

REFERENCES

- Aebi, U., Richterich, R., Comlombo, J.P. and Rossi, E. 1962. Progressive muscular dystrophy. II. Biochem identification of the carrier state in the recessive sex-linked juvenile (Duchenne) type by serum creatine phosphokinase determinations. Enzymol. Biol. et Clin. 1: 61.
- Alexander, J., Dainiak, N., Berger, H.J., Goldman, L., Johnstone, D., Reduto, L., Duffy, T., Schwartz, P., Gottschalk, A. and Zaret, B.L. 1979. Serial assessment of doxorubicin cardiotoxicity with quantitative radionuclide angiocardiology. N. Engl. J. Med. 300: 278-283.
- Ali, M.K., Soto, A., Maroongroge, D., Bekheit-Saad, S., Buzdar, A.U., Blumenschein, G.R., Hortobagyi, G.N., Tashima, C.K., Wiseman, C.L. and Shullenberger, C.C. 1979. Electrocardiographic changes after adriamycin chemotherapy. Cancer. 43: 465-471.
- Arai, M., Yoguchi, A., Takizawa, T., Yokoyama, T., Kanda, T., Kurabayashi, M. and Nagai, R. 2000. Mechanism of doxorubicin-induced inhibition of sarcoplasmic reticulum Ca^{2+} -ATPase gene transcription. Circ. Res. 86: 8-14.
- Azuma, J., Sperelakis, N., Hasegawa, H., Tanimoto, T., Vogel, S., Ogura, K., Awata, N., Sawamura, A., Harada, H., Ishiyama, T., Morita, Y., Yamamura, Y. 1981. Adriamycin cardiotoxicity: possible pathogenic mechanisms. J. Mol. Cell Cardiol. 13: 381-97.
- Bachur, N.R., Gordon, S.L. and Gee, M.V. 1977. Anthracycline antibiotic augmentation of microsomal electron transport and free radical formation. Mol. Pharmacol. 13: 901-10.
- Bachur, N.R., Gordon, S.L. and Gee, M.V. 1978. A general mechanism for microsomal activation of quinone anticancer agents. Cancer. Res. 38: 1745-1750.

- Bates, D.A. and Winterbourn, C.C. 1982. Deoxyribose breakdown by the adriamycin semiquinone and H_2O_2 : Evidence for hydroxyl radical participation. F.E.B.S. Lett. 145: 137-142.
- Benjamin, R.S., Wiernik, P.H. and Bachur, N.R. 1974. Adriamycin chemotherapy efficacy, safety and pharmacologic basis of an intermittent single high dosage schedule. Cancer. 33: 19-27.
- Bergson, A. and Inchiosa, M.A. 1985. Cardiac actomyosin ATPase activity after chronic doxorubicin treatment. Res. Commun. Chem. Pathol. Pharmacol. 48: 57-75.
- Blum, R.H. and Carter, S.K. 1974. Adriamycin: a new anticancer drug with significant clinical activity. Ann. Intern. Med. 80: 249-259.
- Boucek, R.J., Jr., Buck, S.H., Scott, F., Oquist, N.L., Fleischer, S. and Olson, R.D. 1993. Anthracycline-induced tension in permeabilized cardiac fibers: evidence for the activation of the calcium release channel of sarcoplasmic reticulum. J. Mol. Cell. Cardiol. 25: 249-259.
- Boucek, R.J., Jr., Dodd, D.A., Atkinson, J.B., Oquist, N. and Olson, R.D. 1997. Contractile failure in chronic doxorubicin-induced cardiomyopathy. J. Mol. Cell. Cardiol. 29: 2631-2640.
- Boucek, R.J., Jr., Olson, R.D., Brenner, D.E., Ogunbunmi, E.M., Inui, M. and Fleischer, S. 1987. The major metabolite of doxorubicin is a potent inhibitor of membrane-associated ion pumps. A correlative study of cardiac muscle with isolated membrane fractions. J. Biol. Chem. 262: 15851-15856.
- Bristow, M.R., Billingham, M.E., Mason, J.W. and Daniels, J.R. 1978. Clinical spectrum of anthracycline antibiotic cardiotoxicity. Cancer. Treat. Rep. 62: 873-879.
- Bristow, M.R., Kantrowitz, N.E., Harrison, W.D., Minobe, W.A., Sageman, W.S. and Billingham, M.E. 1983. Mediation of subacute anthracycline cardiotoxicity in rabbits by cardiac histamine release. J. Cardiovasc. Pharmacol. 5: 913-919.
- ³Bristow, M.R., Mason, J.W., Billingham, M.E. and Daniels, J.R. 1978. Doxorubicin cardiomyopathy: evaluation by phonocardiography, endomyocardial biopsy and cardiac catheterization. Ann. Intern. Med. 88: 168-175.

