The Story of

AUTISM

PART 21:

REFLEX RETENTION AND THE RETICULAR ACTIVATING SYSTEM

THE STORY OF AUTISM: The Reticular Activating System

I have created a separate presentation for the **Reticular Activating System** for a good reason. Because, along with the cerebellum, **it plays a critical role in creating the dysfunction neural connections that result in autism.**

And once again, primitive reflexes are the source of the problem.

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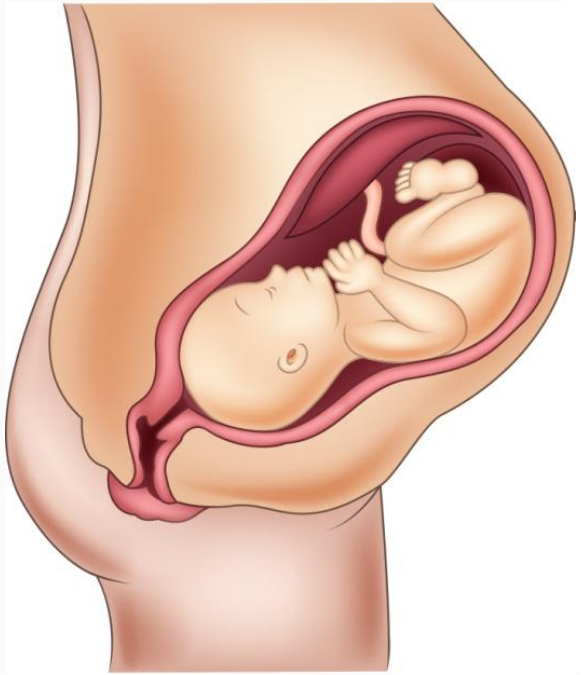
Here's what happens.

Two reflexes that emerge in utero, the **Fear Paralysis reflex** and the **Moro reflex** affect the way a baby responds to sudden, unexpected stimuli.



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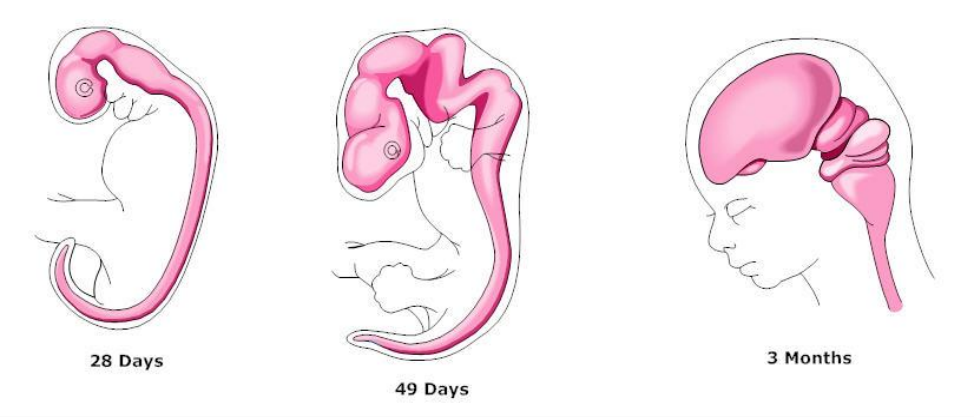
The Fear Paralysis or "startle" reflex is triggered by a sensory stimulus – auditory, visual or tactile –such as a loud noise or a sudden movement/touch. It typically emerges 5-7 weeks after conception and should be fully integrated into the Moro by the 12th week of pregnancy.



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The Moro reflex, often referred to as the "fight or flight" reflex, is triggered by a sudden change in the infant's head position. This proprioceptive movement normally emerges 9-12 weeks after conception and disappears or integrates into the developing nervous system 3-4 months after birth.

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If the FPR remains active, the Moro will remain active as well. And visa versa. If the Moro is retained, the FPR may not be integrated.

Since both these reflexes support a child's emotional and social development, the consequences of non-integration are serious.

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The biggest consequence being that the Moro and FPR form **the basis of the development of the Reticular Activating System in the brain**. When they integrate or bow out of the picture, the RAS takes over the "fight or flight" response role.

