



**Review Article**

ISSN: 2454-5023  
J. Ayu. Herb. Med.  
2023; 9(2): 98-100  
Received: 20-04-2023  
Accepted: 25-05-2023  
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www.ayurvedjournal.com  
DOI: 10.31254/jahm.2023.9208

## Role of the Ayurvedic clock in boosting the immune system

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### ABSTRACT

Ayurveda prophesizes that living in tune with nature's cycles is one of the keys to good health. All living things have a circadian clock which keeps track of night and day in the brain, orchestrates our daily rhythms of physiological, behavioural and molecular processes, and plays an explicit role in the immune system. This cycle regulates cytokine production and the activity of immune cells, such as T cells and B cells, which makes it closely intertwined with our immune system.

**Keywords:** Ayurveda, circadian clock, immune system, cytokine, T cells, B cells.

### INTRODUCTION

All life forms on our Earth have evolved to cope with the rotating nature of the planet, resulting in the alteration between day and night. The specifics of this cycle differ in micro-organisms, fungi, bacteria, plants and animals; however, the consistent feature is a “biological clock” which allows the organism to anticipate and prepare for the change [1-2]. The biological clock keeps track of the night and day which is synchronised with the light received from the retina which is further interpreted in the brain [3]. It is also important to note that all animal cells have their own clocks; however, the clocks do not differ much as it is hugely linked to the day and night. These biological clocks have a cycle which is very close to the 24-hour pattern of light and darkness, it is also called as circadian cycle [4]. This concept which is now a topic of research throughout the globe has been well explained in Ayurveda a long time back. According to Ayurveda, there is an internal clock in our body which is in sync with the day and night cycle that regulates our levels of energy and elucidates that certain functions are most beneficial or optimal at a particular time of the day. Hence, the terms Ayurvedic clock, biological clock, and circadian clock share almost similar perspectives. Ayurveda also advocates the concept of immunity as not only protection from diseases but also the promotion of physical as well as mental health with the term “vyadhikshamatva” [5] and described it to be closely intertwined with the Ayurvedic clock.

The Ayurvedic or circadian clock coordinates an organism’s daily rhythms in molecular, physiological, and behavioural processes. It also plays a specific role in synchronizing functions of the immune system when the organism is in a healthy state and specifically when there are threats of infection. The disruption of our circadian cycles results in a number of health issues, including obesity and diabetes, defective immune response and cancer [6-10]. In this section, a focus is made on the role of the internal circadian clock system on the immune system. The immune system, a complex network of cells comprising special organs, cells and chemicals, guards our body against infection (microbes). The white blood cells which include B and T-lymphocytes, antibodies, the lymphatic system, spleen, thymus, bone marrow and the complement system constitute the main parts of the immune system, which actively fight infections [11-12]. Several immune responses, such as, leukocyte mobilization, trafficking, chemotaxis to cytokine release, and T-cell differentiation are mediated in a daily manner or dependent on the time of day. Also, Cytokines are signalling molecules which play a key role in immune function, and their timing and amount of production are regulated by the circadian clock [13-14].

According to Ayurveda, one of the keys to good health is living in tune with nature’s cycles. Ayurveda has emphasized the importance of a connection with nature for millennia; many people around the globe are only now beginning to understand exactly how important it is for the body to stay connected to the rhythms of nature. Everything in nature works in a rhythm and we human beings are also part of this nature resulting in optimal functioning when the rhythm is maintained. Our 24-hour ayurvedic biological cycles influence the sleeping and waking cycles, the release of hormones, eating pattern, digestion, temperature of our body and other important bodily functions. The Earth’s rotation on the Sun creates a 24-hour cycle of light and dark which impacts human health in many ways. It has been seen that the ayurvedic or circadian cycle affect the gene expression metabolism and functions that has an immense

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role on the well-being, such as, the liver function, cardiovascular function, and blood glucose regulation [13-14]. The Ayurvedic clock can be categorized into six cycles; out of which, three cycles occur during the day while three cycles occur during the night. It is known that Ayurveda is built on the five great elements, viz., earth, water, fire, air and space. As per Ayurveda three doshas, namely, Vata, Pitta and Kapha, are formed by combining the above stated five elements. The

word "Dosha" is a Sanskrit word which disease or fault or defect and as per Ayurvedic medicine, the three doshas describe the fundamental qualities of the elements and the three doshas are considered to govern our mental and physical responses [15-16]. In Ayurvedic medicine, it is said that Vata is the lightest dosha (air and space), Pitta as the hottest dosha (fire and a little water) and Kapha as the densest dosha (earth and water.)