- ²Bristow, M.R., Thompson, P.D., Martin, R.P., Mason, J.W., Billingham, M.E. and Harrison, D.C. 1978. Early anthracycline cardiotoxicity. Am. J. Med. 65: 823-832.
- Calderone, A., De Champlain, J. and Rouleau, J.L. 1991. Adriamycin-induced changes to the myocardial beta-adrenergic system in the rabbit. J. Mol. Cell. Cardiol. 23: 333-342.
- Caroni, P., Villani, F. and Carafoli, E. 1981. The cardiotoxic antibiotic doxorubicin inhibits the $\text{Na}^+/\text{Ca}^{2+}$ exchanger of dog heart sarcolemmal vesicles. F.E.B.S. Lett. 130: 184-186.
- Cheeseman, K.H. and Slater, T.F. 1993. An introduction to free radical biochemistry. Br. Med. Bull. 49: 481-493.
- Chugun, A., Uchide, T., Temma, K., Kennedy, R.H., Kimberg, S.V., Hara, Y., Sasaki, T. and Akera, T. 2001. Doxorubicin affects the cardiac muscarinic system in the rat. J. Vet. Med. Sci. 63: 1315-1322.
- Ciarrochi, G., Lestingi, M., Fontana, M., Spadari, S. and Montecucco, A. 1992. Correlation between anthracycline structure and human DNA ligase inhibition. Biochem. J. 279: 141-146.
- Combs, A.B., Acosta, D. and Ramos, K. 1985. Effects of doxorubicin and verapamil on calcium uptake in primary cultures of rat myocardial cells. Biochem. Pharmacol. 34: 1115-1116.
- Cummings, J., Bartoszek, A. and Smyth, J.F. 1991. Determination of covalent binding to intact DNA, RNA and oligonucleotides by intercalating anticancer drugs using high-performance liquid chromatography. Studies with doxorubicin and NADPH cytochrome P450 reductase. Anal. Biochem. 194: 146-155.
- Cummings, J., Willmott, N., Hoey, B.M., Marley, E.S. and Smyth, J.F. 1992. The consequences of doxorubicin quinone reduction *in vivo* in tumour tissue. Biochem. Pharmacol. 44: 2165-2174.

- De Beer, E.L., Bottone, A.E. and Voest, E.E. 2001. Doxorubicin and mechanical performance of cardiac trabeculae after acute and chronic treatment: a review. Eur. J. Pharmacol. 415: 1-11.
- De Beer, E.L., Finkle, H., Voest, E.E., Van Heijst, B.G., Schiereck, P. 1992. Doxorubicin interacts directly with skinned single skeletal muscle fibers. Eur. J. Pharmacol. 214: 97-100.
- De Jong, J., Schoofs, P.R., Onderwater, R.C., Van Der Vijgh, W.J., Pinedo, H.M. and Bast, A. 1990. Isolated mouse atrium as a model to study anthracycline cardiotoxicity: the role of the beta-adrenoceptor system and reactive oxygen species. Res. Commun. Chem. Pathol. Pharmacol. 68: 275-289.
- De Wildt, D.J., De Jong, Y., Hillen, F.C., Steerenberg, P.A. and Van Hoesel, Q.G. 1985. Cardiovascular effects of doxorubicin-induced toxicity in the intact Lou/M Wsl rat and in isolated heart preparations. J. Pharmacol. Exp. Ther. 235: 234-240.
- Dodd, D.A., Atkinson, J.B., Olson, R.D., Buck, S., Cusack, B.J., Fleischer, S. and Boucek, R.J., Jr. 1993. Doxorubicin cardiomyopathy is associated with a decrease in calcium release channel of the sarcoplasmic reticulum in a chronic rabbit model. J. Clin. Invest. 91: 1697-1705.
- Doroshov, J.H. 1983. Anthracycline antibiotic-stimulated superoxide, hydrogen peroxide and hydroxyl radical production by NADH dehydrogenase. Cancer. Res. 43: 4543-4551.
- Ebashi, S., Toyokura, Y., Momoi, H. and Sugita, H. 1959. High creatine phosphokinase activity of sera of progressive muscular dystrophy. J. Biochem. 46: 103.
- Eliot, H., Gianni, L. and Myers, C. 1984. Oxidative destruction of DNA by the adriamycin-iron complex. Biochemistry. 23: 928-936.
- Feinstein, E., Canaani, E. and Weiner, L.M. 1993. Dependence of nucleic acid degradation on *in situ* free-radical production by adriamycin. Biochemistry. 32: 13156-13161.
- Ferrans, V.J. 1978. Overview of cardiac pathology in relation to anthracycline cardiotoxicity. Cancer. Treat. Rep. 62: 955-961.