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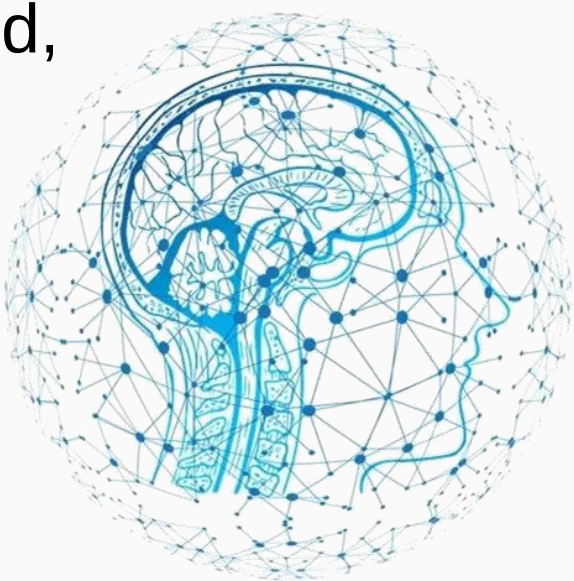
If their wiring remains active, the formation of the **Reticular Activating System (RAS)** will be impacted in such a way that the transition from automatic to postural reflexes might be impeded, especially startle responses and flight vs. flight responses.



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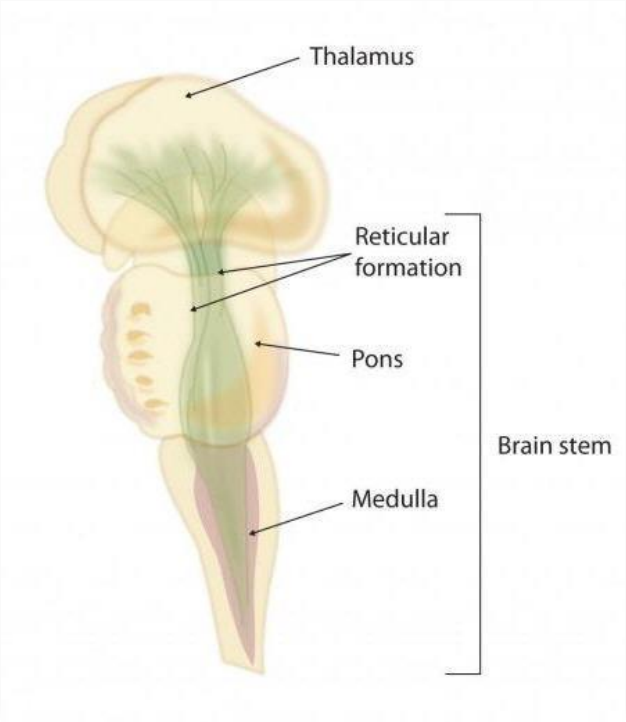
The **reticular formation,** from which the RAS axons sprout, is a set of interconnected nuclei that are located throughout the **brainstem**



Remember, the brainstem is the earliest brain structure and it is where the retained wiring of primitive reflexes would do the most circuitry damage.

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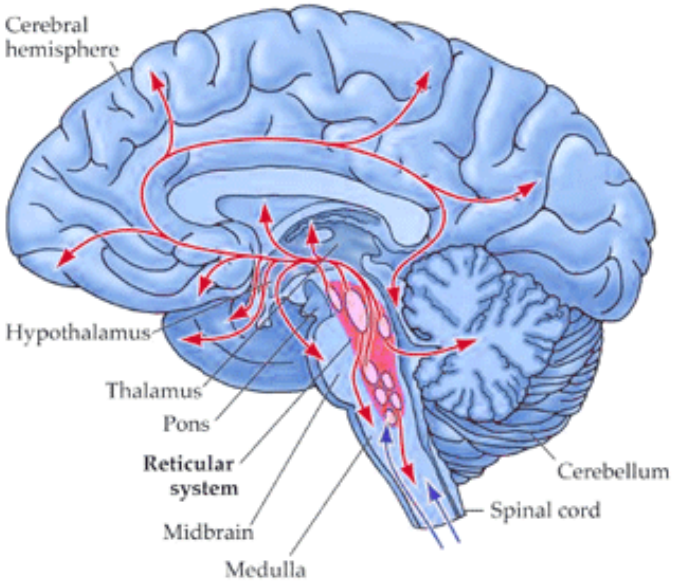
As the brain grows, so does the RAS, extending its neural fibers from the brainstem up through the **thalamus** and eventually connecting to almost all parts of the **cerebral cortex**.



