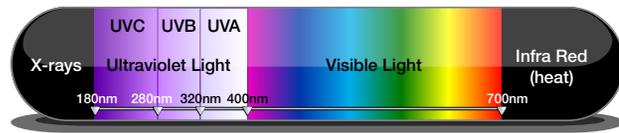


Why do Reptiles need light?

Light is everywhere on the earth, with the exceptions of the deepest caves and oceans, and governs all life on earth. Of course animals use it to see with, but it also has other effects that are far reaching and vital for their health and well being. Reptiles particularly have some very specific needs which can only be met by ensuring that you have the correct equipment for the species you are keeping.

What is light?



Our sun emits electromagnetic radiation in a range of different wavelengths. Right from x-rays with short wavelengths, to infra-red with long wavelengths. Somewhere in the middle, with wavelengths of about 400-700nm, is the visible light which we, and reptiles, can see.

Below this with wavelengths from 400 to 180nm is the ultraviolet part of the spectrum, made up of 3 parts; UVA, UVB and UVC.

At the other end of visible light, beyond what we see as red light, lies the infra red. These are the wavelengths that make us warm, exciting the water in our tissues to generate heat. Reptiles use infrared to warm up as well, but it is also plays an important part of the vitamin D synthesis and calcium absorption process.

Visible light



Reptiles can see the same wavelengths as us, and probably see the same colours although of course we can't ever be really sure exactly what they see. Visible

light can be measured in terms of its quality and its intensity. In light that is very much like natural sunlight then the colours that can be seen will be very similar to colours seen outside on a nice sunny day. For most day active reptiles this is the norm, and they respond well to lights that have a good quality output, reproducing sunlight as closely as possible; these are referred to as having a high colour rendering index or CRI. Under artificial light that has a spectrum that is different to sunlight, such as UV tubes which lack red and tungsten filament bulbs which lack blue, then colours can look very different. This is important to reptiles as they have full colour vision and colour plays an important part in their biology, from recognising food to mating or threat displays.

Intensity refers to how bright the light is and can be independent of the quality of the light. So, you can have a very bright, poor quality light or vice versa.

In the vivarium the light that you choose will depend on the animal in question. A nocturnal leopard gecko will not need bright light while a bearded dragon will remain inactive unless it gets it.

UV light



The UV part of the spectrum is from 180 to 400nm, but this is divided into 3 parts. UVC from 180 to 280nm, UVB from 280 to 320nm and UVA from 320 to 400nm.

In nature UVC never reaches the surface of the earth as it is filtered out by our atmosphere. It is very dangerous, causing burns on the skin and even blindness. Under no circumstances should UVC fluorescent tubes be used to light reptile enclosures.

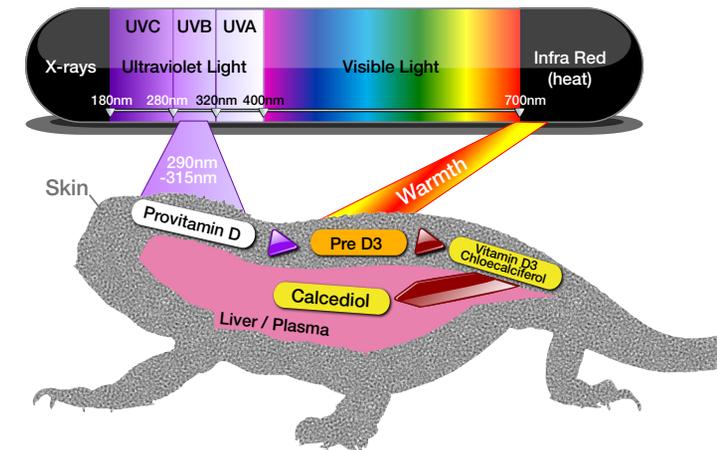
UVA

Although we cannot see UVA reptiles, and birds, can see things completely differently to humans. To a reptile having no UVA in the light in its enclosure is like living in semi darkness. Colours are different, patterns on other animals may not be visible and even food may be unrecognisable.

On top of the purely visual aspects UVA has a host of biological effects. It stimulates the pineal gland (an organ in the brain of reptiles that can detect light) effecting feeding, controlling social behavior, breeding cycles, activity and much more.

UVB

This is possibly the most important part of the UV spectrum, and particularly the wavelengths between 290-315nm. When a reptile basks the UVB light penetrates its skin, driving a rapid chemical reaction which converts provitamin D3 into previtamin D. This builds up in the skin and is slowly converted to Vitamin D3 by heat from basking. The vitamin D3 then circulates in the blood and is converted to calcidiol in the liver. Calcidiol is the active form of vitamin D3 and it is this which is essential for a whole multitude of processes within the reptiles body. Vitamin D3 has so many functions that it is impossible to list them all here, but it is essential to the health and wellbeing of reptiles. One of the most important processes it controls is the uptake of calcium from the gut, and its use in the body. Without vitamin D3 then no calcium can be absorbed and the reptile will develop metabolic bone disease, and other serious deficiency diseases, a potentially fatal condition.