- Ferrari, R., Bachetti, T., Confortini, R., Opasich, C., Febo, O., Corti, A., Cassani, G. and Visioli, O. 1995. Tumor necrosis factor soluble receptors in patients with various degrees of congestive heart failure. Circulation. 92: 1479-1486.
- Foster, G., Bernt, E. and Bergmeyer, H.U. 1974. Creatine kinase. In H.U. Bergmeyer (ed.), Methods of enzymatic analysis, 2 nd ed. pp. 789-793. New York: Academic Press.
- Friedman, M.A., Bozdech, M.J., Billingham, M.E. and Rider, A.K. 1978. Doxorubicin cardiotoxicity. Serial endomyocardial biopsies and systolic time intervals. J.A.M.A. 240: 1603-1606.
- Friess, G.G., Boyd, J.F., Geer, M.R. and Garcia, J.C. 1985. Effects of first-dose doxorubicin on cardiac rhythm as evaluated by continuous 24-hour monitoring. Cancer. 56: 2762-2764.
- Fritzsche, H. and Wahnert, U. 1987. Anthracycline antibiotics. Interaction with DNA and nucleosomes and inhibition of DNA synthesis. Biochemistry. 26: 1996-2000.
- Fu, L.X., Sjogren, K.G., Liang, Q.M., Waagstein, F., Hoebeke, J. and Hjalmarson. 1991. Activity of receptors coupled to guanine nucleotide binding regulatory protein in doxorubicin induced cardiomyopathy. Cardiovasc. Res. 25: 145-150.
- Fujita, N., Hiroe, M., Ohta, Y., Horie, T. and Hosoda, S. 1991. Chronic effects of metoprolol on myocardial beta-adrenergic receptors in doxorubicin-induced cardiac damage in rats. J. Cardiovasc. Pharmacol. 17: 656-661.
- Fukuda, F., Kitada, M., Horie, T. and Awazu, S. 1992. Evaluation of adriamycin-induced lipid peroxidation. Biochem. Pharmacol. 44: 755-760.
- Fulkerson, P.K., Talley, R., Kleinman, D., Weaver, S.K., Leier, C.V., Balcerzak, S.P. and Lewis, R.P. 1978. Noninvasive profile in the prospective monitoring of adriamycin cardiomyopathy. Cancer. Treat. Rep. 62: 881-886.
- Gewirtz, D.A. 1999. A critical evaluation of the mechanisms of action proposed for the antitumor effects of the anthracycline antibiotics adriamycin and daunorubicin. Biochem. Pharmacol. 57: 727-741.

- Gianni, L., Zweier, J., Levy, A. and Myers, C.E. 1985. Characterization of the cycle of iron-mediated electron transfer from adriamycin to molecular oxygen. J. Biol. Chem. 260: 6820-6826.
- Glazer, R.I., Hartmann, K.D. and Richardson, C.L. 1982. Cytokinetic and biochemical effects of 5-iminodaunorubicin in human colon carcinoma in culture. Cancer. Res. 42: 117-121.
- Glisson, B.S., Killary, A.M., Merta, P., Ross, W.E., Siciliano, J. and Siciliano, M.J. 1992. Dissociation of cytotoxicity and DNA cleavage activity induced by topoisomerase II-reactive intercalating agents in hamster-human somatic cell hybrids. Cancer. Chemother. Pharmacol. 31: 131-138.
- Goodman, J. and Hochstein, P. 1977. Generation of free radicals and lipid peroxidation by redox cycling of adriamycin and daunomycin. Biochem. Biophys. Res. Commun. 77: 797-803.
- Goormaghtigh, E. and Ruyschaert, J.M. 1984. Anthracycline glycoside-membrane interactions. Biochem. Biophys. Acta. 779: 271-288.
- Gosalvez, M., Van Rossum, G.D.V. and Blanco, M.F. 1979. Inhibition of sodium-potassium-activated adenosine 5'-triphosphatase and ion transport by adriamycin. Cancer. Res. 39: 257-261.
- Graham, M.A., Newell, D.R., Butler, J., Hoey, B. and Patterson, L.H. 1987. The effect of the anthrapyrazole antitumour agent C1941 on rat liver microsome and cytochrome P-450 reductase mediated free radical processes. Inhibition of doxorubicin activation in vitro. Biochem. Pharmacol. 36: 3345-3351.
- Hagane, K., Akera, T. and Berlin, J.R. 1988. Doxorubicin: Mechanism of cardiodepressant actions in guinea pigs. J. Pharmacol. Exp. Ther. 246: 655-661.
- Hajdu, S. 1969. Mechanism of the Woodworth staircase phenomenon in heart and skeletal muscle. Am. J. Physiol. 216: 206-214.

