

Focal Point

The Newsletter from Southwest Precision Instruments
Tucson, Arizona USA · Tel./Fax +1 (520) 546-4986 · www.swpinet.com

February, 2011

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A new format for Focal Point! Our newsletter is now formatted as a single-column page, rather than the previous two-column design. This reduces the need to scroll up and down as much while you're reading.

The Six Most Popular Microscope Bulbs

Just Six Bulbs are Used in Over 175 Different Makes and Models of Microscopes and Lamphouses!

[In the last issue](#) we discussed the various types of illumination sources, such as incandescent, halogen, gas-discharge and light emitting diode (LED) lamps, and we proposed that the future of microscope illumination likely lies in the increased use of LEDs, even for fluorescence microscopy, as LED manufacturing technology continues to evolve and to improve.

That's perfectly fine, but not everyone can afford a new microscope. There are countless scopes out there which are 40 to 50 years old (or older), and they're still operating just fine, thank you very much. Even more miraculous, bulbs are still available for these microscopes.

Following is a list of the most commonly used microscope bulbs and the microscopes they're used in. Our thanks to Dennis Barker at Bulbworks for helping assemble this information and for allowing us to share it with you. ***All images are courtesy of Bulbworks, Inc.***

There are a few important points to remember as you browse the list:

- ***The list reflects the most popular sellers***, and therefore the most popular (and frequently the older) microscopes. Don't be dismayed if your microscope isn't listed. If you have a microscope, we can locate a bulb for it!
- ***Bulb dealers sometimes assign their own part numbers*** for bulbs. We don't list all of the part numbers from all of the dealers and manufacturers. The essential characteristics of the bulb can usually be cross-referenced to more than one manufacturer and/or dealer. A bulb from Ushio, Osram, Eiko or another manufacturer will frequently do the job as long as it's of the proper voltage, wattage and base type.
- ***Common names and/or numbers*** are given for the bulbs to facilitate their identification. Please contact us if you need additional information on these bulbs.
- ***Always check the label or the lamphouse*** of your microscope for bulb recommendations. Several microscopes were manufactured with different power supplies and bulb requirements.
- ***Footnotes after the table*** explain the differences in the base types of the bulbs.




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The Six Most Popular Microscope Bulbs (images courtesy of Bulbworks, Inc.)

Common Name or Number	Voltage	Wattage	Bulb/Base Type (see footnotes)	Used in:
BRL 	12	50	Halogen Bipin, G6.35 ¹	Nikon 66; 88 Dia; 88 Epi; Alphaphot (KT and KT2); Measurescope (MM11, MM22, MM40-2U, TM20, TM1, TM2, UM3, VM40, VM60); NFC50 and NFC60 Fundus Cameras; Optiphot; Optiphot 66 Epi and Dia; Optiphot 88 Epi, Dia and POL; Optistation Wafer Inspection (2, 2A, 3, 3A, Epi); SCB, SCBD6 QH; SMZ Dia and Coaxial illum.; SMZ10 Coaxial Illum.; SMZU Bright Dia and Dark Dia; V10. Olympus BH2; BH2-M6SH; BH2-MLSH; BH2-ULSH; BX; BX2; BX30; BXFM; IMT2; PME3; SZH-ILLD Darkfield; ULS20
JC6V-30W 	6	30	Halogen Bipin, G4 ²	Nikon Eclipse 50i; E400; E400 POL; Labophot 2; Labophot 2A; SMZ600 BD, DIA and OCC Bases; SMZ645 BD, DIA and OCC Bases; SMZ660 BD, DIA and OCC Bases; SMZ 800 BD, DIA and OCC Bases; SMZ1000 BD, DIA and OCC Bases; SMZ1500 BD, DIA and OCC Bases; SMZU DIA Base Olympus BMAX; Original BX2; BX40; BX40F3; BX41; BX45;CH; CH40; CK; CK2; CK30; CK40; IX ILL30; IX2; IX50 (with ILL30 Illumination Pillar); IX51 (with ILL30 Illumination Pillar); ULS30; ULS303 Zeiss Primostar
BLC 	120	30	Incandescent Bayonet, Double Contact ³	Fisher Scientific 35M Olympus CH (Models Taking 120V Bulbs); CH2 (Binoc and Compound Models); CHB; CHT; CHZ; KH-2; KHC; KK-2 Leica Galen, B&L 31-70-01