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In a neurotypical brain, **the RAS circuitry controls the degree of activity of the central nervous system.**

It filters and prioritizes all incoming sensory information.

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But, in brains with retained Moro and or FPRs, the RAS develops atypically, generally skewing or up-regulating the interpretation of sensory input (increasing its amplitude and decreasing sensory gating).[14]

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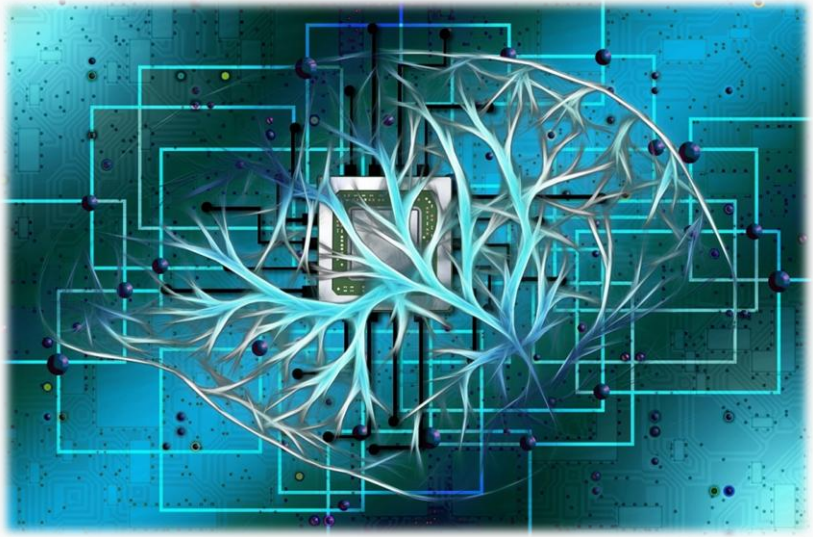
It is also possible, if a number of reflexes are retained, that the overabundance of un-pruned reflex wiring in the brainstem could create a traffic jam effect, **down-regulating some RAS outputs.**



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Either way, **the influence of a dysregulated RAS would have a wide-ranging impact on a number of brain structures and functions.**

In the cerebellum, it could cause or compound dysmetria of thought and movement.

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It could make the intake of sensory information so uncomfortable or overwhelming that one is forced to tune it out rather than suffer from the overload.

This, as we know, is what happens in autism.

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The RAS influences lower motor pathways as well. Although there are fewer descending neural fibers, they still exert an impact on movement and postural control.[15]

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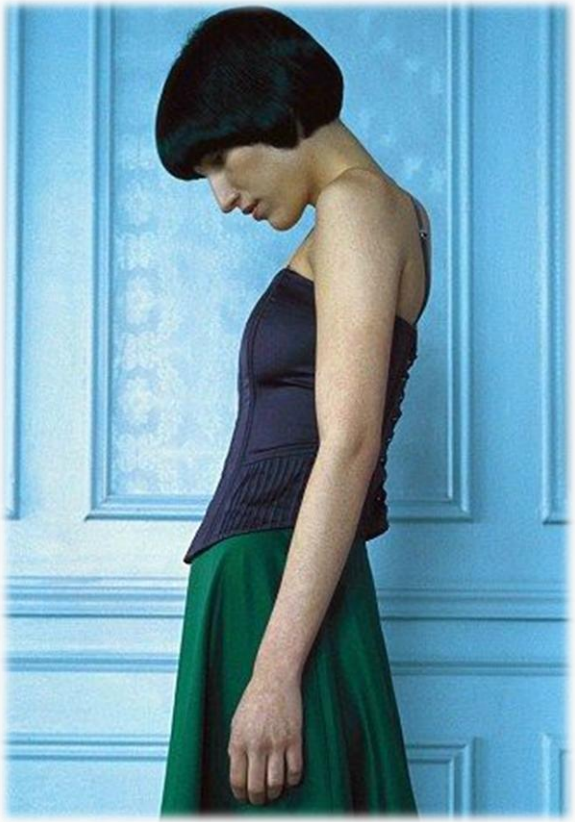
We see that impact clearly in the unusual gait of kids with autism and the stooped way they stand, with their heads bent down, facing the ground.