- Hamlin, R.L. 1999. Pathophysiology of the failing heart. In P.R. Fox, D. Sisson and N.S. Moise (eds.), Textbook of canine and feline cardiology, 2 nd ed. pp. 205-206. Philadelphia: W.B. Saunders Company.
- Haq, M.M., Legha, S.S., Choksi, J., Hortobagyi, G.N., Benjamin, R.S., Ewer, M. and Ali, M. 1985. Doxorubicin-induced congestive heart failure in adults. Cancer. 56: 1361-1365.
- Hara, Y., Temma, K., Sekiya, Z., Chugun, A. and Kondo, H. 2000. Molecular mechanism of doxorubicin-induced anticholinergic effect in guinea-pig atria. Can. J. Physiol. Pharmacol. 78: 483-489.
- Hasinoff, B.B. 1994. Pharmacodynamics of the hydrolysis-activation of the cardioprotective agent (+)-1,2-bis(3,5-dioxopiperazinyl-1-yl)propane. J. Pharm. Sci. 83: 64-67.
- Herman, E.H., el-Hage, A.N., Ferrans, V.J. and Ardalan, B. 1985. Comparison of the severity of the chronic cardiotoxicity produced by doxorubicin in normotensive and hypertensive rats. Toxicol. Appl. Pharmacol. 78: 202-214.
- Herman, E.H. and Ferrans, V.J. 1998. Preclinical animal models of cardiac protection from anthracycline-induced cardiotoxicity. Semin. Oncol. 25: 15-21.
- Hofling, B. and Bolte, H.D. 1981. Acute negative inotropic effect of adrimycin (doxorubicin). Naunyn-Schmiedeberg's Arch. Pharmacol. 317: 252-256.
- Holmberg, S.R. and Williams, A.J. 1990. Patterns of interaction between anthraquinone drugs and the calcium-release channel from cardiac sarcoplasmic reticulum. Circ. Res. 67: 272-283.
- Hoyano, Y., Furukawa, Y., Oguchi, T., Kasama, M., Imamura, H. and Chiba, S. 1996. Acute presynaptic inhibition by doxorubicin of negative chrono- and inotropic responses to parasympathetic nerve stimulation in isolated, blood-perfused dog atrium. J. Cardiovasc. Pharmacol. 27: 37-41.
- Hu, S.T., Brandle, E. and Zhinden, G. 1983. Inhibition of cardiotoxic, nephrotoxic and neurotoxic effects of doxorubicin by ICRF-159. Pharmacology. 26: 210-220.

- Iliskovic, N. and Singal, P.K. 1997. Lipid lowering: an important factor in preventing adriamycin-induced heart failure. Am. J. Pathol. 150: 727-734.
- Imondi, A.R., Della, T.P., Mazue, G., Sullivan, T.M., Robbins, T.L., Hagerman, L.M., Podesta, A. and Pincioli, G. 1996. Dose-response relationship of dexrazoxane for prevention of doxorubicin-induced cardiotoxicity in mice, rats and dogs. Cancer. Res. 56: 4200-4204.
- Ito, H., Miller, S.C., Billingham, M.E., Akimoto, H., Torti, S.V., Wade, R., Gahlmann, R., Lyons, G., Kedes, L. and Torti, F.M. 1990. Doxorubicin selectively inhibits muscle gene expression in cardiac muscle cells in vivo and in vitro. Proc. Natl. Acad. Sci. U.S.A. 87: 4275-4279.
- Jensen, R.A. 1986. Doxorubicin cardiotoxicity: contractile changes after long-term treatment in the rat. J. Pharmacol. Exp. Ther. 236: 197-203.
- Kim, D.H., Akera, T. and Brody, T.M. 1980. Inotropic actions of doxorubicin in isolated guinea-pig atria: evidence for lack of involvement of Na⁺, K⁺-adenosine triphosphatase. J. Pharmacol. Exp. Ther. 214: 368-374.
- Kim, D.H., Landry, A.B., Lee, Y.S. and Katz, A.M. 1989. Doxorubicin-induced calcium release from cardiac sarcoplasmic reticulum vesicles. J. Mol. Cell. Cardiol. 21: 433-6.
- Kusuoka, H., Futaki, S., Koretsune, Y., Kitabatake, A., Suga, H., Kamada, T. and Inoue, M. 1991. Alterations of intracellular calcium homeostasis and myocardial energetics in acute adriamycin-induced heart failure. J. Cardiovasc. Pharmacol. 18: 437-444.
- Langer, G.A. 1968. Ion fluxes in cardiac excitation and contraction and their relation to myocardial contractility. Physiol. Rev. 48: 708-757.
- Leandro, J., Dyck, J., Poppe, D., Shore, R., Airhart, C., Greenberg, M., Gilday, D., Smallhorn, J. and Benson, L. 1994. Cardiac dysfunction late after cardiotoxic therapy for childhood cancer. Am. J. Cardiol. 74: 1152-1156.
- Lefrak, E.A., Pitha, J., Rosenheim, S. and Gottlieb, J.A. 1973. A clinicopathologic analysis of adriamycin cardiotoxicity. Cancer. 32: 302-314.