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Common Name or Number	Voltage	Wattage	Bulb/Base Type (see footnotes)	Used in:
15T7N (Clear Envelope) 	120	15	Incandescent Intermediate Screw (E17) ⁴	Bausch & Lomb Stereozoom 2000; Academic Stereomicroscopes Leica Stereozoom 2000 American Optical 40 (Older Series); 615 (Older Series) Cambridge Stereozoom
13528 	6	15	Halogen Bipin, GZ4 ⁵	Bausch & Lomb Stereozoom 2000; Academic Stereomicroscopes Leica Stereozoom 2000 Southern Precision Microscope 220-85 Olympus SZH Illuminator VanGuard Microscopes
EVA 	12	100	Halogen Bipin, GY6.35 ⁶	Nikon 80i; 90i; E1000; E1000M; E600; E600FN; E600 POL; E800; E800M; Epiphot 100; Epiphot 300; L150; L10A; L200; L200A; L200D; ME600 Series; Measurescope (MM40, MM60); Microphot FXA and FXL; Optiphot (150, 200, 200C, 300); TE200; TE300; TS100; TS100-F Olympus A-LSH-3; AHMT; AHS; AHT; B-LSH-3; BH-RFL; BH2I BHS; IX-70; PME-LSM; PMG-3; PMG-LSM; U-LH (BX30/50/60) Zeiss Axiophot; Axiophot 2; Axioplan; Axioplan 2; Axioskop; Axiotech 100; Axiotech Vario; Axiotron; Axiovert 10/35/405; Axiovert 100/135/135M/TV in Lamp House 100

FOOTNOTES

¹A **G6.35** base has two pins measuring 1mm in diameter, located 6.35 mm apart.

²A **G4** base has two pins measuring 0.7 mm in diameter, located 4 mm apart.

³**Bayonet mounts** are used when the location and orientation of the filament are critical. They may be either double contact (DC) or single contact (SC).

⁴**Screw bases** follow the industry-standard “Edison” system, developed by [Thomas Edison](#). Household lamps are usually “E27” bases, measuring 27mm in diameter. The **E17** base, also called an intermediate screw base, measures 17 mm in diameter.

⁵A **GZ4** base has two pins measuring 1 mm in diameter, located 4 mm apart.

⁶A **GY6.35** base has two pins measuring 1.25 mm in diameter, located 6.35 mm apart.

External links in this Newsletter were current as of the date of publication, but please remember: The World Wide Web evolves and changes on a daily basis. Please contact us if you find a dead link.

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\$67.00



\$2.25



Images Courtesy of
Bulbworks.com

Did you know...

Pathology and teaching microscopes frequently have dual viewing heads with illuminated pointers. Many of these pointers use a small 6 volt / 2 Amp bulb called a "Midget Flange."

If you can tolerate slightly less brightness in the illuminated pointer, you can save a bundle on the bulbs.

Original equipment replacement bulbs with a lens built into the end of the bulb can cost \$50.00-\$70.00 each. The cost of a similar bulb without the built-in lens: less than \$3.00!

Getting Close to Your Subject: Scientists in a Moose Suit

"Recolonizing Carnivores and Naïve Prey: Conservation Lessons from Pleistocene Extinctions," Joel Berger, Jon E. Swenson and Inga-Lill Persson, *Science*, vol. 291, 2001, pp. 1036–9. The authors, at University of Nevada, Reno, U.S.A.; at the Agricultural University of Norway; and at the University of Oslo, report:

"The reactions of moose were gauged.... [The] experiments were conducted using sounds of different species (4) and by presentation of canid urine and bear feces obtained from zoological parks.... Delivery of olfactory material to within four moose body lengths was accomplished by launching snowballs either soaked in urine or coated with feces from less than 35 m, and delivery was occasionally facilitated by use of a moose suit."

Source: *Annals of Improbable Research*, November/December, 2010, Vol. 16, No. 6. Available at:

www.improbable.com



Is this moose naïve? Approach with caution, even if you're wearing a moose suit. Public domain image (Source: USDA Forest Service, <http://www.fs.fed.us>)

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Light Controls a Worm's Behavior: Scientists Commandeer Organism's Nervous System Without Wires or Electrodes