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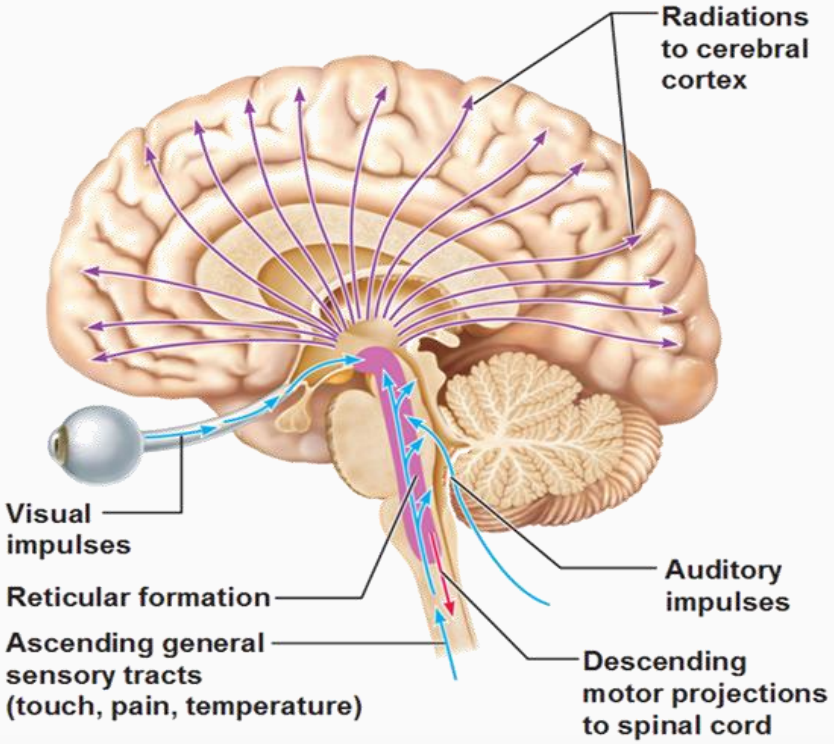
But perhaps the **biggest impact of the RAS is on vision and hearing** – on how the information these senses take in is processed.



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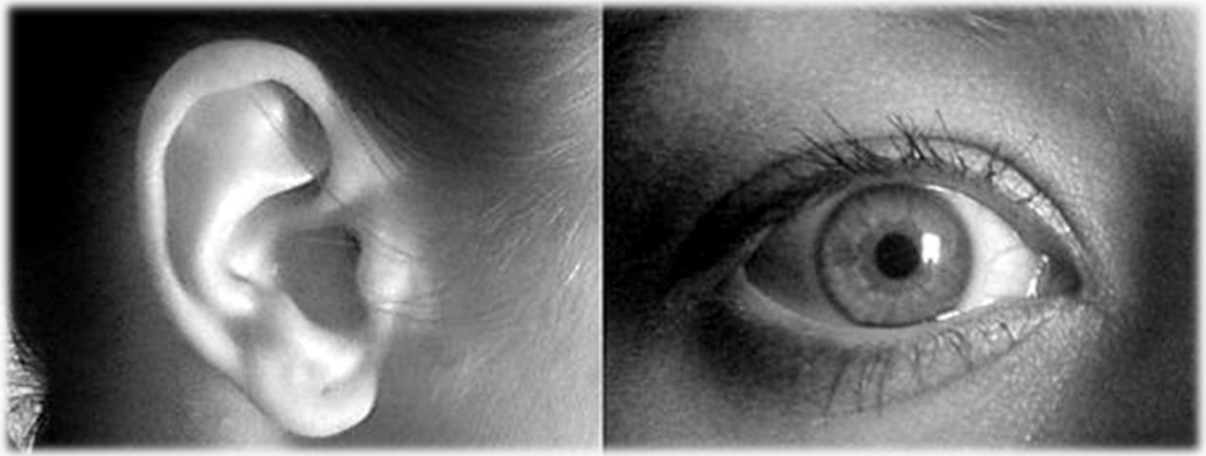
As you can see from the diagram above, **all visual and auditory sensory input passes through the reticular formation before it moves on to the cortical lobes. ALL OF IT.**



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And if the RAS is not doing it's job of modulating, organizing and prioritizing sensory input, then it is easy to see why the autistic brain can so easily become overwhelmed.

We will focus more on the distortion of sight and sound in the next presentation.

GO ON TO THE NEXT PRESENTATION