- Legha, S.S., Benjamin, R.S., Mackay, B., Ewer, M., Wallace, S., Valdivieso, M. Rasmussen, S.L. Blumenschein, G.R. and Freireich, E.J. 1982. Reduction of doxorubicin cardiotoxicity by prolonged continuous intravenous infusion. Ann. Intern. Med. 96: 133-139.
- Lewis, W., Kleinerman, J. and Puzskin, S. 1982. Interaction of adriamycin in vitro with cardiac myofibrillar proteins. Circ. Res. 50: 547-553.
- Lipshultz, S.E., Colan, S.D., Gelber, R.D., Perez-Atayde, A.R., Sallan, S.E. and Sanders, S.P. 1991. Late cardiac effects of doxorubicin therapy for acute lymphoblastic leukemia in childhood. N. Engl. J. Med. 324: 808-815.
- Lipshultz, S.E., Lipsitz, S.R., Mone, S.M., Goorin, A.M., Sallan, S.E., Sanders, S.P., Orav, E.J., Gelber, R.D. and Colan, S.D. 1995. Female sex and drug dose as risk factors for late cardiotoxic effects of doxorubicin therapy for childhood cancer. N. Engl. J. Med. 332: 1738-1743.
- Lowry, O.H., Rosenbrough, N.J., Farr, A.L. and Randall, R.J. 1951. Protein measurements with the folin phenol reagent. J. Biol. Chem. 193: 265-275.
- Mettler, F.P., Young, D.M. and Ward, J.M. 1977. Adriamycin-induced cardiotoxicity (cardiomyopathy and congestive heart failure) in rats. Cancer. Res. 37: 2705-2713.
- Minow, R.A., Benjamin, R.S., Lee, E.T. and Gottlieb, J.A. 1978. QRS voltage change with adriamycin administration. Cancer. Treat. Rep. 62: 931-934.
- Munger, C., Ellis, A., Woods, K., Randolph, J., Yanovich, S. and Gewirtz, D. 1988. Evidence for inhibition of growth related to compromised DNA synthesis in the interaction of daunorubicin with H-35 rat hepatoma. Cancer. Res. 48: 2404-2411.
- Myers, C.E., McGuire, W.P., Liss, R.H., Ifrim, I., Grotzinger, K. and Young, R.C. 1977. Adriamycin, The role of lipid peroxidation in cardiac toxicity and tumor response. Science. 197: 165-167.
- Nayler, W.G. and Merrillees, N.C. 1971. Cellular exchange of calcium. In P. Harris and L.H. Opie (eds.), Calcium and the heart., pp. 24-65. New York: Academic Press.

