No Sleep in the Deep

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Unlike Other Mammals, Newborn Dolphins and Killer Whales Stay Active 24/7 During First Months of Development

If you thought the sleep-deprived months with your newborn were tough, pity the poor mother dolphin or killer whale.
Reporting in the June 30 edition of the peer-reviewed journal *Nature*, UCLA/Veterans Affairs neuroscientists report a developmental pattern in bottlenose dolphins and killer whales that is unique from other mammals, with calves of both species active 24 hours a day during their first month.

The mother also has minimal sleep during this period, but unlike all other mammals always manages more sleep than her busy newborns. The

newborns and mothers gradually increase sleep over a period of months until they reach normal adult levels. As the newborns grow, neither mothers nor offspring show counterbalancing increases in rest that would indicate accumulated sleepiness.

All mammals previously studied have maximum rest or sleep behavior at birth with amounts gradually decreasing to adult levels. In fact, past findings that sleep deprivation for two to three weeks can be lethal in rats and flies has led to the belief that sleep is critical for the development of brain and body and serves a vital function in adults.

The ability to remain active and responsive after birth has several apparent advantages for newborn cetaceans: Movement and wakefulness reduce danger from predators, help maintain body temperature until mass and blubber insulation develop, allow frequent respiration at the surface, and facilitate rapid growth of brain and body and related behavioral development.

"Somehow these seafaring mammals have found a way to cope with sleep deprivation, facilitating rather than hindering a crucial phase of development for their offspring," said Dr. Jerome Siegel, professor-in-residence at the Semel Institute for Neuroscience and Human Behavior at UCLA and chief of neurobiology research at the VA Greater Los Angeles Healthcare System, Sepulveda. "Their bodies have found a way to cope, offering evidence that sleep isn't necessary for development and raising the question of whether humans and other mammals have untapped physiological potential for coping without sleep."

Researchers observed two adult female killer whales and their calves at Shamu Stadium at SeaWorld San Diego and four dolphins and their calves housed at the Gelendgick Dolphinarium and the Utrish Marine Mammal Research Station in the Black Sea region of Russia.

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Other researchers on the project included Oleg Lyamin of UCLA, VA and Utrish Dolphinarium Ltd.; Julia Pryaslova of Utrish Dolphinarium Ltd.; and Valentine Lance of San Diego State University.

Source: UCLA