sensitivity of the warm sensitive POA neurons remains elusive while the signaling signature of these neurons’ ie their transmitters, neuropeptides and their receptors has been described.