- O'Bryan, R.M., Luce, J.K., Talley, R.W., Gottlieb, J.A., Baker, L.H. and Bonadonna, G. 1973. Phase II evaluation of adriamycin in human neoplasia. Cancer. 32:1-8.
- Ohhara, H., Kanaide, H. and Nakamura, M. 1981. A protective effect of coenzyme Q10 on the adriamycin-induced cardiotoxicity in the isolated perfused rat heart. J. Mol. Cell. Cardiol. 13: 741-752.
- Olson, R.D., Boerth, R.C., Gerber, J.G. and Nies, A.S. 1981. Mechanism of adriamycin cardiotoxicity: evidence for oxidative stress. Life. Sci. 29: 1393-1401.
- Olson, R.D., and Mushlin, P.S. 1990. Doxorubicin cardiotoxicity: analysis of prevailing hypotheses. F.A.S.E.B. J. 4: 3076-3086.
- Olson, H.M., Young, D.M., Prieur, D.J., LeRoy, A.F. and Reagan, R.L. 1974. Electrolyte and morphologic alterations of myocardium in adriamycin-treated rabbits. Am. J. Pathol. 77: 439-454.
- Ondrias, K., Borgatta, L., Kim, D.H. and Ehrlich, B.E. 1990. Biphasic effects of doxorubicin on the calcium release channel from sarcoplasmic reticulum of cardiac muscle. Circ. Res. 67: 1167-1174.
- Oster, M.W. and Rakowsky, T.J. 1981. Myocardial injury immediately following adriamycin administration. Med. Pediatr. Oncol. 9: 463-465.
- Pan, S.S., Pederson, L. and Bachur, N.R. 1980. Comparative flavoprotein catalysis of anthracycline antibiotic. Reductive cleavage and oxygen consumption. Mol. Pharmacol. 19: 184-186.
- Pappano, A.J. and Mubagwa, K. 1992. Actions of muscarinic agents and adenosine on the heart. In H.A. Fozzard, R.B. Jennings, E. Harber, A.M. Katz and H.E. Morgan (eds.), The heart and cardiovascular system, pp. 1765-1776. New York: Raven Press.
- Perkins, W.E., Schroeder, R.L., Carrano, R.A. and Imondi, A.R. 1982. Effect of ICRF-187 on doxorubicin-induced myocardial effects in the mouse and guinea pig. Br. J. Cancer. 46: 662-667.

- Pessah, I.S., Durie, E.L., Schiedt, M.J. and Zimanyi, I. 1990. Anthraquinone-sensitized Ca^{2+} release from rat cardiac sarcoplasmic reticulum: possible receptor-mediated mechanism of doxorubicin cardiomyopathy. Mol. Pharmacol. 37: 503-514.
- Pfaffinger, P.J., Martine, J.M., Hunter, D.D., Nathanson, N.M. and Hill, B. 1985. GTP-binding proteins couple cardiac muscarinic receptors to a K channel. Nature (Lond.). 317: 536-538.
- Politi, P.M., Rothlin, R.P. and Pinto, J.E.B. 1985. Acute effects of doxorubicin on chronotropic and inotropic mechanisms in guinea pig atria. Cancer. Treat. Rep. 69: 859-865.
- Praga, C., Beretta, G., Vigo, P.L., Lenaz, G.R., Pollini, C., Bonadonna, G., Canetta, R., Castellani, R., Villa, E., Gallagher, C.G., von Melchner, H., Hayat, M., Ribaud, P., De Wasch, G., Mattsson, W., Heinz, R., Waldner, R., Kolaric, K., Buehner, R., Ten Bokkel-Huyninck, W., Perevodchikova, N.I., Manziuk, L.A., Senn, H.J. and Mayr, A.C. 1979. Adriamycin cardiotoxicity: A survey of 1273 patients. Cancer. Treat. Rep. 63: 827-834.
- Pratt, C.B., Ransom, J.L. and Evans, W.E. 1978. Age-related adriamycin cardiotoxicity in children. Cancer. Treat. Rep. 62: 1381-1385.
- Rabkin, S.W., Otten, M. and Polimeni, P.I. 1983. Increased mortality with cardiotoxic doses of adriamycin after verapamil pretreatment despite prevention of myocardial calcium accumulation. Can. J. Physiol. Pharmacol. 61: 1050-1056.
- Rajagopalan, S., Politi, P., Sinha, B.K. and Myers, C.E. 1988. Adriamycin induced free radical formation in the perfused rat heart: Implications for cardiotoxicity. Cancer. Res. 48: 4766-4769.
- Ramachandran, C., Samy, T.S.A., Huang, X.L., Yuan, Z.K. and Krishan, A. 1993. Doxorubicin-induced DNA breaks, topoisomerase II activity and gene expression in human melanoma cells. Biochem. Pharmacol. 45: 1367-1371.