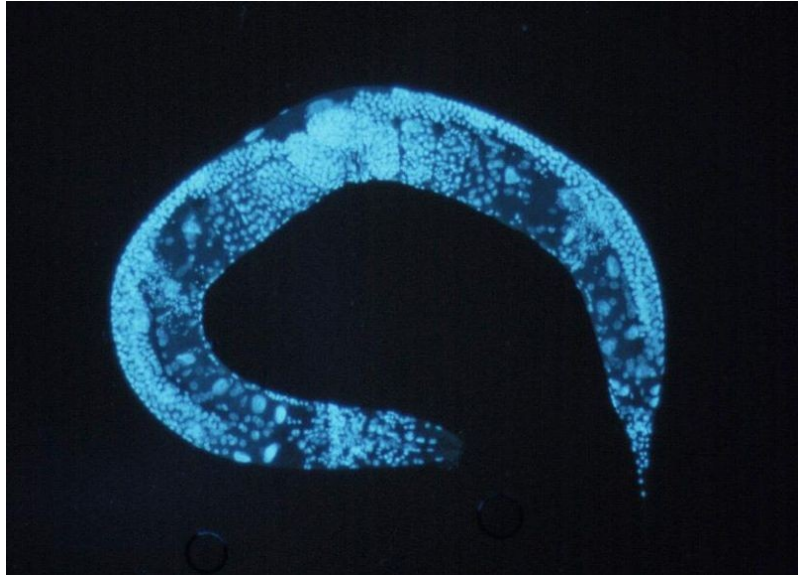
Physicists and bioengineers have developed an optical instrument allowing them to control the behavior of a worm by shining a tightly focused beam of light at individual neurons inside the organism.

The optogenetic research, by a team at Harvard University, the University of Pennsylvania, and the University of Massachusetts Medical School, is described in the journal *Nature Methods*. Their device is known as the CoLBeRT (Controlling Locomotion and Behavior in Real Time) system for optical control of freely moving animals, in this case the millimeter-long worm *Caenorhabditis elegans*. The team genetically modified the worms so their neurons express the light-activated proteins channelrhodopsin-2 and halorhodopsin.

Key to the CoLBeRT system is a tracking microscope recording the motion of a swimming or crawling worm, paired with image processing software that can quickly estimate the location of individual neurons and instruct a digital micromirror device to illuminate targeted cells. Because cells in an unrestrained worm represent a rapidly moving target, the system can capture 50 frames per second and attain spatial resolution of just 30 microns.

"This optical instrument allows us to commandeer the nervous system of swimming or crawling nematodes using pulses of blue and green light -- no wires, no electrodes," says Aravinthan D.T. Samuel, a professor of physics and affiliate of Harvard's Center for Brain Science. "We can activate or inactivate individual neurons or muscle cells, essentially turning the worm into a virtual biorobot."

Source: sciencedaily.com, Jan. 18, 2011. [Read the complete article here.](#)



C. elegans. Public domain image (Source: National Human Genome Research Institute, <http://www.genome.gov/10000570>)

The hardest thing to understand in the world is the income tax.
Albert Einstein

Einstein may be right on this one. Nobody knows for sure, but calculations show the number of pages needed to record the United States Tax Code for the year 2011 is somewhere around...wait for it... 72,574 pages!

Source: politicalcalculations.blogspot.com

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Molecules and Sensors: Why Olive Oil's Quality is in the Cough

To identify a particularly good olive oil, connoisseurs take a slurp and wait for a curious burning sensation in the throat. In a new study, researchers uncover the reason for this odd practice: Sensor molecules found mainly in the human throat — but not the mouth — latch on to a chemical found in superior olive oils. The results provide a scientific basis for the age-old custom of rating superlative extra-virgin olive oils on a scale of one, two or three coughs.

The new study, published in the *Journal of Neuroscience*, may lead to a better understanding of inflammation-fighting drugs. Extra-virgin olive oil's cough-eliciting compound, oleocanthal, fights inflammation. Ibuprofen, which elicits a similar throat burn when chewed and swallowed, binds to this same oleocanthal receptor, the researchers found.

Source: sciencenews.org. [Read the complete article here.](#)

Public domain image (Source: Wikipedia, http://en.wikipedia.org/wiki/Olive_oil)

Medicine: Alzheimer's Disease May Stem from Protein Clearance Problem



Researchers have discovered that a key protein implicated in Alzheimer's disease is produced in the brain at a normal rate but is not cleared, or removed, efficiently. The finding may lead to improved tests for early diagnosis as well as a new approach to treating this devastating disorder.

Alzheimer's disease is marked by dense protein clumps, called amyloid plaques, that form between brain cells. The plaques are made mostly of a protein fragment called beta-amyloid.