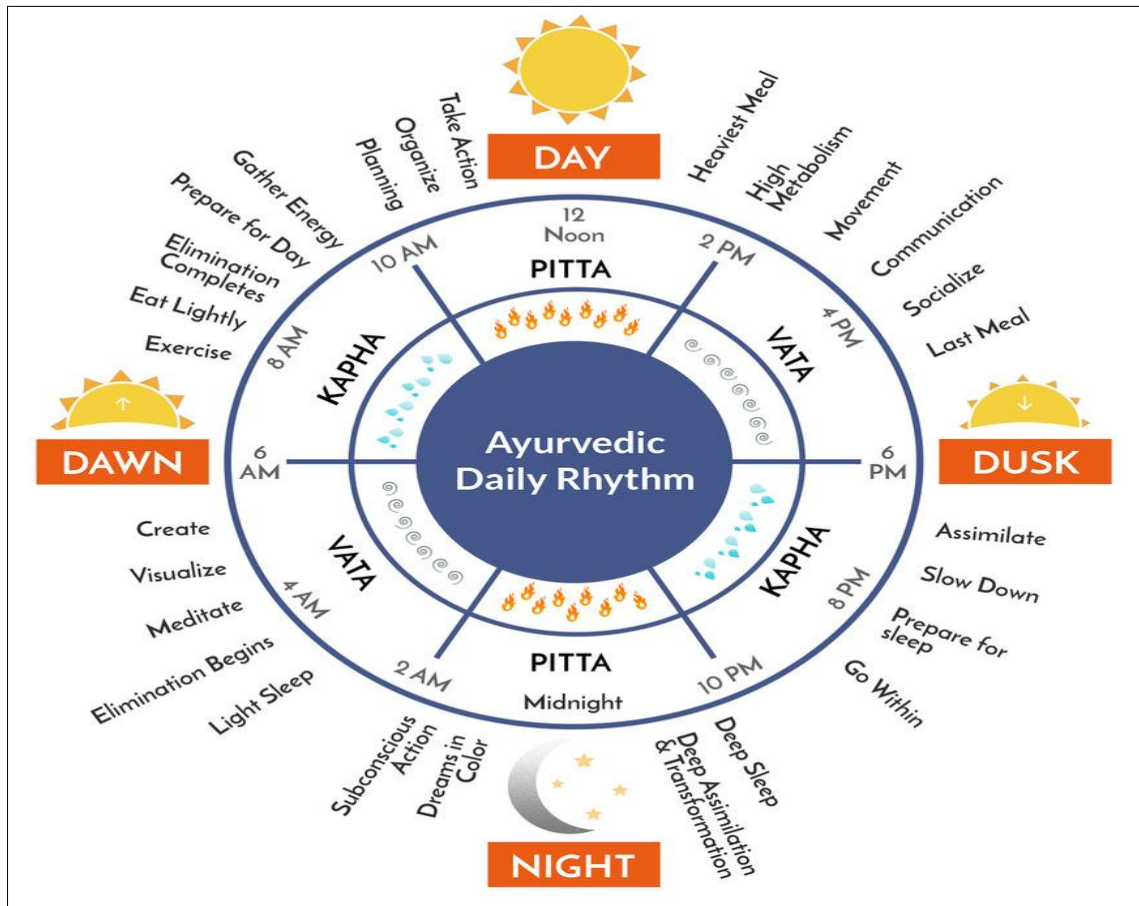


Figure 1: Ayurvedic clock [Source: www.nourishmyself.com]

### Day Cycle (comprised of Kapha, Pitta, and Vata)

6 am – 10 am - Kapha Time: Time periods always begin with Kapha dosha. As per Ayurveda, getting up (ideally before 6 am) and engaging in certain early morning exercise or activity to get our heart pumping with an energetic start is considered the best practice. Also, having a light well-spiced breakfast is advised.

10am - 2pm - Pitta Time: Kapha time flows into Pitta time. It is the time when the sun is highest in the sky and so is called the time of productivity when there is sufficient heat in the natural world. During this time, heat naturally predominates our body and mind; thus, making it ideal for physical activities. This is the best time to have the largest meal of the day which is our lunch.

2 pm - 6 pm - Vata Time: As the day passes, the pitta period time fades and the Vata time begins. Thus, Vata represents the time of transition and characterised by calm and peaceful environment allows the best of creative and expansive thinking, making it an ideal time for problem-solving and creative pursuits.

### Night Cycle (the cycle ruled by the three doshas of Kapha, Pitta, and Vata repeats)

6pm - 10pm - Kapha Time: As we move towards night, the cycle continues and times ruled by the doshas again repeats. Kapha becomes once again dominant and its heavy qualities indicate that it's time to wind down, have a light dinner, and settle in for the night.

10pm - 2am - Pitta Time: When the Kapha time starts, it is considered best to snug in bed and have a sound sleep. It is vital to sleep during this time as the activities inside the body mainly related to internal cleansing takes place.

2am - 6am - Vata Time: The Vata time of the night cycle marked another time of transition. This time which represents the early morning is not an ideal time of creativity; instead considered best for receptivity. Hence, it is the best time for prayer, meditation, and other spiritual practices.

When human being sleep, it is the time of resetting our clock with nature's clock. Today's highly competitive society has compelled us to listen to the demands of our work often ignoring the needs of the body

and nature's rhythm. The alteration in sleep and eating patterns usually disturb the primary circadian system which then influences the gut microbiome resulting in metabolic health issues [17-18]. Thus, frequent disruption in the pattern of eating and sleeping has immensely impacted our mind-body system which can lead to a weakening immune system and different kinds of diseases. People with certain disorders and weakened immune system are more likely to get severely affected by any diseases including Covid-19 as compared to those who strictly follow the Ayurvedic clock [19]. Maintaining the circadian clock helps in a better immune response to Covid-19 and may have some role in the severity of the symptoms and the disease [20]. So, it will be beneficial to switch our routine up in accordance to our ayurvedic cycle and be encouraged to make small changes and adjust habits over time specially during the present pandemic time.

## CONCLUSION

The circadian cycle is closely intertwined with our immune system, as it regulates cytokine production and the activity of immune cells, such as T cells and B cells, lowering the susceptibility to infections and immune-related disorders. Thus, maintaining a healthy circadian cycle which includes is important for optimal immune function. This can be achieved through good sleep hygiene, regular exercise, and exposure to natural light during the day.

## Conflict of interest

None declared.

## Financial support

None declared.

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## HOW TO CITE THIS ARTICLE

Maibam P. Role of the Ayurvedic clock in boosting the immune system. *J Ayu Herb Med* 2023;9(2):98-100. DOI: 10.31254/jahm.2023.9208

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