- Rasmussen, I.M., Schou, H.S. and Hermansen, K. 1989. Cardiotoxic effects and the influence on the beta-adrenoceptor function of doxorubicin (Adriamycin) in the rat. Pharmacol. Toxicol. 65: 69-72.
- Robison, T.W. and Giri, S.N. 1986. Effects of chronic administration of doxorubicin on myocardial beta-adrenergic receptors. Life. Sci. 39: 731-736.
- Rosalki, S.B. 1967. An improved procedure for serum creatine phosphokinase determination. J. Lab. Clin. Med. 69: 696-705.
- Shan, K., Lincoff, A.M. and Young, J.B. 1996. Anthracycline-induced cardiotoxicity. Ann. Intern. Med. 125: 47-58.
- Shenasa, H., Calderone, A., Vermeulen, M., Paradis, P., Stephens, H., Cardinal, R., De Champlain, J. and Rouleau, J.L. 1990. Chronic doxorubicin induced cardiomyopathy in rabbits: mechanical, intracellular action potential, and β adrenergic characteristics of the failing myocardium. Cardiovasc. Res. 24: 591-604.
- Singal, P.K., Deally, C.M. and Weinberg, L.E. 1987. Subcellular effects of adriamycin in the heart: a concise review. J. Mol. Cell. Cardiol. 19: 817-828.
- Singal, P.K. and Pierce, G.N. 1986. Adriamycin stimulates low-affinity Ca^{2+} binding and lipid peroxidation but depresses myocardial function. Am. J. Physiol. 250: H419-H425.
- Singal, P.K., Siveski-Iliskovic, N., Hill, M., Thomas, T.P. and Li, T. 1995. Combination therapy with probucol prevents adriamycin-induced cardiomyopathy. J. Mol. Cell Cardiol. 27: 1055-1063.
- Sinha, B.K. 1989. Free radicals in anticancer drug pharmacology. Chem. Biol. Interact. 69: 293-317.
- Sinha, B.K., Trush, M.A., Kennedy, K.A. and Mimnaugh, E.G. 1984. Enzymatic activation and binding of adriamycin to nuclear DNA. Cancer. Res. 44: 2892-2896.

- Siveski, I.N., Hill, M., Chow, D.A. and Singal, P.K. 1995. Probuocol protects against adriamycin cardiomyopathy without interfering with its antitumor effect. Circulation. 91: 10-15.
- Siveski, I.N., Kaul, N. and Singal, P.K. 1994. Probuocol promotes endogenous antioxidants and provides protection against adriamycin-induced cardiomyopathy in rats. Circulation. 89: 2829-2835.
- Skladanowski, A and Konopa, J. 1993. Adriamycin and daunomycin induce programmed cell death (apoptosis) in tumour cells. Biochem. Pharmacol. 46: 375-382.
- Skladanowski, A. and Konopa, J. 1994. Relevance of interstrand DNA crosslinking induced by anthracyclines for their biologic activity. Biochem. Pharmacol. 47: 2279-2287.
- Sleator, W., Furchgott, R.F., Gubareff, T.D. and Krespi, V. 1964. Action potentials of guinea pig atria under conditions which alter contraction. Am. J. Physiol. 206: 270-282.
- Speyer, J. and Wasserheit, C. 1998. Strategies for reduction of anthracycline cardiac toxicity. Semin. Oncol. 25: 525-537.
- Steinberg, J.S., Cohen, A.J., Wasserman, A.G., Cohen, P. and Ross, A.M. 1987. Acute arrhythmogenicity of doxorubicin administration. Cancer. 60: 1213-1218.
- Steinherz, L.J., Graham, T., Hurwitz, R., Sondheimer, H.M., Schwartz, R.G., Shaffer, E.M., Sandor, G., Benson, L. and Williams, R. 1992. Guidelines for cardiac monitoring of children during and after anthracycline therapy: report of the cardiology committee of the childrens cancer study group. Pediatrics. 89: 942-949.
- Steinherz, L.J., Steinherz, P.G. and Tan, C. 1995. Cardiac failure and dysrhythmias 6-19 years after anthracycline therapy: a series of 15 patients. Med. Pediatr. Oncol. 24: 352-361.

- Steinherz, L.J., Steinherz, P.G., Tan, C.T., Heller, G. and Murphy, M.L. 1991. Cardiac toxicity 4 to 20 years after completing anthracycline therapy. J.A.M.A. 266: 1672-1677.
- Swain, S.M., Whaley, F.S., Gerber, M.C., Ewer, M.S., Bianchine, J.R. and Gams, R.A. 1997. Delayed administration of dexrazoxane provides cardioprotection for patients with advanced breast cancer treated with doxorubicin-containing therapy. J. Clin. Oncol. 15: 1333-1340.
- Tan, C., Etcubanas, E., Wollner, N., Rosen, G., Gilladoga, A., Showel, J., Murphy, M.L. and Krakoff, I.H. 1973. Adriamycin-an antitumor antibiotic in the treatment of neoplastic diseases. Cancer. 52: 9-17.
- Tanaka, M. and Yoshida, S. 1980. Mechanism of the inhibition of calf thymus DNA polymerases a and b by daunomycin and adriamycin. J. Biochem. (Tokyo) 87: 911-918.
- Tausky, H.H. and Shorr, E. 1953. A microcolorimetric method for the determination of inorganic phosphorus. J. Biol. Chem. 202: 675-685.
- Temma, K., Akera, T., Chugun, A., Kondo, H., Hagane, K. and Hirano, S. 1993. Comparison of cardiac actions of doxorubicin, pirarubicin and aclarubicin in isolated guinea-pig heart. Eur. J. Pharmacol. 234: 173-181.
- Temma, K., Akera, T., Chugun, A., Ohashi, M., Yabuki, M. and Kondo, H. 1992. Doxorubicin: an antagonist of muscarinic receptors in guinea pig heart. Eup. J. Pharmacol. 220:63-69.
- Tong, J., Ganguly, P.K. and Singal, P.K. 1991. Myocardial adrenergic changes at two stages of heart failure due to adriamycin treatment in rats. Am. J. Physiol. 260: H909-916.
- Tritton, T.R. and Yee, G. 1982. The anticancer agent adriamycin can be actively cytotoxic without entering cells. Science. 217: 248-250.
- Tuteja, N., Phan, T.N., Tuteja, R., Ochem, A. and Falaschi, A. 1997. Inhibition of DNA unwinding and ATPase activities of human DNA helicase II by chemotherapeutic agents. Biochem. Biophys. Res. Commun. 236: 636-640.