Researchers have recently developed ways to measure beta-amyloid levels in cerebrospinal fluid (CSF)—the fluid that bathes the brain. A team led by Dr. Randall Bateman at Washington University in St. Louis developed a procedure to measure beta-amyloid levels over time. They measured beta-amyloid production and clearance rates in 12 patients with late-onset Alzheimer's and 12 age-matched volunteers free of the disease.

The beta-amyloid production rate was similar between the 2 groups. However, the clearance of beta-amyloid was about 30% slower in those with Alzheimer's disease than in cognitively normal people.

"These findings may help point us toward better diagnostic tests and effective therapies," Bateman says. "The next question is what is causing the decreased clearance rate."

Source: National Institutes of Health. [Read the full report here.](#)

Public domain image. Source: [National Institutes of Health](http://NationalInstitutesofHealth.gov)

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Cancer and Metastasis: Blocking Rogue Gene Could Stop Spread of Cancer, New Research Suggests

Scientists at the University of East Anglia (UEA) have discovered a rogue gene involved in the spread of cancer in the body. By blocking the gene, they believe, cancer could be stopped in its tracks.

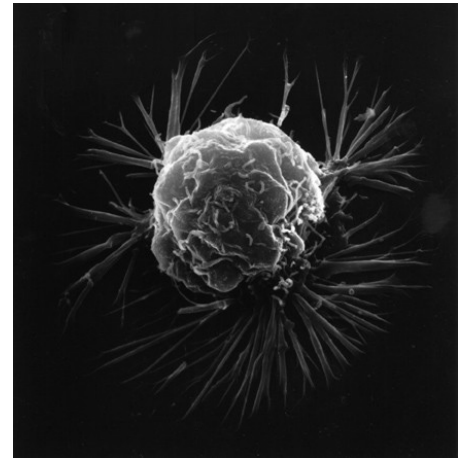
Published in the journal *Oncogene*, the discovery is a breakthrough in our understanding of how cancer spreads. It is hoped the research will lead to new drugs that halt the critical late stage of the disease when cancer cells spread to other parts of the body.

The culprit gene -- known as WWP2 -- is an enzymic bonding agent found inside cancer cells. It attacks and breaks down a natural inhibitor in the body which normally prevents cancer cells spreading. The UEA team found that by blocking WWP2, levels of the natural inhibitor are boosted and the cancer cells remain dormant. If a drug was developed that deactivated WWP2, conventional therapies and surgery could be used on primary tumours, with no risk of the disease taking hold elsewhere.

The initial discovery was made while researchers were studying a group of natural cancer cell inhibitors called 'Smads'.

Dr Surinder Soond, who spearheaded the experimental work in the laboratory, said: "This is a very novel and exciting approach to treating cancer and the spread of tumours which holds great potential."

Source: sciencedaily.com, Jan. 24, 2011. [Read the complete article here.](#)



Scanning electron micrograph of breast cancer cell. Public domain image (source: [National cancer Institute](#))

[Cytomegalovirus and Monogamy: Women Have the Power!](#)



The screenshot shows a web browser window displaying a PubMed search result. The browser's address bar shows the URL: <http://www.ncbi.nlm.nih.gov/pubmed/19828260>. The page title is "Kissing as an evolutionary adaptation to protect a... [Med Hypotheses. 2010] - PubMed result - Mozilla Firefox". The search bar contains the text "PubMed". The article title is "Kissing as an evolutionary adaptation to protect against Human Cytomegalovirus-like teratogenesis." by Hendrie CA, Brewer G. The abstract text is visible, starting with "Mouth to mouth sexual kissing is seen in more than 90% of human cultures. Various theories have been put forward to account for this but none offer a full explanation within an evolutionary framework. As mouth to mouth sexual kissing exposes each participant to the diseases of the other, it must confer significant benefit. Human Cytomegalovirus (HCMV) is a ubiquitous infection that carries a severe teratogenic risk if primary infection is acquired during certain critical periods. As HCMV is present in salivary gland epithelial cells and sheds from periodontitis induced lesions, female inoculation with a specific male's HCMV is most efficiently achieved through mouth to mouth contact and saliva exchange, particularly where the flow of saliva is from the male to the typically shorter female. The current hypothesis proposes that mouth to mouth sexual kissing enables females to control when they become infected with a particular male's HCMV and so protect their offspring from the threat of teratogenesis from primary infection during vulnerable times in their development. Females only gain this benefit if they also avoid becoming infected by other males. Hence HCMV induced teratogenesis is a strong viral pressure towards the development of monogamy as well as kissing as a behavioural strategy to protect against it."

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