Infra-Red

Strictly the infra-red part of the spectrum is not light, but it is an essential part of the vitamin D3 synthesis cycle, and is also produced by many lights, so it is worth mentioning it here. Infra-red is divided into several types, but the

two types that are important to reptiles are short and long wavelength infra-red radiation. Short wavelength IR is emitted by the sun and fall on the earth, and basking reptiles! This penetrates through the reptiles body, exciting the molecules and so warming the animal up.

If an object is warmed by the sun then it re-emits infra-red radiation, but as long wavelength IR. This type is not able to penetrate the reptiles body and so it will only heat the skin, which warms up. The warmth is then distributed through the animals body by the blood. Spot bulbs, ceramic heater and heat mats emit this longer wavelength infra-red radiation.

Which reptile lighting products do what?

As with many aspects of reptile care there is not a “right” or “wrong” product type. Each type of light has its benefits and drawbacks, and it is a case of choosing the right product, or combination of products, to provide the correct UV, visible light and heat suitable for the animal being kept. This will mean assessing its requirements, and natural environment, and creating that as closely as possible in the vivarium.

Tungsten filament spot lights

These are the most commonly used product to create a warm basking site for day active reptiles. They produce visible light, a little UVA and infra-red heat, but CANNOT produce UVB. Bulbs of this type sold as “daylight” bulbs are so called as they produce a light with a good CRI and so produce a “natural” look, but generally these bulbs produce a fairly dull light that is skewed towards the red/yellow end of the spectrum and is not very natural looking. Coloured bulbs are more for the owner than the reptile and the best colour is a simple white bulb. Contrary to popular belief reptiles can see red light and red bulbs are not invisible to them.

Halogen bulbs

Although not widely used halogen bulbs are good for creating a basking site. Like tungsten bulbs they produce visible light, a little UVA and infra-red heat, but CANNOT produce UVB. They are brighter than tungsten

bulbs though, and tend to have a better spectrum and CRI. They also have the advantage that they can be run from a low voltage supply, rather than the mains.

Mercury vapour spot bulb

These large format bulbs are discharge bulbs with an internal starter system. This means they do not need an external ballast to run them. They produce a bright light, but with a spectrum that is quite “spikey”, with gaps that mean they do not produce a very natural looking light. Because of the way they are made they cannot be controlled with a thermostat, and are only suitable for large, well ventilated enclosures. However they can produce good UVA and UVB, visible light to appeal to basking reptiles, and also heat to create a basking spot.

Metal halide bulbs

In many ways these are like an improved version of the mercury vapour lamps, producing good UVA, UVB, visible light and heat. They do have a better spectrum though and produce a brighter, more natural looking light. They need an external ballast to run them and also cannot be thermostatically controlled, but with available wattages down to 35w they are more useful for smaller enclosures.

Linear fluorescent tubes

These were the first UVB reptile bulbs produced, and are still the most widely used products. Unlike the previous products these are only used to provide light and not to create basking sites. They can produce good UVA and UVB, with passable visible light that can appear slightly bluish. The quality of the output however varies from make to make and it is essential that you choose a reputable brand which you know produces good quality light. Until recently the 1” (T8) tube was the norm, available from 15” to 48” in length. More recently however the thinner T5 tube has become available. These produce brighter, better quality visible light with more UV. All Linear fluorescent tubes use an external ballast to control them.

Compact fluorescent lamps

These lamps have the same output and characteristics as the linear tubes. Because of their design they are not as

bright as linear tubes, but the quality of the light is similar. They are useful to provide areas of UV in a basking spot and do not require an external control ballast.

All UV emitting lights have a limited life as the UV output declines over time. This varies from bulb to bulb, and even between brands.

“Sunlight” tubes

These linear tubes do not provide UVB, although they can provide some UVA. Their output has been designed to give a good CRI and create a bright, natural looking visible light. They are particularly useful for using along with UVB lights to provide good background light.

In the vivarium it is usually necessary to combine different product in order to create the perfect basking site and correct UV. So a tungsten spot bulb may be used to create the basking spot, and a linear fluorescent tube to supply the UV, or a mercury vapour lamp to provide a basking spot with UVB along with a daylight tube to illuminate the rest of the enclosure. As with all products there are good and bad makes and it is important to use well known, reputable makes to ensure the best for your reptile.

This leaflet only provides a very basic overview of the lighting products available for reptiles and in all cases it is essential that you carry out the necessary research to ensure that you can meet all of the parameters necessary for the animal you wish to keep. Your local specialist reptile shop can provide help and advice on husbandry requirements and the products available.

Bulb	CRI	Intensity	UVA	UVB	Heat
Tungsten filament spot bulb	poor	poor	poor	none	good
Tungsten filament bulb	poor	poor	poor	none	good
Halogen	good	good	medium	none	good
Mercury vapour	medium	good	good	medium	good
Metal Halide	excellent	excellent	good	good	good
T8 UV Fluorescent tube	medium	medium	good	good	none
UV Fluorescent compact	medium	poor	good	medium	none
T5 UV Fluorescent tube	good	good	good	good	none
“Sunlight” Fluorescent tube	excellent	good	good	none	none