- Van Acker, S.A., Kramer, K., Voest, E.E., Grimbergen, J.A., Zhang, J., Van Der Vijgh, W.J. and Bast, A. 1996. Doxorubicin-induced cardiotoxicity monitored by ECG in freely moving mice. A new model to test potential protectors. Cancer Chemother. Pharmacol. 38: 95-101.
- Van Boxtel, C.J., Olson, R.D., Boerth, R.C. and Oates, J.A. 1978. Doxorubicin: inotropic effects and inhibitory action on ouabain. J. Pharmacol. Exp. Ther. 207: 277-283.
- Vichi, P., Robison, S. and Tritton, T.R. 1989. Temperature dependence of adriamycin-induced DNA damage in L1210 cells. Cancer. Res. 49: 5575-5580.
- Viglione, P.N., Praprotnik, A., Politi, P.M. and Pinto, J.E. 1992. Comparison of acute effects of mitoxantrone and doxorubicin in guinea-pig atria. Gen. Pharmacol. 23: 873-879.
- Voest, E.E., Van Acker, S.A., Van Der Vijgh, W.J., Van Asbeck, B.S. and Bast, A. 1994. Comparison of different iron chelators as protective agents against acute doxorubicin-induced cardiotoxicity. J. Mol. Cell. Cardiol. 26: 1179-1185.
- Von Hoff, D.D., Layard, M.W., Basa, P., Davis, H.L., Jr., Von Hoff, A.L., Rozenzweig, M. and Muggia, F.M. 1979. Risk factors for doxorubicin-induced congestive heart failure. Ann. Intern. Med. 91: 710-717.
- Von Hoff, D.D., Rosencweig, M and Piccart, M. 1982. The cardiotoxicity of anticancer agents. Semin. Oncol. 9: 23-33.
- Wang, Y.X. and Korth, M. 1995. Effects of doxorubicin on excitation-contraction coupling in guinea pig ventricular myocardium. Circ. Res. 76: 645-653.
- Wasserman, K., Zwelling, L.A., Mullins, T.D., Silberman, L.E., Andersson, B.S., Bakic, M., Acton, E.M. and Newman, R.A. 1986. Effects of 3'-deamino-3'-(3-cyano-4-morpholinyl) doxorubicin and doxorubicin on the survival, DNA integrity, and nucleolar morphology of human leukemia cells in vitro. Cancer. Res. 46: 4041-4046.
- Watanabe, T. and Kishikawa, Y. 1998. Degradation of myocardiac myosin and creatine kinase in rats given alkaline ionized water. J. Vet. Med. Sci. 60: 245-250.

- Wortman, J.E., Lucas, V.S., Jr., Schuster, E., Thiele, D. and Logue, G.L. 1979. Sudden death during doxorubicin administration. Cancer. 44: 1588-1591.
- Yeung, S.T., Yoong, C., Spink, J., Galbraith, A. and Smith, P.J. 1991. Functional myocardial impairment in children treated with anthracyclines for cancer. Lancet. 337: 816-818.
- Zorzato, F., Margreth, A. and Volpe, P. 1986. Direct photoaffinity labeling of junctional sarcoplasmic reticulum with [¹⁴C] doxorubicin. J. Biol. Chem. 261: 13252-13257.
- Zweier, J.L. 1984. Reduction of O₂ by iron-adriamycin. J. Biol. Chem. 259: 6056-6058.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

BIOGRAPHY

Miss Sukullaya Assarasakorn was born on January 19, 1977 in Bangkok, Thailand. She graduated from the Faculty of Veterinary Science, Chulalongkorn University. She received the degree of Doctor of the Veterinary Medicine in 2001.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย