**MailOnline**

**The eternal chronometer: How our body clock has remained unchanged for millions of years**

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**UPDATED:** 16:53, 27 January 2011

Scientists have identified the universal ancient body clock that regulates the behaviour of all forms of life.

The internal chronometer tells the body what should be happening at different times during the 24-hour cycle and when it should take place.

The researchers found that the version today is unchanged from the earliest forms of life on Earth like algae and dates back millions of years.

Its discovery could shed light on a range of human conditions such as depression, cancer and diabetes and provide relief to workers such as pilots or nurses who do odd hours.

Studies have long shown that working irregular shifts increases the risk of catching a range of conditions and puts employees at greater risk of mental illness.

The studies from the University of Cambridge and the University of Edinburgh examined the circadian clock which controls patterns of seasonal activity in everything from sleep cycles to butterfly migration.

In the first study, Cambridge scientists found that red blood cells have a 24-hour rhythm.

This is an important step because circadian rhythms have always been assumed to be linked to DNA and gene activity, but unlike most other cells in the body red blood cells do not have DNA.

The second study found a similar 24-hour cycle in marine algae suggesting that internal body clocks have always been important, even for ancient forms of life.

Scientists had previously thought the circadian clock was driven by gene activity, but both the algae and the red blood cells kept time without it, meaning other factors were at play.

Dr Akhilesh Reddy, a neuroscientist with Cambridge University who led the first study, said: ‘The implications of this for health are manifold.

'We already know that disrupted clocks - for example, caused by shift-work and jet-lag - are associated with metabolic disorders such as diabetes, mental health problems and even cancer.

‘By furthering our knowledge of how the 24-hour clock in cells works, we hope that the links to these disorders - and others - will be made clearer.

‘This will, in the longer term, lead to new therapies that we couldn't even have thought about a couple of years ago.’

Professor Andrew Millar of the University of Edinburgh's School of Biological Sciences, who led the second study, added: ‘This ground-breaking research shows that body clocks are ancient mechanisms that have stayed with us through a billion years of evolution.

‘They must be far more important and sophisticated than we previously realised.

‘More work is needed to determine how and why these clocks developed in people - and most likely all other living things on earth - and what role they play in controlling our bodies.’